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FRENALD ENVIRONMENTAL MANAGEMENT PROJECT - 1995 STACK TEST REPORTS - LAUNDRY CONTAMINATED CLOTHING DRYERS AND THE EAST OLIVER FILTER NASH VACUUM PUMP

05/30/96

C:EC:96-0076
FERMCO USEPA
500
REPORTS

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Fernald Environmental

FERMCO

estoration Management Corporation P. O. Box 538704 Cincinnati, Ohio 45253-8704 (513) 648-3000

May 30, 1996

Fernald Environmental Management Project
Letter No. C:EC:96-0076

Mr. David A. Kee, Director
Air & Radiation Division
United States Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604-3590

Dear Mr. Kee:

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT - 1995 STACK TEST REPORTS - LAUNDRY CONTAMINATED CLOTHING DRYERS AND THE EAST OLIVER FILTER NASH VACUUM PUMP

Enclosed are the 1995 stack test reports for the periodic confirmatory testing of the Laundry Contaminated Clothing Dryers and the East Oliver Filter Nash Vacuum Pump. Submission of these reports to your office is pursuant to Clean Air Act, paragraph D of the 1986 Federal Facilities Compliance Agreement. The stack test results confirm the estimated low levels of emissions as required by 40 CFR 61.93(b)(4)(i), and also verify that the sources are being operated in compliance with their respective permits.

If you have any questions regarding these stack tests, please call Tim Miller of my staff at (513) 648-4198.

Sincerely,

Terence D. Hagen
Director
Environmental Compliance

TDH:TEM:mhv
Enclosures

c: Without Enclosures

S. M. Beckman, FERMCO
K. O. Klee, FERMCO
T. E. Miller, FERMCO
E. P. Skintik, DOE-FN

With Enclosures

AR Coordinator, 4578
AW&P Files
File Record Storage Copy 108.14

COMPLIANCE EMISSIONS TEST REPORT DETERMINATION OF PARTICULATE, RADIONUCLIDES, AND TOTAL URANIUM EMISSIONS FROM THE EAST OLIVER FILTER NASH VACUUM PUMP (EMISSION POINT # EP8-013) FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION CINCINNATI, OHIO

HAYDEN ENVIRONMENTAL GROUP, INC.

Health & Safety Division

561 Congress Park Drive, Dayton, Ohio 45459, USA•(513) 438-3010•(800) 282-8043•FAX (513) 438-3020

COMPLIANCE EMISSIONS TEST REPORT DETERMINATION OF PARTICULATE, RADIONUCLIDES, AND TOTAL URANIUM EMISSIONS FROM THE EAST OLIVER FILTER NASH VACUUM PUMP (EMISSION POINT # EP8-013) FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION CINCINNATI, OHIO

prepared for

FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION
P.O. Box 398704
Cincinnati, Ohio 45239-8704

prepared by:

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561 Congress Park Drive
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Written By:
Bruce A. Sarven
Project Manager
Emissions Measurements Division

Reviewed By:
Bert G. Forsyth
Group Leader
Emissions Measurement Division

P.N. A95010
July 13, 1995

HAYDEN ENVIRONMENTAL GROUP, INC.

Executive Summary

Hayden Environmental Group, Inc. was retained by Fernald Environmental Restoration Management Corporation to determine the particulate, radionuclide, and total uranium emission rates of the East Oliver Filter Nash Vacuum Pump exhaust at their Ross, Ohio facility. The evaluation was performed to demonstrate compliance with Ohio Environmental Protection Agency regulations restricting emissions from stationary sources. Emission samples were collected and analyzed using USEPA Reference Methods for stationary source sampling. The tests were conducted on May 10, 1995. The results of the tests are summarized below:

Summary of East Oliver Filter Nash Vacuum Pump Emissions

Compound	Emission Rate (lb/hr)[a]
Total Particulate	5.00E-03
Total Uranium	4.48E-04

Compound	Emission Rate (ρci/hr)[b]
Gross Alpha	570 with 106 std. dev.
Gross Beta	271 with 100 std. dev.

[a] pounds per hour
[b] picocuries per hour

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1.0 Introduction

Hayden Environmental Group, Inc. was retained by Fernald Environmental Restoration Management Corporation (FERMCO) to perform a compliance particulate, radionuclide, and total uranium emissions evaluation on the East Oliver Filter Nash Vacuum Pump exhaust at their Ross, Ohio facility. The evaluation was performed on May 10, 1995. A single test run was conducted using USEPA Reference Methods 1, 2, 3, 4, 5, and 114. Mr. Tim Miller of FERMCO coordinated the test schedule with plant operations. The emission tests were performed by the Hayden test team of Mr. Bruce Sarven and Mr. Bert Forsyth. The emission samples were analyzed by DataChem Laboratories located in Salt Lake City, Utah.

2.0 Process Description

The East Oliver Filter is used to filter sump liquor or sump water. The soap liquor and slop water feeds are neutralized with lime then passed through the Oliver Filter at a rate of 2,000 gallons per hour. The oliver filter is a rotary vacuum filter precoated with dicalite (diatomaceous earth).

The Nash vacuum pump produces the vacuum that moves the feed liquor or water through the Oliver filter. The vacuum pump is equipped with moisture separation systems which reduce the amount of water vapor discharged to the atmosphere. The discharged water vapor can contain radioactive (primarily uranium) compounds, lime, and other miscellaneous solids filtered from the liquor/slurry feed.

3.0 Sampling Site Description

The emissions from the East Oliver Filter are vented through a 10 inch diameter circular stack. Two sampling ports were located at 90° angles from each other. The sampling ports were located 84 inches or 8.4 stack diameters downstream from the last flow disturbance (elbow) and 37 inches or 3.7 stack diameters upstream from the next flow disturbance (elbow). A drawing of the sampling site is provided in Figure 3.1.

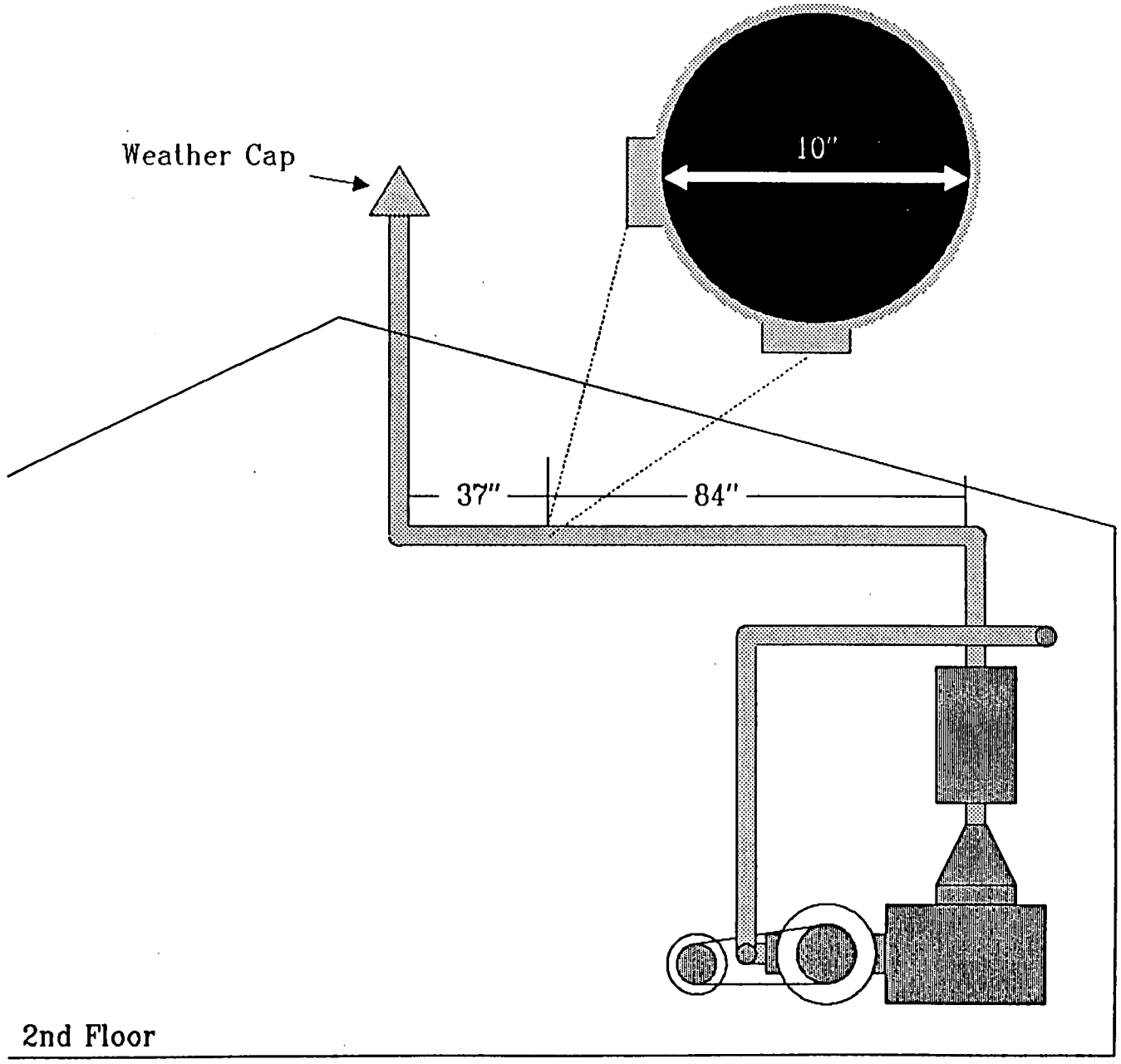

Figure 3.1 Sample Site Detail

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4.0 Sampling and Analytical Procedures

The sampling and analytical procedures conformed to the most recent revisions of USEPA Reference Methods for stationary sources. Specifically, USEPA Reference Methods 1, 2, 3, 4, 5, and 114 were used. A brief description of each procedure is included below:

4.1 Measurement Sites (USEPA Method 1A)

The location of measurement sites and the number of traverse points were determined using USEPA Reference Method 1A, "Sample and Velocity Traverses for Stationary Sources with Small Stacks or Ducts."

4.2 Velocities and Volumetric Flow Rates (USEPA Method 2C)

The stack gas velocity and volumetric flow rates were determined using USEPA Reference Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate in Small Stack or Ducts (Standard Pitot Tube)." The stack gas velocity was measured on a Dwyer oil filled manometer using a calibrated S-type pitot tube. The stack gas temperature was measured with a calibrated type "K" thermocouple and Omega digital temperature readout.

4.3 Dry Molecular Weight (USEPA Method 3)

The stack gas dry molecular weight was determined using USEPA Reference Method 3, "Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight." Several grab samples were collected and analyzed during each test with Fyrite combustion gas analyzers which directly measure concentrations of O_2 and CO_2.

4.4 Moisture (USEPA Method 4)

The stack gas moisture content was determined using USEPA Reference Method 4, "Determination of Moisture Content in Stack Gases." The samples were collected in a series of chilled impingers. The moisture collected within the impingers was analyzed by gravimetric analysis.

4.5 Particulate Matter (USEPA Method 5C)

The particulate emissions were determined using USEPA Reference Method 5C, "Determination of Particulate Emissions from Stationary Sources with Small Stacks or Ducts." The samples were collected isokinetically from a single representative point through a heated glass lined probe, a heated (248°+/-25°) tared glass fiber filter, and a series of cooled impingers (to condense the moisture). The nozzle, probe, and glassware before the filter was rinsed and brushed with acetone. The acetone rinse was placed in a tare-weighed beaker. The contents of the impingers were collected and all of the glassware behind the filter was rinsed with deionized water. The DI rinse was collected in a separate tare-weighed beaker. The acetone and DI water were both evaporated at temperatures below their boiling points. The filter and acetone residue were analyzed by gravimetric analysis to determine the filterable particulate mass collected. The DI water residue was analyzed by gravimetric analysis to determine the condensible particulate mass collected. The total particulate was obtained by adding the filterable and condensible particulate emission rates. A drawing of the particulate sampling train is provided in Figure 4.1.

4.6 **Radionuclide and Total Uranium (USEPA M-114)**

The Radionuclide and total uranium emissions were determined using USEPA Reference Method 114, "Test Methods for Measuring Radionuclide Emissions from Stationary Sources." The radionuclide analysis was performed on the total particulate. The uranium was dissolved, oxidized to the hexavalent state, and extracted using a suitable solvent. The samples were analyzed for total uranium by colorimetry (Method A-5) and laser phosphoremetry. The total gross alpha activity was determined using an alpha counter (Method A-4). The total gross beta activity was determined using a beta counter (Method B-4). The total gamma isotopic activity was determined using a high resolution gamma detector (Method G-1).

The Hayden Environmental Group Inc. Air Sampling Quality Assurance Program includes procedures for equipment calibration that follow USEPA and manufacturers guidelines, use of and strict adherence to standard published procedures, and traceability protocols for the recording and calculation of data.

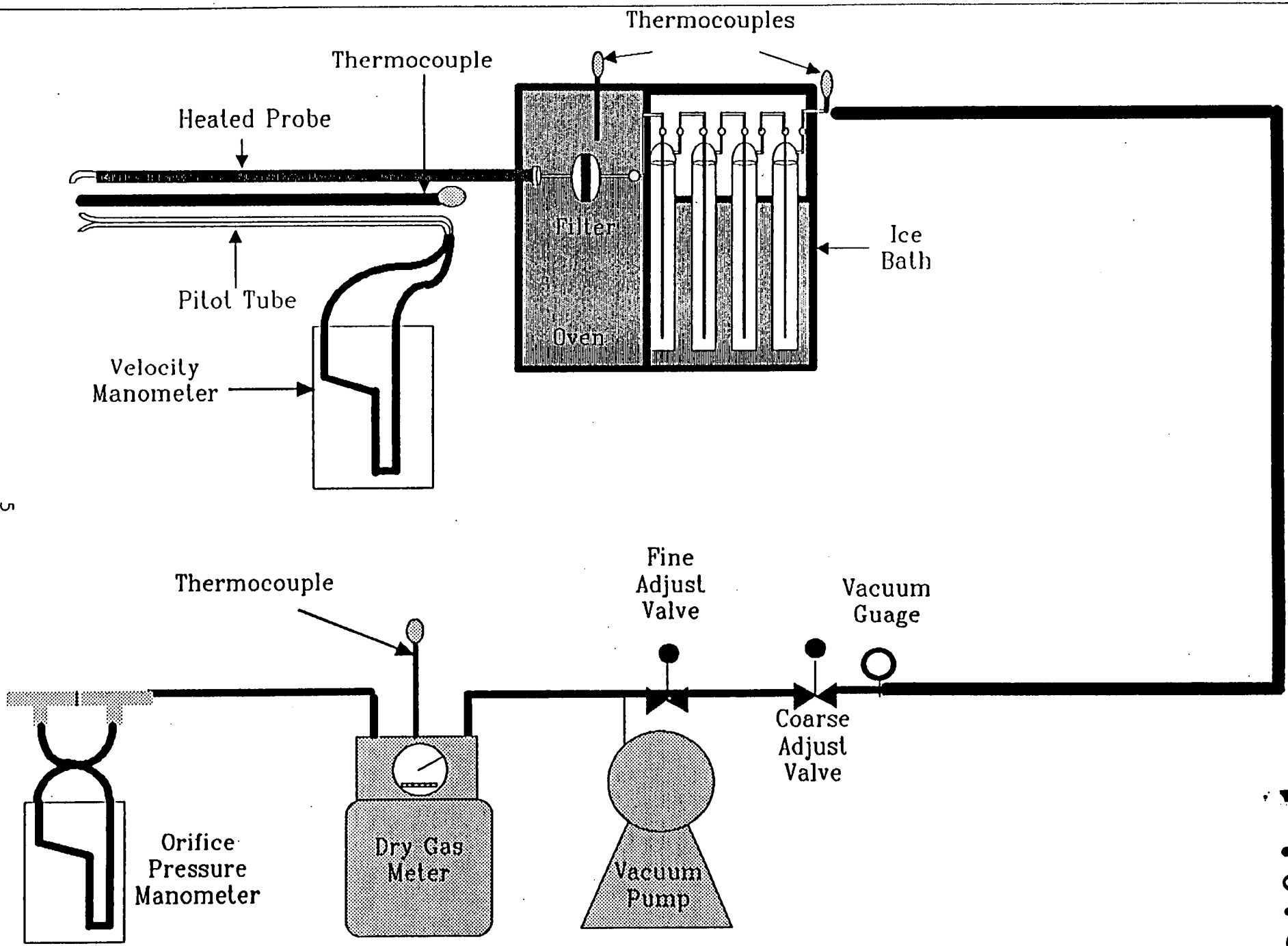

Figure 4.1 Particulate Sampling Train

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5.0 Test Results

Table 5.1 summarizes the East Oliver Filter Nash Vacuum Pump exhaust stack gas conditions. The stack gas velocity averaged 12.8 feet per second (fps). The volumetric flow rate averaged 418 actual cubic feet per minute (acfm) or 351 dry standard cubic feet per minute (dscfm) at 124°F. The stack gas concentration of oxygen and carbon dioxide were 21.0% and 0.0%, respectively.

Table 5.2 summarizes the East Oliver Filter Nash Vacuum Pump exhaust particulate emissions. The average stack gas filterable particulate concentration was 7.87E-04 grains per dry standard cubic feet (gr/dscf) or 1.12E-07 pounds per dry standard cubic foot (lb/dscf). The filterable particulate emission rate averaged 2.37E-03 pounds per hour (lb/hr). The average stack gas condensible particulate concentration was 8.72E-04 gr/dscf or 1.25E-07 lb/dscf. The condensible particulate emission rate averaged 2.63E-03 lb/hr. The average total particulate emission rate was 5.00E-03 lb/hr.

Table 5.3 summarizes the East Oliver Filter Nash Vacuum Pump exhaust total uranium emissions. The average stack gas uranium concentration was 3.40E-01 milligrams per cubic meter (mg/m^3) or 2.12E-08 lb/dscf. The uranium emission rate averaged 4.48E-04 lb/hr.

Table 5.4 summarizes the East Oliver Filter Nash Vacuum Pump exhaust gross alpha radionuclide emissions. The average stack gas gross alpha concentration was 2.70E-02 picocuries per dry standard cubic foot (ρci/dscf) with a standard deviation of 5.02E-03 ρci/dscf. The gross alpha emission rate averaged 570 picocurries per hour (ρci/hr) with a standard deviation of 106 ρci/hr.

Table 5.5 summarizes the East Oliver Filter Nash Vacuum Pump exhaust gross beta radionuclide emissions. The average stack gas gross beta concentration was 1.29E-02 ρci/dscf with a standard deviation of 4.76E-03 ρci/dscf. The gross beta emission rate averaged 271 ρci/hr with a standard deviation of 100 ρci/hr.

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Table 5.1 Summary of East Oliver Filter Nash Vacuum Pump Exhaust Stack Gas Conditions

Run No.	Date Time	Velocity (fps)[a]	Air Flow (acfm)[b]	Air Flow (dscfm)[c]	Temp. (°F)[d]	Moisture (%)	Oxygen (%)	Carbon Dioxide (%)
EO-1	5/10/95 0924-1433	12.8	418	351	124	5.0[e]	21.0	0.0

[a] feet per second
[b] actual cubic feet per minute
[c] dry standard cubic feet per minute
[d] degrees Fahrenheit
[e] The moisture was estimated to be 5.0%. An explanation is provided in Section 6.0 "Discussion and Interpretation."

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Table 5.2 Summary of East Oliver Filter Nash Vacuum Pump Exhaust Particulate Emissions

Run No.	Date Time	Filterable Particulate			Condensible Particulate			Total Particulate Emission Rate (lb/hr)[c]
		Concentration		Emission Rate (lb/hr)[c]	Concentration		Emission Rate (lb/hr)[c]	
		(gr/dscf)[a]	(lb/dscf)[b]		(gr/dscf)[a]	(lb/dscf)[b]		
EO-1	5/10/95 0924-1433	7.87E-04	1.12E-07	2.37E-03	8.72E-04	1.25E-07	2.63E-03	5.00E-03

[a] grains per dry standard cubic foot
[b] pounds per dry standard cubic foot
[c] pounds per hour

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Table 5.3 Summary of East Oliver Filter Nash Vacuum Pump Exhaust Total Uranium Emissions

Run No.	Date Time	Concentration		Emission Rate (lb/hr)[c]
		(mg/m^3)[a]	(lb/dscf)[b]	
EO-1	5/10/95 0924-1433	3.40E-01	2.12E-08	4.48E-04

[a] milligrams per cubic meter
[b] pounds per dry standard cubic foot
[c] pounds per hour

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Table 5.4 Summary of East Oliver Filter Nash Vacuum Pump Exhaust Gross Alpha Emissions

Run No.	Date Time	Concentration			Emission Rate		
		Measured Concentration (ρci/dscf)[a]	Standard Deviation (ρci/dscf)[a]	Concentration Range (ρci/dscf)[a]	Measured Emission Rate (ρci/hr)[b]	Standard Deviation (ρci/hr)[b]	Emission Rate Range (ρci/hr)[b]
EO-1	5/10/95 0924-1433	1.29E-02	5.02E-03	7.88E-03 to 1.79E-02	570	106	464 to 676

[a] picocuries per dry standard cubic foot
[c] picocuries per hour

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Table 5.5 Summary of East Oliver Filter Nash Vacuum Pump Exhaust Gross Beta Emissions

Run No.	Date Time	Concentration			Emission Rate		
		Measured Concentration (ρci/dscf)[a]	Standard Deviation (ρci/dscf)[a]	Concentration Range (ρci/dscf)[a]	Measured Emission Rate (ρci/hr)[b]	Standard Deviation (ρci/hr)[b]	Emission Rate Range (ρci/hr)[b]
EO-1	5/10/95 0924-1433	1.29E-02	4.76E-03	8.14E-03 to 1.77E-02	271	100	171 to 371

[a] picocuries per dry standard cubic foot
[c] picocuries per hour

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6.0 Discussion and Interpretation

One of the sampling ports was not accessible during the test. The sampling port was sealed shut and could not be opened. Therefore the air flow measurements were performed on only one sampling port.

The filtration system shut down before a post-test air flow measurement could be performed. Both a pre-test and a post-test air flow are required to be performed and averaged together for USEPA Reference Method 5C calculations. Since the process is considered to be steady state and the post-test air flows were not representative, the pre-test air flow was used to calculate the air flows and emission rates.

The silica gel impinger was broken sometime between the end of the sample run and the beginning of the sample recoveries. The broken impinger had no effect on the integrity of the sample, However, it made calculating a stack gas moisture impossible. Therefore an estimate of the stack gas moisture was used to calculate the air flows.

The negative weight was recorded for the filter catch. It is not uncommon for the net weight change of the particulate filter to be negative on sources with very low particulate loadings. The filter edge is typically partially damaged by normal use in a Method 5 sampling train. When the filter is recovered, the loose filter material from the edge of the filter holder and frit are also recovered with the filter to the extent possible. Following recovery of the filter, the filter holder and frit are brushed and rinsed with acetone to recover any particulate and filter residue that could not be recovered by physical means. This portion of the particulate is included in the acetone rinse fraction. The portion of filter material not recovered with the filter fraction is reflected in the weight gain of the acetone rinse. The sample from this test run showed a positive <u>total</u> particulate weight gain.

APPENDIX A

FIELD DATA

METHOD 1 TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Client: FEMCO PN: A8E910 Date: 5/10/95
Source: EAST OLIVER PUMP Site: EXHAUST

INSIDE OF FAR WALL TO OUTSIDE OF NIPPLE: ~13"

INSIDE OF NEAR WALL TO OUTSIDE OF NIPPLE: ~3'

STACK I.D.: 10"

NEAREST UPSTREAM DISTURBANCE: 37" (3.7 DIA)

NEAREST DOWNSTREAM DISTURBANCE: ~64' (6.4 DIA)

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D. (Y)	STACK DIAMETER (D)	(Y) x (D)	NIPPLE DEPTH	TRAVERSE POINT LOCATION
1	0.067	10	0.670	NA	0.670
2	0.250	↓	2.50	↓	2.50
3	0.750	↓	7.50	↓	7.50
4	0.933	↓	9.33	↓	9.33

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METHOD 2 VELOCITY FIELD DATA

Client: FERMCO
Project Number: A95010
Date: 5/10/95
Source: EAST OLIVER
Site: VACUUM PUMP EXHAUST
Run: EO-1 PRE
Operators: BI, BT
Barometric Pressure: 29.30
Static Pressure: -0.05

Pitot Tube I.D.: 3A
Thermocouple I.D.: 5N
Pre-Test Leak Check: ✓
Post-Test Leak Check: ✓
Stack I.D.: 104

METHOD 4 DATA

Wet Bulb Thermocouple I.D.:
Dry Bulb Thermocouple I.D.:
Temperatures (°F); Wet: Dry:

Traverse Point #	Δ P ("H_2O)	Stack Temp. (°F)	Traverse Point #	Δ P ("H_2O)	Stack Temp. (°F)
1	0.04	124			
2	0.05	125		OTHER	
3	0.05	125		PORT	
4	0.04	123		WAL	
				NOT	
				ACCESSIBLE	

O_2:
CO_2:
Bws:
Δ P:
√ Δ P: 0.2148
Ts: 124.3
Vs:
Qa:
Qstd:

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EMISSION TESTING FIELD DATA

Client: FERRCO
PN: A95010
Date: 5/10/95
Source: EAST OLIVES
Site: VACUUM PUMP EXHAUST
Sample Type: M-5, M-114
Run: EO-2
Operators: BL, BE
Barometric Pressure (Pb): 29.30
Static Pressure (Pg): -0.05

Meter Box #: N-3
Sample Box #: 5
Filter #: 000229
Probe Length/Type: 3' GLASS
Stack Thermocouple #: NA
Oven Thermocouple #: OV-5
Impinger Thermocouple #: I-1
Pitot Tube #: NA
Stack I.D.: 10"
Record Data Every 10 Minutes

Meter ΔH@: 1.951
Meter Y Factor: 0.9988
C Factor: 1.1
Reference ΔP: 0.029
Nozzle I.D.: _ _ _ Avg. 0.498
Pre-Test Leak Rate: 0.010 cfm@ 10 "Hg
Post-Test Leak Rate: 0.018 cfm@ 4 "Hg
Pitot Tube Leak Check: Pre: NA Post: NA
Orsat Train Leak Check: Pre: NA Post: NA
Page 1 of 2

Traverse Point Number	Sampling Time (min)	Clock Time (hr)	Meter Reading (cu ft.)	Velocity Pressure ΔP ("H2O)	Orifice Pressure ΔH@ ("H2O) Desired	Orifice Pressure ΔH@ ("H2O) Actual	Train Vacuum ("Hg)	Temperatures (°F) Stack	Filter	Probe	IMP	Meter	
	0	0924	281.599										
C	10		290.625	NA	2.8	2.8	2.0	NA	235	70	67	77	75
G	20		299.840		2.8	2.8	2.0		228		66	86	75
N	30		308.859		2.8	2.8	2.0		228		63	92	80
T	40		317.590		2.6	2.8	2.0		229		63	93	81
E	50	Stop 1014	326.780		2.8	2.8	3.0		230		64	95	83
A	60	Start 10:18 1026	328.578 / 335.735		2.8	2.8	4.0		235		64	97	85
	70		344.905		2.8	2.8	2.0		252		68	88	82
	80		354.140		2.8	2.8	2.0		234		65	93	83
	90		363.310		2.8	2.8	2.0		233		66	96	85
	100		372.450		2.8	2.8	2.0		233		65	98	87
	110		381.640		2.8	2.8	2.0		234		65	100	89
	120		390.870		2.8	2.8	3.0		234		66	100	90
	130		400.085		2.8	2.8	3.0		234		66	103	91
	140		409.285		2.8	2.8	3.0		234		65	102	92

PROCESS DOWN FOR LUNCH 10:18
RESTART 1026

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EMISSION TESTING FIELD DATA

Client: FERMCO Run #: EO-1 Date: 5/10/95 Page 2 of 2

Traverse Point Number	Sampling Time (min)	Clock Time (hr)	Meter Reading (cu ft.)	Velocity Pressure ΔP ("H2O)	Orifice Pressure ΔH@ ("H2O) Desired	Orifice Pressure ΔH@ ("H2O) Actual	Train Vacuum ("Hg)	Temperatures (°F) Stack	Filter	Probe	IMP	Meter	
	140		408.285										
20	150		418.460	NA	2.80	2.80	3.0	NA	234	70%	65	103	93
	160		427.785		2.80	2.80	3.0		234		66	103	93
2	170		437.024		2.80	2.80	3.0		235		66	103	94
	180	1433	446.325		2.80	2.80	3.0		231		66	103	93
NATEN													
			164.726			2.80						91.2	
			JBJ			VAJ						VBJ	

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METHOD 2 VELOCITY FIELD DATA

Client: FEAMCO
Project Number: A25010
Date: 5/10/95
Source: EAST OLIVER
Site: VACUUM PUMP EXHAUST
Run: EO-1 PART
Operators: BS, BF
Barometric Pressure: 29.30
Static Pressure: -0.05

Pitot Tube I.D.: 3A
Thermocouple I.D.: 5N
Pre-Test Leak Check: ✓
Post-Test Leak Check: ✓
Stack I.D.: 10"

METHOD 4 DATA

Wet Bulb Thermocouple I.D.:
Dry Bulb Thermocouple I.D.:
Temperatures (°F); Wet: Dry:

Traverse Point #	Δ P ("H_2O)	Stack Temp. (°F)	Traverse Point #	Δ P ("H_2O)	Stack Temp. (°F)
1	0.20	85	NOT		
2	0.22	85	ACCESSIBLE		
3	0.20	85			
4	0.13	84			

O_2:
CO_2:
Bws:
Δ P:
$\sqrt{\Delta P}$: 0.4310
Ts: 84.8
Vs:
Qa:
Qstd:

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SAMPLE RECOVERY DATA

Client: FERMCO PN: A95010 Date: 5/4/95
Source: EAST OLIVER Site: VACUUM PUMP EXPANSION Run#: E0-1
Sample Date: 5/10/95 Recovery Date: 5/11/95

Filter No: 000229 Glassware Set No: _____ Sample Box No: 5

IMPINGER DATA

Gravimetric: ✓ Volumetric: _____

	#1	#2	#3	#4	#5	Total
Contents	100 ml DI H_2O	100 ml DI H_2O	Empty	Sil Gel		
Final						
Initial	536.7	573.8 g	461.1 g	603.6 g		
Net						

RECOVERED SAMPLE

Description of Particulate on Filter: WHITE NONE VISIBLE

Color of Silica Gel: 20% BLUE

Recovered By: BJ

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APPENDIX B

LABORATORY DATA

DATA CHEM
LABORATORIES
A SORENSON COMPANY

Case Narrative

Method: EPA Method 5, 40 CFR
Analysis: Particulates
DCL Set ID: S95-0498-BE

Client: Hayden Environmental Group, Inc.
Account: 3025
Matrix: Water/Acetone

General Set Information: There were eight field samples in this set.

Method Summary: The beakers were uniquely marked and rinsed with ASTM type II water, and then placed in a 180°C oven for at least one hour. The beakers were then placed in a desiccator for at least three hours before obtaining a tare weight. The corresponding entire sample was poured into each beaker, then rinsed well with ASTM type II water or acetone (as appropriate for each sample) to remove all dissolved solids. The water samples were placed in the 97°C oven to evaporate. The acetone samples were allowed to evaporate in a hood before being placed in the 97°C oven. The evaporated samples were dried at 103°C for at least an hour and transferred to a desiccator. After being in the desiccator for at least three hours, they were weighed again. The difference in weight is the result. Samples were weighed until two consecutive results showed a difference in weight of no more than 0.0004 gram.

Method and Sample QC data: LCS recovery was 97.4%. The method blank was below the CRDL.

MD Analysis: A matrix duplicate was not performed because all sample was consumed in the analysis.

Sample Calculation: The final results are calculated in mg/L. Example for sample EO 3872:

$$\frac{(81.6798\,g - 81.6629\,g) \times (1000\,mg/g)}{(0.154\,L)} = 109.7\,mg/L$$

Cynthia Adams 06/16/95
Cynthia Adams Date

This report is 116 total pages.

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DATA CHEM LABORATORIES
A Sorenson Company

COVER FORM (TYPE I)
SINGLE METHOD ANALYSES

SUMMARY INFORMATION

Form RLIMS63M-V1.0
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Page 1

G954P022

Date Reported.....:

Date Printed.....: 15-JUN-95 21:34
DCL Client Group..: S95-0498-BE

Client Ref Number.: Not Provided
Release Number....: Not Provided

Analysis Method...: EPA 5

Hayden Environmental Group, Inc.
Attention: David Robinson
561 Congress Park Drive
Dayton, OH 45459

Client Sample ID	Lab Sample ID
BL-57150-1	BL-57150-1
QC-57150-1	QC-57150-1
REAG BLK	EO 3869
REAG BLK	EO 3870
EO-1	EO 3872
EO-1	EO 3873
LO-1	EO 3875
LO-1	EO 3876
FLD BLK	EO 3879
FLD BLK	EO 3880

Cynthia Adams
Analyst: Cynthia Adams

Suzanne W. Bowe
Reviewer: Suzanne W. Bowe

Tim S. Mikesell
Laboratory Supervisor: Tim S. Mikesell

000027

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002

DATA CHEM LABORATORIES
A Sorenson Company

FORM H (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE GROUP COMMENTS

G954P022

Date Printed.....: 15-JUN-95 01:24
DCL Client Group..: 895-0498-BE

Client Name.....: Hayden Environmental Group, Inc.

Release Number....: Not Provided

General Information

The DCL QC Database maintains all numerical figures which are input from the pertinent data source. These data have not been rounded to significant figures nor have they been moisture corrected. Reports generated from the system, however, list data which have been rounded to the number of significant figures requested by the client or deemed appropriate for the method. This may create minor discrepancies between data which appear on the QC Summary Forms (Forms B-G) and those that would be calculated from rounded analytical results. Additionally, if a moisture correction is performed, differences will be observed between the QC data and the surrogate data reported on Form A (or other report forms) and corresponding data reported on QC Summary Forms. In these cases, the Form A will indicate the "Report Basis" as well as the moisture value used for making the correction.

Symbol Definitions

ND - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry).
B - For organic analysis the qualifier indicates that this analyte was found in the method blank. For inorganic analysis the qualifier signifies the value is between the IDL and PQL.
J - The qualifier indicates that the value is between the MDL and the PQL. It is also used for indicating an estimated value for tentatively identified compounds in mass spectrometry where a 1:1 response is assumed.

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06159501245655
Page 3

S95550VJ

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: BL-57150-1
DCL Sample Name...: BL-57150-1

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: mg/L
☐ As Received ☐ Dried

Date Received.....: Not Applicable
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 100 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	ND			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: QC-57150-1
DCL Sample Name...: QC-57150-1

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: mg/L
☐ As Received ☐ Dried

Date Received.....: Not Applicable
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 100 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	730			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954P06R

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: REAG BLK |200153662
DCL Sample Name...: EQ 3869

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: ACETNE
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 216 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	ND			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06159501245655
Page 6

S954P06S

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: REAG BLK |200153666
DCL Sample Name...: EO 3870

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: WATER
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 370 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	ND			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954P06T

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: EO-1 |200153663
DCL Sample Name...: EO 3872

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: ACETNE
Date Sampled.....: 10-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 154 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	110			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06159501245655
Page 8

S954P06V

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: EO-1 |200153667
DCL Sample Name...: EO 3873

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

Matrix.....: WATER
Date Sampled.....: 10-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 440 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	20			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954P06W

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: LO-1 |200153664
DCL Sample Name...: EO 3875

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: ACETNE
Date Sampled.....: 09-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 240 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	30			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: LO-1 |200153668
DCL Sample Name...: EO 3876

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: WATER
Date Sampled.....: 09-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 349 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	ND			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954P06Y

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: FLD BLK |200153665
DCL Sample Name...: EO 3879

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: ACETNE
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 230 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	ND			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954P06Z

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: FLD BLK |200153669
DCL Sample Name...: EO 3880

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: WATER
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 430 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	ND			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM B (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
LABORATORY CONTROL SAMPLE (LCS)

S95550VK

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: WATER
Reporting Units.....: mg/L

LCS Source.....:

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable

Date Printed.....: 15-JUN-95 01:24
DCL Sample Name...: QC-57150-1

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Target	Result	Percent Recovery	QC Limits	QC Flag
TS	25-MAY-95 00:00	746.	726.	97.4	80.0/120.	

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DATA CHEM LABORATORIES
A Sorenson Company

FORM C (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
BLANK SAMPLE

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: WATER
Reporting Units.....: mg/L

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable

Date Printed.....: 15-JUN-95 01:24
DCL Sample Name...: BL-57150-1

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Result	CRDL
TS	25-MAY-95 00:00	-8.00	10.0

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DATA CHEM LABORATORIES
A Sorenson Company

QUALITY CONTROL REPORT

Form RLIMS65-V1.0
06069522533261
Page 1

G9555063

Method....: 160.3, EPA 5
Analyte...: TS OR PARTICULATE
Matrix....: WATER

Date Printed....: 06-JUN-1995 22:53
Group Name.....: G9555063
Analyst.....: CA
Units.....: mg/L

Blank Results

Sample ID	Sample Name	QC Date	Blank Result	Lower Limit	Upper Limit	Flags
S95550VJ	BL-57150-1	25-MAY-1995	-8.00	-10.0	10.0	Mp

LCS Results

Sample ID	Sample Name	QC Date	LCS Result	Amount Spiked	Percent Recovery	Lower Limit	Upper Limit	Flags
S95550VK	QC-57150-1	25-MAY-1995	726.	746.	97.4	80.0	120.	Mp

checked by: Suzanne W. Bowe 06/16/95

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DATA CHEM LABORATORIES
A SOREREOR COMPANY

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Datapackage Table of Contents

Information pertaining to this datapackage is divided into the four categories listed below (see colored divider sheets for an inventory list of each category). If an item on the inventory is not applicable, an "NA" is placed in the corresponding check box. A Case Narrative immediately precedes this Table of Contents and contains pertinent information about this datapackage.

Analytical Forms ..... Yellow
Sample Tracking Documentation ..... Pink
Analytical Documentation ..... Blue
Raw Data ..... Green

♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦

Analytical Forms
Inventory Checklist

[X] Case Narrative

[NA] IRDMIS	[X] Commercial Forms
[ ] Data Review and Approval Form	[NA] Analytical or Environmental Report Form
[ ] IRDMIS Reports	[NA] Set Comments
[ ] GC/MS TICs	[X] Applicable QC Sheets

[X] RLIMS Forms	
[X] Cover Form	[NA] Matrix Spike/Matrix Spike Duplicate Sample (Form F)
[X] Sample Group Comments (Form H)	[NA] Surrogate Summary (Form G)
[X] Sample Analysis Data Sheet (Form A)	[NA] Initial Calibration Form
[X] Laboratory Control Sample (Form B)	[NA] Continuing Calibration Form
[X] Blank Sample (Form C)	[NA] Serial Dilution Form
[NA] Matrix Spike Sample (Form D)	[NA] Endrin Breakdown or BFB/DFTPP GC/MS Tuning Form
[NA] Matrix Duplicate Sample (Form E)	[NA] Internal Standard Form

Analytical Forms
Reviewer Checklist

X The Analytical Forms Inventory Checklist above is complete.

X The Case Narrative was completed in accordance with procedures in DCL SOP XX-DC-020, "Datapackage Preparation and Validation."

X Only the correct report forms are used (IRDMIS or Commercial Forms or RLIMS Forms).

X All fields on the report forms are complete with the correct information, including signatures.

X Results for all samples are reported per client request.

X Units, methods, and dates are correct.

X Sample and/or set comments are complete.

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Assembled by: Cynthia Adams 06/06/95 (Signature / Date) Reviewed by: Suzanne W. Bowe 06/16/95 (Signature / Date)

DATA CHEM LABORATORIES
A SORENSON COMPANY

Sample Tracking Documentation
Inventory Checklist

- [X] LIMS Grouping Reports
- [X] DataChem Laboratories (DCL) Chain-of-Custody Record
- [X] DCL Sample Work Order
- [NA] Copy of numbered Nonconformance/Corrective Action Report (NC/CAR)
- [NA] Copy of Client-Related Problem Report (CPR)

Sample Tracking Documentation
Reviewer Checklist

X The Sample Tracking Documentation Inventory Checklist above is complete.

X DCL Chain-of-Custody Record provides signatures for the sample portion reported in this data package.

X DCL Chain-of-Custody Record was completed in accordance with procedures in DCL SOP XX-DC-006 "Chain-of-Custody and Laboratory Tracking."

X Methods specified on the Sample Work Order were performed or an explanation for deviations is provided.

X Special instructions on the Sample Work Order were followed.

X Project Management instructions on the Project Protocol Worksheet were followed.

X Client's requests were met or an explanation is provided in the Case Narrative.

NA NC/CAR and/or CPR were completed in accordance with procedures in DCL SOP QC-DC-006 "Nonconformance/Corrective Action Report (NC/CAR) Procedures."

Assembled by: Cynthia Adams 06/06/95 (Signature / Date) Reviewed by: Suzanne W. Bowe 06/16/95 (Signature / Date)

DataChem Laboratories
LIMS - Sample Master System
Analysis Group Report

Date: 6-JUN-1995 22:21
User: ADAMS

RLIMS15-V1.1

Analysis Run Name: G9555063

Group ID: G9555063

Samples: 10

Pos	Laboratory Sample Name	Field Sample Name	Laboratory Sample ID	Laboratory Group Name	Accnt. Number
1	BL-57150-1	BL-57150-1	S95550VJ	S95-0498-BE	03025
2	QC-57150-1	QC-57150-1	S95550VK	S95-0498-BE	03025
3	EO 3869	REAG BLK	S954P06R	S95-0498-BE	03025
4	EO 3870	REAG BLK	S954P06S	S95-0498-BE	03025
5	EO 3872	EO-1	S954P06T	S95-0498-BE	03025
6	EO 3873	EO-1	S954P06V	S95-0498-BE	03025
7	EO 3875	LO-1	S954P06W	S95-0498-BE	03025
8	EO 3876	LO-1	S954P06X	S95-0498-BE	03025
9	EO 3879	FLD BLK	S954P06Y	S95-0498-BE	03025
10	EO 3880	FLD BLK	S954P06Z	S95-0498-BE	03025

----- END OF LISTING -----

Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498 * | Reporting Group | BE

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AM 5-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Analysis	Particulates	# Bottles
11-May-1995	REAG BLK	EO 3869			ACETNE		X	1
11-May-1995	REAG BLK	EO 3870			WATER		X	1
10-May-1995	EO-1	EO 3872			ACETNE		X	1
10-May-1995	EO-1	EO 3873			WATER		X	1
9-May-1995	LO-1	EO 3875			ACETNE		X	1
9-May-1995	LO-1	EO 3876			WATER		X	1
11-May-1995	FLD BLK	EO 3879			ACETNE		X	1
11-May-1995	FLD BLK	EO 3880			WATER		X	1

Received: Date/Time/Signature 5-18-95 / 1000 / Amaryllis McElwee

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Amaryllis McElwee R-23-1 CA	5-18-95 1100	AM Kin R-231	Storage R-231
	05/25/95 17:00	Cynthia Adams	TS analysis / R-403-1 ~~Rm 408~~

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: TS

Prepared/Analyzed by: CA

Lab Notebook No.: A21

Date/Time: 05/25/95 20:00

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Printed 5/23/1995 16:41

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Sample Work Order

QC Clearance: _____

Project Manager: Keith R. Nicholson

Client: Hayden Environmental Group, Inc.

Account: 03025

Project/Task: COMM-ENV

Date Received: 18-May-1995

Date for Mailing Report: 7-Jun-1995

DCL Root Set ID: S95-0498 *

DCL Lab. Name: EO 3869–EO 3880

Total # Samples: 8

Sample Medium: ACETNE

Earliest Sampling Date: 9-May-1995

Preparation Type:

Rep. Group	Physical Properties - Wet Chemistry Analytes Requested	Latest Prep. Date	Latest Anal. Date	No. of Samp.	Split ID	Storage Location	Analysis/Prep. Method	Inst.	
BE	Particulates			8		Kab lab	40CFR method 160.1	Grav	

Special Instructions: Take the entire sample and evaporate in a Tared Beaker below Boiling point ~~at ambient~~ (Temp) for Acetone & Water. Rinse Contain w/Acetone to Remove additional sample. After sample comes to dryness desicate to constant weight. Then the beaker w/Residue goes to Rad chem for additional analysis. Contact ~~Charlie Walker~~ Bill Hauser to hand off samples. (Do a direct handoff please).

Section Manager Approval: Jim S. Mikesell 5/24/95
Jim S. Mikesell — Date

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Other Sections Receiving Sample Portions: IM, WA

DataChem Laboratories/ 960 West LeVoy Drive / Salt Lake City, Utah 84123

Form: WO1.04-SWV2.12

PRINTED 5/23/1995 16:49

RSO - ANALYTICAL LABORATORY SERVICES

Page 1 of 2

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO.:

SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFFL. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT 84123

	SAMPLE NUMBER		SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153657	REAG. BLK.	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* PARTICULATES ED 3868	ANALYSIS ED 3881
2	200153662	REAG. BLK.	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3869	
3	200153666	REAG. BLK.	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3870	
4	200153658	EO-1	G.F. FILTER	5/10/95 0930	PETRI DISH	1 x FLTR	NONE	* 3871	3882
5	200153663	EO-1	ACETONE	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3872	
6	200153667	EO-1	D.I. WATER	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3873	
7	200153659	LO-1	G.F. FILTER	5/9/95 1450	PETRI DISH	1 x FLTR	NONE	* 3874	3883
8	200153664	LO-1	ACETONE	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3875	
9	200153668	LO-1	D.I. WATER	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3876	
10	200153660	FLD BLK	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* 3877	3884
11	200153665	FLD BLK	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3879	

CAN SEAL NO. 2470

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLUOMETRY (AS LISTED IN METHOD 114)

* = TOTAL U (CE); GROSS A/B (DE); PARTICULATES (AE BE); GAMMA SCAN (EE)

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN 5-17-95 COOLER	SEALED	CAN w/ C-O-C	TAPE				

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaryllis McGuire
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	WHITE	REMAIN WITH SAMPLES
2	YELLOW	OFF-SITE LAB
3	PINK	FERMCO DATA REVIEW AND REPORTING
4	BLUE	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

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Fernald Environmental Restoration Management Corporation
RSO - ANALYTICAL LABORATORY SERVICES

Page 2 of 2

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO:
SAR/CR: SDL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFF. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT. 84123

	SAMPLE NUMBER	SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	20053669 FLD BLK	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	PRESERVATIONS *ED 3880	ANALYSIS ED 3884
2							CAN SEAL NO: 2970	
3								
4								
5								
6								
7								
8								
9								
10								
11								

LAST ENTRY MMC 5-17-95

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOUOMETRY (AS LISTED IN METHOD 114)

*= TOTAL U; GROSS A/B; PARTICULATES; GAMMA SCAN

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN COOLER SEALED W/C-O-C TAPE MMC 5-17-95					

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaly his McKewee
			3.		

NO.	DISTRIBUTION OF COPIES	
1	WHITE	REMAIN WITH SAMPLES
2	YELLOW	OFF-SITE LAB
3	PINK	FERMCO DATA REVIEW AND REPORTING
4	BLUE	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

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HAYDEN

DEN
NTAL GROUP, INC.

Post-it® Fax Note 7671	Date 11-21-94	# of pages ▶ 8
To Customer Service	From D. Robinson	
Co./Dept.	Co.	
Phone #	Phone #	
Fax # 801-268-9992	Fax #	

November 21, 1994

Customer Service
DataChem Laboratories
960 West Levoy Drive
Salt Lake City, UT 84123

Subject: Laboratory Services / Subcontracting
FERMCO RFP # PES-80706

Dear Sir or Madam:

We are submitting a proposal in response to the above request and would like to receive a quotation from your firm for laboratory services. Your firm's name was given to us by FERMCO as a qualified subcontract laboratory.

We request a firm, fixed cost proposal to provide analytical support for the scope of work included with this letter. To summarize the analytical scope of work:

1. Provide analysis by USEPA Method 5 (40CFR Part 61) for three field samples from Source EP8-013 and one field sample from EP11-002. Filter, probe rinse (Acetone), and backhalf (H_2O) samples will be included as well as quality control samples (see below). Samples are to be analyzed for total particulate.

2. Following particulate analysis, the fractions for each field sample shall be composited and analyzed to total activity and uranium per EPA Method 114, and according to the protocol shown in Table 2 of the scope of work.

3. Proposed cost shall include cost to analyze and report results for all field samples and quality control samples. Quality control samples to be included in the sample sets:

   - Performance evaluation sample, to be supplied by FERMCO, and analyzed for total Uranium in the same manner as the composites (Item 6, scope of work).

   - Two field blank acetone rinse samples, two field blank filters, two laboratory filter blanks (supplied by Hayden), laboratory matrix spike/spike duplicate, and two container blanks.

F010331.94

TALLY SHEET

RELEASE #: 1000006737 (Can 1 of 1)
PO #: 95-H053 (DCL-SLC)
DATE SHIPPED: 17-May-95
MATERIAL: Periodic Confirmatory Measurements – Filters, Acetone, Water

ANALYSIS: Total U; Gross A/B; Particulates; Gamma Scan

Composite Sample Number	Lot Number	Sample Container Size	AnaLis/ FACTS Number	Gross Weight lbs.	Tare Weight lbs.	Net Weight lbs.
REAG. BLK.	W050-725-P047-6737	PETRI DISH	200153657	0.106	0.088	0.018
REAG. BLK.	W050-725-P047-6737	1L PLST	200153662	0.511	0.141	0.370
REAG. BLK.	W050-725-P047-6737	1L PLST	200153666	0.943	0.141	0.802
EO-1	W050-725-P047-6737	PETRI DISH	200153658	0.106	0.088	0.018
EO-1	W050-725-P047-6737	1L PLST	200153663	0.423	0.141	0.282
EO-1	W050-725-P047-6737	1L PLST	200153667	1.128	0.141	0.987
LO-1	W050-725-P047-6737	PETRI DISH	200153659	0.101	0.088	0.013
LO-1	W050-725-P047-6737	1L PLST	200153664	0.542	0.141	0.401
LO-1	W050-725-P047-6737	1L PLST	200153668	0.934	0.141	0.793
FLD. BLK.	W050-725-P047-6737	PETRI DISH	200153660	0.106	0.088	0.018
FLD. BLK.	W050-725-P047-6737	1L PLST	200153665	0.476	0.141	0.335
FLD. BLK.	W050-725-P047-6737	1L PLST	200153669	1.163	0.141	1.022
				6.537	1.480	5.057

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FEMP	RADIOLOGICAL SURVEY REPORT COVER SHEET		SURVEY NUMBER: 95-05-G1-194	
ATE: 5-17-95	LOCATION: Lab	RCT: [redacted]	BADGE: 10148	PAGE: 1 OF 4
ME: 0700	LEVEL: 580-	SIGNATURE: [redacted]		
ORK PERMIT NUMBER: N/A		REVIEWER:	BADGE:	
WP NUMBER:		SIGNATURE:	DATE:	

ITACHMENTS: 3	
Pg 2 MURF	
Pg 3 & 4 Tennelec Printout	

REASON FOR SURVEY	
Sample surveyed for release to go offsite. Gross	
area smears taken. Direct frisk inside drum	
Release # ~~0000~~ 6737 N/A	

SUMMARY:

N/A

000051

No.	Distribution of Copies
1	Radiological Records
2	Files

Supervisor Notified	Time	Date	Notified by:

FS-F-1993-0 (REV. 04/18/95)

MATERIAL UNRESTRICTED RELEASE FORM

SURVEY # 95-05-G11-194

DATE: 5-17-95 | LOCATION: Lab | RCT: [redacted] | BADGE #: 10148/721

MODEL	SERIAL NUMBER	TYPE ALPHA or BETA/GAMMA	CAL DUE DATE	BKGD. (CPM)	CP	MDA (DPM)	INSP/PERFORMANCE TEST YES	NO
LB5100	7	α, β, γ	6-95	.2 / 1.72	.289 / 418	18.2 / 19.8	X	
M-3	77101	β, γ	10-95	60	30	3K	X	
			N					
				A				

TIME	RCT INIT	MATERIAL DESCRIPTION	RELEASE CRITERIA SURF or VOL	RESULTS ALPHA REMOVABLE	ALPHA FIXED + REM	BETA/GAMMA REMOVABLE	BETA/GAMMA FIXED + REM	RELEASE JUSTIFICATION	RECIPIENT	MATERIAL RELEASE EVALUATOR BADGE # and SIGNATURE (1)
0700	bw/DC	200153667	SURF	-0 *	N/A	0 *	<MDCP		Doug Stack	
		200153668		2 *		4 *	<MDCP			
		200153669		2 *		4 *	<MDCP			
		200153666		-0 *		4 *	<MDCP			
		200153662		-0 *		0 *	<MDCP			
		200153665		-0 *		-1 *	<MDCP			
		200153664		2 *		-1 *	<MDCP			
		200153663		2 *		8 *	<MDCP			
		200153658 (AF)		-0 *		0 *	<MDCP	*		N/A
		200153659 (AF)		5 *		-1 *	<MDCP	*		
		200153666 (AF)		-0 *		0 *	<MDCP	*		
		200153657 (AF)		2 *		0 *	<MDCP	*		
		10 gal Can		-0 *		0 *	<MDCP			
					N					
						A				

* M:ESH:BCRC: 93 613

Comments: Release # 6737

(AF) = Air Filter

REVIEW: INITIAL | DATE

(1) Material Release Evaluator approval required in accordance with RC-DPT-019, (Release of Materials from the Fernald Environmental Management Project), if any of the following conditions exist:

a. Material has areas which are inaccessible for proper survey.
b. Process knowledge is used to support the release decision.
c. Material must be evaluated for the potential of contamination beneath any coating applied while the material was in the Controlled Area.
d. Material must be evaluated for the potential for any volume or in-depth radioactivity within the material matrix.
e. Special case items are being released, such as radioactive consumer products, industrial sources, etc.
f. Material has detectable activity present and the activity is below the contamination limits listed in Attachment A of RC-DPT-019.

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ED MAY 17, 1995 08:57:36
ROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1 MIN)

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AMPLE UMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	08:58:45
2	1	4	2	4	09:00:06
3	1	4	2	4	09:01:27
4	0	4	-0	4	09:02:48
5	0	2	-0	0	09:04:10
6	0	1	-0	-1	09:05:30
7	1	1	2	-1	09:06:51
8	1	6	2	8	09:08:13
9	0	2	-0	0	09:09:34
10	2	1	5	-1	09:10:55
11	0	2	-0	0	09:12:16
12	1	2	2	0	09:13:37
~~12~~	~~0~~	~~5~~	~~0~~	~~6~~	~~09:14:58~~ had 5-17-95

)PERATION COMPLETE

FEMP RADIOLOGICAL S... REPORT pg 3 of 4
SURVEY # 95-05-G11-194 ... 5-17-95
[redacted]

WED MAY 17, [illegible] 10:04:45

GROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1[illegible]MIN)

SAMPLE NUMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	[illegible]	TIME OF COUNT
1	0	2	-0	0		10:05:55

OPERATION COMPLETE [illegible]

000054

FEMP RADIOLOGICAL SURVEY REPORT pg 4 of 4

SURVEY # 95-05-G11-194 DATED 5/15/95

(name) (signature)

RCT: [redacted]

REVIEWER: [redacted]

8292

ection: ER 26 05/17/19 7678

RG93
UIDE 26

ACETONE, 3, UN1090, II

POTENTIAL HAZARDS

IRE OR EXPLOSION

Flammable/combustible material; may be ignited by heat, sparks or flames.
Vapors may travel to a source of ignition and flash back.
Container may explode in heat of fire.
Vapor explosion hazard indoors, outdoors or in sewers.
Runoff to sewer may create fire or explosion hazard.

EALTH HAZARDS

May be poisonous if inhaled or absorbed through skin.
Vapors may cause dizziness or suffocation.
Contact may irritate or burn skin and eyes.
Fire may produce irritating or poisonous gases.
Runoff from fire control or dilution water may cause pollution.

EMERGENCY ACTION

Keep unnecessary people away; isolate hazard area and deny entry.
Stay upwind; keep out of low areas.
Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.
Isolate for 1/2 mile in all directions if tank, rail car or tank truck is involved in fire.
CALL Emergency Response Telephone Number on Shipping Paper first.
If Shipping Paper not available or no answer, CALL CHEMTREC AT 1-800-424-9300.
If water pollution occurs, notify the appropriate authorities.

RE

Small Fires: Dry chemical, CO2, water spray or alcohol-resistant foam.
Do not use dry chemical extinguishers to control fires involving nitromethane or nitroethane.
Large Fires: Water spray, fog or alcohol-resistant foam.
Move container from fire area if you can do it without risk.
Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.
For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

LL OR LEAK

Shut off ignition sources; no flares, smoking or flames in hazard area.
Stop leak if you can do it without risk.
Water spray may reduce vapor; but it may not prevent ignition in closed spaces.

000055

Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal.
Large Spills: Dike far ahead of liquid spill for later disposal.

FIRST AID

Move victim to fresh air and call emergency medical care; if not breathing, give artificial respiration; if breathing is difficult, give oxygen.
In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water.
Remove and isolate contaminated clothing and shoes at the site.

SURVEY RECORD

Date: 5-18-95

By: MM

Survey Type: Meter: ✓ Smear: ✓ Leak Test: ___

Approved: ___ RSO

Date: ___

Survey Instrument:

Manufacturer: LUDLUM
Model Number 19
Serial Number: ~~159~~ 102872
Calib. Date: 9-30-94

FERMCO ~~MX-0199~~ mm 5-18-95 IH.

BACKGROUND <0.011 mR/hr

Scintillation Counter:

Manufacturer: Ludlum
Model Number: 2929
Lab Instrument No.: 108227

Sample Count Time - 1 min.

	ALPHA	BETA
BLANK (CPM)	0.08	65.03
COUNTER EFFICIENCY (%)	0.3517	0.4083

Mixed Waste Lab Survey Location or Sealed Source Number	Instrument Reading	Disc Smears/Leak Test Swipes: Alpha CPM	Alpha DPM	Alpha pCi	Beta CPM	Beta DPM	Beta pCi	Remarks
M095 0341 OUTSIDE	<0.012 mR/hr	0			68			<0.011 mR/hr @ 1 METER
INSIDE	<0.012	0			63			
SAMPLE	<0.012	0			71			

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DATACHEM LABORATORIES COOLER RECEIPT CHECKLIST

1. Client Name: FERMCO
2. Project/Task/Site: REL. #: 6737
3. Time/Date of Receipt: 1000 5-18-95
4. # Coolers Received: 1
5. Custody Seals?: (Circle) Present/Absent* Intact/Broken*
   Tamper Evident: Yes/No
6. Condition of Coolers: Acceptable/Unacceptable
7. Comments on Cooler Condition (#6): 1 DRUM
8. Ice Present: Yes/No* Frozen/Melted
   Comments: RAD CHEM ONLY
9. Temp Control: Present/Not Included
10. Location Temp Taken: Control/Between Samples
11. Taken by: (Signature) [signature] 5-18-95
    MARK MENDENHALL (Printed Name)
    5-18-95 1130 (Date/Time)
12. Are all temperatures within project specific guidelines? Yes/No*

*CONTACT PROJECT MANAGER. COMPLETE INCIDENT REPORT.

Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp
1	MC95 0341	20 °C	6	MC95	°C	11	MC95	°C
2	MC95	°C	7	MC95	°C	12	MC95	°C
3	MC95	°C	8	MC95	°C	13	MC95	°C
4	MC95	°C	9	MC95	°C	14	MC95	°C
5	MC95	°C	10	MC95	°C	15	MC95	°C

SAMPLE RECEIVING INCIDENT REPORT

Client Sample #'s Affected: _____ DCL Set I.D: _____

DCL Sample #'s Affected: _____

- ☐ Cooler Temps out of Range
- ☐ Missing Cooler
- ☐ Broken/Leaking Samples
- ☐ Missing Samples/Bottles
- ☐ Missing Paperwork
- ☐ Incorrect Preservation
- ☐ Low Sample Volume
- ☐ Incorrect Bottle Type
- ☐ Missing/Incorrect Bottle Labels
- ☐ Other

BRIEFLY DESCRIBE PROBLEM:

Delivered to: _____ Project Manager

Delivered by: _____ Signature/Date/Time

RESPONSE REQUIRED WITHIN 24 HOURS

PROJECT MANAGER'S COMMENTS:

Returned to Sample Receipt by: _____ (Date/Time/Signature)

Accepted for Sample Receipt by: _____ (Date/Time/Signature)

000058

8/95

Project Protocol Worksheet

Client	Hayden Environmental
Project	FERMCO Emissions Tests
Project Manager	Keith Nicholson
Account Number	3025
Project Duration	1 Month

Date 5/17/95

Mailby Days 20 days

Sample Stream	Project/ Method Type
595	EPA Clean Air

QC Requirements

Inorganic		
Blank		
LCS		
MS		
MSD		
MD		
USAEC		
MSA		
Tracer		
Other		
Radiochemistry		
Blank	X	
LCS	X	
MS	X	U only
MSD	X	U only
Tracer		
Other	X	MD
Organic		
Blank		
LCS		
MS/MSD		
USAEC		
Surrogate		
Other		

Preparation Requirements

Inorganic		
CLP SOW		
SW-846 Rev.		
USAEC 1990		
USAEC 1993		
Microwave		
Hotplate		
DCL SOP		
Other		
Radiochemistry		
Hotplate leach		
Muffle furnace		
Total dissolution		
Microwave		
DCL SOP		
Other	X	Mthd. 114
Organic		
CLP SOW		
SW-846 Rev.		
USAEC 1990		
USAEC 1993		
Sonication		
Soxhlet		
Continuous		
Separatory funnel		
DCL SOP		
Other		

Reporting Requirements

Full CLP SOW		
CLP Forms Only		
CLP Disk		
RLIMS	X	
Raw Data		
Custom Disk		
ARF		
QC Forms (specify below)	X	
Case Narrative	X	
Calibration data	X	
Continuing Cal. data		
Reporting Basis		
IRDMIS		
# of TICs		
Counting Error (1 or 2 sigma)		
TPU		
RPD		
RER		
Send raw data	X	
Store raw data		
Other		

LOD/MDL/IDL Requirements

CLP SOW		
SW-846 Rev.		
EPA Clean H2O		
USAEC 1990		
USAEC 1993		
NIOSH		
DCL SOP		
Client specified		
Other	X	Method
QC Limits		
Method	X	
Statistical		
Client specified		

David Robinson

Batch samples with other sets? (●) yes ( ) no

MS/MD/MSD sample identified? ( ) yes (●) no

Specific spiking levels identified? (●) Method ( ) DCL SOP ( ) other (see comments)

Comments: Analyze for U by EPA method 114 A-5, and by laser phosphoremetry - report results separately. Desired detection limits are 50 ug/sample for colorimetric U, and 1 ug/sample for phosphoremetry. Analyze for gamma, alpha, and beta for method 114 G-1, A-4 and B-4. Desired detection limits are 10 pCi for alpha and beta, a 20 pCi/sample as Cs-137 for gamma. Liquid samples and filters are to be analyzed for total particulates prior to other analyses. The client will specify how any compositing of liquid samples is to be conducted.

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DATA CHEM LABORATORIES
A SORENSON COMPANY

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Analytical Documentation
Inventory Checklist

- [NA] Copy of TCLP Preparation Logbook Pages
- [NA] Copy of Sample Preparation Notebook/Logbook Pages
- [X] Copy of Analyst's Notebook/Method Logbook Pages
- [NA] Copy of Instrument Injection Logbook/Instrument Logbook/Run Log Pages
- [NA] Percent Solids/Percent Moisture Results
- [NA] Copy of Reagent Logbook Pages
- [NA] Copy of Working Standard Preparation Logbook Pages
- [NA] Copy of Secondary or Intermediate Standard Preparation Logbook Pages
- [NA] Copy of Primary Standard or Concentrated Stock Standard Preparation Logbook Pages
- [NA] Certificates of Analysis for Standards
- [NA] Copy of Standard Verification Logbook Pages (including documentation for spiking solutions and calibration standards)
- [NA] Copy of Preparation Logbooks for solutions prepared by QC

All other miscellaneous documentation associated with this set (describe)

- [X] Copy of Conductivity Method page with QC target

Analytical Documentation
Reviewer Checklist

- X The Analytical Documentation Inventory Checklist above is complete.
- X Basic documentation procedures were followed in accordance with DCL SOP XX-DC-004 "Analytical Data Record Keeping."
- X All notebook and logbook pages contain page number, book number, title, and available space for pagination (if required).
- X All notebook and logbook pages were signed and dated by the analyst and reviewer before copying.
- X All copies are legible.
- NA Standard preparation is documented in accordance with DCL SOP XX-DC-019 "Standards Purity, Preparation, Traceability and Verification" or by WR-DC-001 "The Acquisition, Preparation, and use of Radioactive Standard Reference Materials."
- NA Documentation is provided to verify that standard calibration solutions and spiking solutions are traceable to a vendor certificate.

Assembled by: Cynthia Adams 06/16/95 (Signature, Date) Reviewed by: Suzanne W. Bowe 06/16/95 (Signature, Date)

DataChem Laboratories

Particulates
~~Total Residue~~ CA 06/15/95

Page 107 Book A 021

DCL Set ID	595-0498-BE
DCL Sample #	EO 3869-70, 72-73, 75-76, 79-80
DCL Acct #	3025
Date Analysis Started	05/25/95
Balance #'s	105930 (Mettler AT 261) For 400mL beakers & 102839 (Sartorius)
LOD	10 mg/L
Method	~~EPA 160.3~~ CA 06/15/95 EPA METHOD 5 from CFR

Sample preparation: Clean beakers were rinsed with Type II water and placed in a 180°C oven for one hour. Beakers were removed and placed in desiccators to cool for 4 1/2 hours. Beakers were weighed in grams (the tare weight) and stored in desiccators CA 06/06/95 until ready for use. The water samples EO 3870, 73, 76, 80 were placed in the 400 mL beakers, ~~also~~ CA 06/06/95 placed in a 103°C CA 06/15/95 oven and allowed to evaporated overnight. The rest of the sample and rinsings were added the next day for EO 3873 and EO 3880. CA 06/06/95 ~~All~~ The entire sample was used and each sample container was rinsed three times with the appropriate matrix. The acetone samples EO 3869, CA 06/06/95 3872, 75, and 79 were poured into the 150 mL beakers and placed in a hood to evaporate. By the end of night shift all the sample and rinsings had been added. The samples were left in the hood till dryness and placed in 103-105°C oven early the next morning by SKP. The blank consists of 100 mL Type II water. The QC/LCS was 100 mL of PS-44K conductivity solution (413 micromhos/cm. RICCA LOT E219 EXP 07/95). No acetone blank prepared.

Bottle #	Tare wt.	Sample #'s	wt. #1 (g)	wt. #2 (g)	wt #3 (g)	wt #4 (g)	wt #5 (g)	wt #6 (g)
1	175.0451	EO 3870	175.0426	175.0432	175.0442	175.0431	175.0443	175.0446
2	160.6076 80 CA 06/06/95	EO 3873	160.6144	160.6157	160.6153	NA	NA	NA
3	150.1550	EO 3876	150.1547	150.1550	NA	NA	NA	NA
4	157.6280	EO 3880	157.6270	157.6273	NA	NA	NA	NA
5	83.8590	BLK	83.8598 CA 06/06/95	83.8583	83.8595	83.8607	83.8580	83.8598
6	81.3255	QC/LCS	81.4003	81.4 CA 07/30/95 3991	81.4003	81.4009	81.3988	81.4007
7	81.6629 CA 06/06/95	EO 3872	81.6798	81.6778	81.6795	81.6798	NA	NA
8	79.8689	EO 3875	79.8778	79.8759	79.8770	79.8772	NA	NA
9	85.6009	EO 3879	85.6040	85.6026	85.6036	85.6046	85.6030	85.6045
10	87.3759	EO 3881 87 CA 06/06/95	87.3777	87.3766	87.3775	87.3779	NA	NA

Recorded by: Cynthia Adams 06/05/95 Date

Reviewed by: Suzanne W. Bowe 06/16/95 Date

DataChem Laboratories

Particulates ~~Total Residue~~ CA 06/15/95 Continued.

Page 108 Book A 021

Beaker #	Tare wt(g)	Sample #'s	wt #7(g)	wt #8(g)
5	83.8590	BLK	83.8578	83.8582
6	81.3255	QC/LCS	81.3985	81.3981
9	85.6009	EO 3879	85.6031	85.6028

Since the LCS was in water, the blank was also done in water.
The 400mL beakers were too heavy for the Sartorius balance; this is why two different balances were used. Samples were dryed, cooled, desiccated and weighed until a constant weight is obtained (Two consecutive weighings agree within < 0.5mg of each other). No duplicates were analyzed since all sample was consumed.

Sample Calculations:

Total Residue, mg/L = $\frac{(A-B) \times 1000}{C}$ where A = weight of sample + dish in g
B = weight of dish in g
C = volume of sample in L

Sample volumes obtained by ~~measuring~~ CA 06/16/95 filling sample bottles to customer marked levels and then measuring that volume with a graduated cylinder.

EO 3869	216mL = 0.216L		EO 3875	240 mL	= 0.240L
EO 3870	370mL = 0.370L		EO 3876	349 mL	= 0.349L
EO 3872	154mL = 0.154L		EO 3879	230 mL	= 0.230L
EO 3873	440mL = 0.440L		EO 3880	430 mL	= 0.430L

			calculated		reported
Blank	[(83.8582g ~~85.6009g~~ − 83.8590g) X 1000] ÷ 0.1 L	=	−8 mg/L	=	ND
QC/LCS	[(81.3981g − 81.3255g) X 1000] ÷ 0.1L	=	726 mg/L	=	730
EO 3869	[(87.3779g − 87.3759g) X 1000] ÷ 0.216L	=	9.3 mg/L	=	ND
EO 3870	[(175.0446g − 175.0451g) X 1000] ÷ 0.370L	=	−1.4 mg/L	=	ND
EO 3872	[(81.6798g − 81.6629g) X 1000] ÷ 0.154L	=	109.7 mg/L	=	110
EO 3873	[(160.6153g − 160.6080g) X 1000] ÷ 0.440L	=	16.6 mg/L	=	20
EO 3875	[(79.8772g − 79.8689g) X 1000] ÷ 0.240L	=	34.6 mg/L	=	30
EO 3876	[(150.1550g − 150.1550g) X 1000] ÷ 0.349L	=	0 mg/L	=	~~NO~~ CA 06/16/95 ND
EO 3879	[(85.6028g − 85.6009g) X 1000] ÷ 0.230L	=	8.3 mg/L	=	ND
EO 3880	[(157.6273g − 157.6280g) X 1000] ÷ 0.430L	=	−1.63 mg/L	=	ND

QC/LCS Recovery = 726/745.6 X 100 = 97.4 %

For QC target see page 6 of BOOK 2084

000062

Recorded by: Cynthia Alamed 06/05/95 Date Reviewed by: Suzanne W. Bouk 06/16/95 Date

Project No. 2 DATACHEM
TITLE CONDUCTIVITY, OR SPECIFIC CONDUCTANCE Book No. 2084 LABORATORIES 6

From Page No. NA

METHODS: EPA 120.1, EPA 9050, SOP-PNL-ASTM D1125 (12/91), MODIFIED AS DESCRIBED BELOW.

INSTRUMENT: ORION MODEL 160 CONDUCTIVITY METER. THIS INSTRUMENT CORRECTS FOR CELL CONSTANT AND TEMPERATURE, USING THE FOLLOWING SETTINGS: CELL CONSTANT: 0.609 cm^{-1} USING THE 016010 CELL.
TEMPERATURE: nLF (CORRECTS READING TO 25°C).

PROCEDURE: THE CELL AND TEST TUBE ARE RINSED THREE TIMES WITH EACH SAMPLE OR STANDARD BEFORE READING. FOR ANALYSIS, THE TUBE IS FILLED WITH ENOUGH SAMPLE TO COVER THE ELECTRODE.

QUALITY CONTROL REQUIREMENTS:
EPA 120.1: NONE SPECIFIED.
EPA 9050: CHECK STANDARD/15 SAMPLES, DUPLICATE/10 SAMPLES.
SOP-PNL-ASTM D1125: DUPLICATE/10 SAMPLES.
WHEN NOT OTHERWISE SPECIFIED, BLANKS, DUPLICATES, AND CHECK STANDARDS WILL BE ANALYZED ONCE PER 20 SAMPLES OR ANALYTICAL BATCH, WHICHEVER IS MORE FREQUENT.

STANDARDS: ALL THREE METHODS REQUIRE STANDARDS OF KCL IN WATER. PREPARATION REQUIREMENTS DIFFER SLIGHTLY, BUT THESE DIFFERENCES ARE NEGLIGIBLE CONSIDERING THE REPORTING LIMITS USED. THEREFORE, STANDARDS MADE FOLLOWING ONE METHOD ARE USED FOR ANY OF THE METHODS. ASTM D1125 DESCRIBES A SERIES OF STANDARDS; HOWEVER, THEY ARE USED TO DETERMINE THE CELL CONSTANT, WHICH IS ALREADY KNOWN FOR THIS INSTRUMENT. IN PRACTICE, AT LEAST ONE STANDARD PER RUN IS USED TO CHECK THE SYSTEM. STANDARDS MAY BE MADE AS FOLLOWS:

WATER TEMP.	g KCL*/L SOL'N	µmhos/cm AT 25°C FROM KCL (ADD WATER READING)	METHOD REFERENCE
25°C	0.7456	1413	EPA 120.1, 9050
20±2°C	7.4365	12,856	SOP-PNL-ASTM D1125
20±2°C	0.7440	1408.8	↓
20±2°C	100 mL OF THIS SOL'N. *(DRIED 2 HR. AT 105°C)	146.93	

HOLD TIME AND PRESERVATION: EPA 120.1 AND 9050 RECOMMEND 24 HOURS, HOWEVER, 28 DAYS IS USED AS THE MAXIMUM HOLD TIME, AS SPECIFIED BY THE EPA (SW-846, 3RD ED., REV. 0). WHEN POSSIBLE, SAMPLES ARE ANALYZED WITHIN 7 DAYS. SAMPLES SHOULD BE REFRIGERATED AND PROTECTED FROM GAIN OR LOSS OF DISSOLVED GASES.

To Page No. NA

Witnessed & Understood by me,	Date	Invented by	Date	
Christine R Lui	09/08/92	Recorded by J. J. Rouse	09/03/92	000063

DATA CHEM LABORATORIES
A SOREMSON COMPANY

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Raw Data
Inorganic Department
Inventory Checklist

- [NA] Analytical protocol sheets
- [NA] Analysis summary sheets
- [NA] Instrument print-outs of the calibration standards and appropriate QC
- [NA] Instrument print-outs of each exposure or instrumental reading of the initial analysis
- [NA] Instrument print-outs of each exposure or instrumental reading of subsequent analyses
- [NA] Chromatograms and/or strip charts
- [NA] Analysis worksheets
- [NA] Muddle sheets or other calculation sheets

Raw Data
Inorganic Department
Reviewer Checklist

- X The Raw Data Inventory Checklist above is complete.
- NA Specific analytical protocols are followed for particular contract requirements.
- NA Print-outs of raw data are legible.
- NA Print-outs are dated and signed as required.
- NA Instrument ID# is recorded on raw data.
- NA Conditions of instrument setup are noted.
- NA Standard and reporting units are listed.
- NA Chromatograms and/or strip charts are labeled correctly.
- NA Cross-outs are performed as required (initialed and dated with an explanation if needed). No correction fluid or correction tape has been used on any raw data.
- NA Dilutions are clearly noted.
- NA All weights, dilution, and volumes used to obtain the reported values are recorded.
- NA Data not used are crossed off and the reason for non-use is explained sufficiently.

000064

Assembled by: Cynthia Adams 06/06/95 (Signature, Date) Reviewed by: Suzanne W. Bowe 06/16/95 (Signature, Date)

3/95

Filter # 0445 HEG Task # _____

Date/Time Dessicated 10/25/94 1500 Project # _____

Date/Time/Analyst 10/26/94 1500 [illegible] Tare Wt. 405.8 mg.
Date/Time/Analyst 10/26/94 1130 [illegible] Tare Wt. 405.8 mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.

Avg = 405.8

Filter # 0446 HEG Task # _____

Date/Time Dessicated 10/25/94 1500 Project # _____

Date/Time/Analyst 10/26/94 1500 [illegible] Tare Wt. 406.3 mg.
Date/Time/Analyst 10/27/94 1130 [illegible] Tare Wt. 406.3 mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.

Avg = 406.3

Filter # 0447 HEG Task # _____

Date/Time Dessicated 10/25/94 1500 Project # _____

Date/Time/Analyst 10/26/94 1500 [illegible] Tare Wt. 405.6 mg.
Date/Time/Analyst 10/27/94 1130 [illegible] Tare Wt. 405.7 mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.

Avg = 405.6

Filter # 0448 HEG Task # _____

Date/Time Dessicated 10/25/94 1500 Project # _____

Date/Time/Analyst 10/26/94 1500 [illegible] Tare Wt. 403.6 mg.
Date/Time/Analyst 10/27/94 1130 [illegible] Tare Wt. 403.8 mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.

Avg = 403.7

HAYDEN ENVIRONMENTAL GROUP INC

7678

Filter # 000227 HEG Task # _____

Date/Time Dessicated 3-1-95 1530 Project # _____

Date/Time/Analyst 3/2/95 1545 Tare Wt 404.8 mg.
Date/Time/Analyst 3/10/95 1000 Tare Wt 404.9 mg.
Date/Time/Analyst _____ Tare Wt _____ mg.
Date/Time/Analyst _____ Tare Wt _____ mg.

Avg = 404.8

Filter # 000228 HEG Task # _____

Date/Time Dessicated 3-1-95 1530 Project # _____

Date/Time/Analyst 3/2/95 1545 Tare Wt 414.1 mg.
Date/Time/Analyst 3/10/95 1000 Tare Wt 414.1 mg.
Date/Time/Analyst _____ Tare Wt _____ mg.
Date/Time/Analyst _____ Tare Wt _____ mg.

Avg = 414.1

Filter # 000229 HEG Task # _____

Date/Time Dessicated 3-1-95 1530 Project # _____

Date/Time/Analyst 3/2/95 1545 Tare Wt 409.3 mg.
Date/Time/Analyst 3/10/95 1000 Tare Wt 409.4 mg.
Date/Time/Analyst _____ Tare Wt _____ mg.
Date/Time/Analyst _____ Tare Wt _____ mg.

Avg = 409.4

Filter # 000230 HEG Task # _____

Date/Time Dessicated 3-1-95 1530 Project # _____

Date/Time/Analyst 3/2/95 1545 Tare Wt 418.5 mg.
Date/Time/Analyst 3/10/95 1000 Tare Wt 418.5 mg.
Date/Time/Analyst _____ Tare Wt _____ mg.
Date/Time/Analyst _____ Tare Wt _____ mg.

Avg = 418.5

HAYDEN ENVIRONMENTAL GROUP, INC.

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 1 of 2
Part 1 of 1

JUN 6 1995

Date
Agency Identification Number S95-0498-AE
Account No. 03025

Hayden Environmental Group, Inc.
561 Congress Park Drive
Dayton, OH 45459
Attention: David Robinson

FAX (513) 438-3000
Telephone (513) 438-3010

Sampling Collection and Shipment

Sampling Site Rel# 1000006737 Date of Collection May 09, 1995

Date Samples Received at Laboratory May 18, 1995

Analysis

Method of Analysis Gravimetric

Date(s) of Analysis June 05, 1995

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Gross Weight grams								
REAG BLK	EO 3868	FILTER	0.407								†
EO-1	EO 3871	FILTER	0.400								†
LO-1	EO 3874	FILTER	0.405								†
FLD BLK	EO 3877	FILTER	0.420								†
Limit of Detection			NA								

† See comment on last page.
ND Parameter not detected.
NR Parameter not requested.
** See comment on last page.
( ) Parameter between LOD and LOQ.

Analyst: Jim L. Gale

Reviewer: Robert L. Quigley

Laboratory Supervisor: Patricia A. Klinger

000067

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

JUN 8 1995

Date _____

Agency Identification Number S95-0498-AE

General Set Comments

The samples in this set were collected on 70 mm glass fiber filters that have no tare weights. The samples were analyzed for gross weight and reported in grams. Note: Glass fiber filters are not recommended for total weight analysis.

Sample Comments

Laboratory Number	-- Comment --
EO 3868	See set comment.
EO 3871	See set comment.
EO 3874	See set comment.
EO 3877	See set comment.

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547 / (801) 266-7700
A Sorenson Company

CHAIN-OF-CUSTODY

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498 * | Reporting Group: AE

Client: Hayden Environmental Group, Inc. | Account: 03025 | Results due by: 7-Jun-1995

Comments:

Verified: AM 5-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Analysis: Particulates	# Bottles
11-May-1995	REAG BLK	EO 3868			FILTER	X	1
10-May-1995	EO-1	EO 3871			FILTER	X	1
9-May-1995	LO-1	EO 3874			FILTER	X	1
11-May-1995	FLD BLK	EO 3877			FILTER	X	1

Received: Date/Time/Signature 5-18-95 1000 Hmarylt McGuire

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Hmarylt McGuire	5-23-95 1700	WALLIN R-23-1	STORAGE R-23-1
R-23-1 CA	05/25/95 17:00	Cynthia Adams	analysis / R-403-1
Cynthia Adams	05/30/95	JC Cole	
JC Cole	5/31/95 1330	RCL RM 311 DR	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

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69000

8 of 9

7678

Sample Work Order

QC Clearance: _____
Project Manager: Keith R. Nicholson
Client: Hayden Environmental Group, Inc.
Account: 03025
Project/Task: COMM-ENV
Date Received: 18-May-1995
Date for Mailing Report: 7-Jun-1995

DCL Root Set ID: S95-0498 *
DCL Lab. Name: EO 3868–EO 3877
Total # Samples: 4
Sample Medium: FILTER

Earliest Sampling Date: 9-May-1995
Preparation Type:

Rep. Group	Minerals Analysis Analytes Requested	Latest Prep. Date	Latest Anal. Date	No. of Samp.	Split ID	Storage Location	Analysis/Prep. Method	Inst.	
AE	~~Particulates~~ total weight			4		Rab lab	GRAV	GRAV	

Special Instructions: Gross wt if no tare wts avail.

Section Manager Approval: [signature] 5/24/95
Patricia A. Klinger — Date

~~it appears that total weights have already been done — see 191 Tally sheet. Therefore, the samples were passed onto Rad Chem on 5/30/95~~ [signature]

Use 6K filter as a blank corr. factor for determining tot. wt. of the other filters.

EO 3868 0.407, 0.409
71 0.400, 0.399
74 0.404, 0.405
K 77 0.419, 0.420

10mm GFF

QC 35659 (37mm GFF) 0.0747g, 0.0747g

Other Sections Receiving Sample Portions: IW, WA

000070

Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498 * | Reporting Group | AE

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AM 5-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix				Analysis		Particulates									# Bottles
11-May-1995	REAG BLK	EO 3868			FILTER						X									1
10-May-1995	EO-1	EO 3871			FILTER						X									1
9-May-1995	LO-1	EO 3874			FILTER						X									1
11-May-1995	FLD BLK	EO 3877			FILTER						X									1

Received: Date/Time/Signature 5-18-95 1000 Hmarylis McGuire

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY			
Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Hmarylis McGuire	5-23-95 1700	WALKIN R-231	STORAGE R-231

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

000071

8292

Check box if there is a continuation page ☐

Printed 5/23/1995 16:41

Form: COFC1.01-SWV2.30

Fernald Environmental Restoration Management Corporation

RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO:
SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFFL. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT 84123

	SAMPLE NUMBER		SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153657	REAG. BLK.	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* PARTICULATES ED 3868	ANALYSIS ED 3881
2	200153662	REAG. BLK.	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3869 CAN SEAL NO. 2470	
3	200153666	REAG. BLK.	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3870	
4	200153658	EO-1	G.F. FILTER	5/10/95 0930	PETRI DISH	1 x FLTR	NONE	* 3871	3882
5	200153663	EO-1	ACETONE	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3872	
6	200153667	EO-1	D.I. WATER	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3873	
7	200153659	LO-1	G.F. FILTER	5/9/95 1450	PETRI DISH	1 x FLTR	NONE	* 3874	3883
8	200153664	LO-1	ACETONE	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3875	
9	200153668	LO-1	D.I. WATER	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3876	
10	200153660	FLD BLK	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* 3877	3884
11	200153665	FLD BLK	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3879	

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOWOMETRY (AS LISTED IN METHOD 114)

* = TOTAL U (CE); GROSS A/B (DE); PARTICULATES (AE, BE); GAMMA SCAN (EE)

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN 5-17-95 COOLER	SEALED	w/ C-O-C	TAPE				

RELINQUISHED BY	DATE	TIME	RECEIVED DATE	RECEIVED TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaryllis McGuire
3.			3.		

NO.		DISTRIBUTION OF COPIES
1	WHITE	REMAIN WITH SAMPLES
2	YELLOW	OFF-SITE LAB
3	PINK	FERMCO DATA REVIEW AND REPORTING
4	BLUE	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

220000

8 2 0 2

RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO:
SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO P.O. BOX 398704 CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFF. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT. 84123

	SAMPLE NUMBER	SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153669 FLD BLK	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	PARAMETERS *EO 3880	ANALYSIS EO 3884
2							CAN SEAL NO: 2470	
3								
4								
5								
6								
7								
8								
9								
10								
11								

LAST ENTRY MNC 5-17-95

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOUOMETRY (AS LISTED IN METHOD 114)

*= TOTAL U; GROSS A/B; PARTICULATES; GAMMA SCAN

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN COOLER SEALED w/C-O-C TAPE MNC 5-17-95							

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaly Lis McKenzie
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	WHITE	REMAIN WITH SAMPLES
2	YELLOW	OFF-SITE LAB
3	PINK	FERMCO DATA REVIEW AND REPORTING
4	BLUE	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

FS-F-3366 (REV. 12/31/92)

8292

7678

HAYDEN

DEN
ENTAL GROUP, INC.

Post-it® Fax Note 7671	Date 11-21-94	# of pages ▶ 8
To Customer Service	From D. Robinson	
Co./Dept.	Co.	
Phone #	Phone #	
Fax # 801-268-9992	Fax #	

November 21, 1994

Customer Service
DataChem Laboratories
960 West Levoy Drive
Salt Lake City, UT 84123

Subject: Laboratory Services / Subcontracting
FERMCO RFP # PES-80706

Dear Sir or Madam:

We are submitting a proposal in response to the above request and would like to receive a quotation from your firm for laboratory services. Your firm's name was given to us by FERMCO as a qualified subcontract laboratory.

We request a firm, fixed cost proposal to provide analytical support for the scope of work included with this letter. To summarize the analytical scope of work:

1. Provide analysis by USEPA Method 5 (40CFR Part 61) for three field samples from Source EP8-013 and one field sample from EP11-002. Filter, probe rinse (Acetone), and backhalf (H_2O) samples will be included as well as quality control samples (see below). Samples are to be analyzed for total particulate.

2. Following particulate analysis, the fractions for each field sample shall be composited and analyzed to total activity and uranium per EPA Method 114, and according to, the protocol shown in Table 2 of the scope of work.

3. Proposed cost shall include cost to analyze and report results for all field samples and quality control samples. Quality control samples to be included in the sample sets:

   - Performance evaluation sample, to be supplied by FERMCO, and analyzed for total Uranium in the same manner as the composites (Item 6, scope of work).

   - Two field blank acetone rinse samples, two field blank filters, two laboratory filter blanks (supplied by Hayden), laboratory matrix spike/spike duplicate, and two container blanks.

000074

F010331.94

TALLY SHEET

RELEASE #: 1000006737 (Can 1 of 1)
PO #: 95-H053 (DCL-SLC)
DATE SHIPPED: 17-May-95
MATERIAL: Periodic Confirmatory Measurements – Filters, Acetone, Water

ANALYSIS: Total U; Gross A/B; Particulates; Gamma Scan

Composite Sample Number	Lot Number	Sample Container Size	AnaLis/ FACTS Number	Gross Weight lbs.	Tare Weight lbs.	Net Weight lbs.
REAG. BLK.	W050-725-P047-6737	PETRI DISH	200153657	0.106	0.088	0.018
REAG. BLK.	W050-725-P047-6737	1L PLST	200153662	0.511	0.141	0.370
REAG. BLK.	W050-725-P047-6737	1L PLST	200153666	0.943	0.141	0.802
EO-1	W050-725-P047-6737	PETRI DISH	200153658	0.106	0.088	0.018
EO-1	W050-725-P047-6737	1L PLST	200153663	0.423	0.141	0.282
EO-1	W050-725-P047-6737	1L PLST	200153667	1.128	0.141	0.987
LO-1	W050-725-P047-6737	PETRI DISH	200153659	0.101	0.088	0.013
LO-1	W050-725-P047-6737	1L PLST	200153664	0.542	0.141	0.401
LO-1	W050-725-P047-6737	1L PLST	200153668	0.934	0.141	0.793
FLD. BLK.	W050-725-P047-6737	PETRI DISH	200153660	0.106	0.088	0.018
FLD. BLK.	W050-725-P047-6737	1L PLST	200153665	0.476	0.141	0.335
FLD. BLK.	W050-725-P047-6737	1L PLST	200153669	1.163	0.141	1.022
				6.537	1.480	5.057

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FEMP	RADIOLOGICAL SURVEY REPORT COVER SHEET		SURVEY NUMBER: 95-05-G1-194	
DATE: 5-17-95	LOCATION: Lab	RCT: [redacted]	BADGE: 10148	PAGE: 1 OF 4
TIME: 0700	LEVEL: 580-	SIGNATURE: [redacted]		
WORK PERMIT NUMBER: N/A		REVIEWER:	BADGE:	
RWP NUMBER:		SIGNATURE:	DATE:	

ATTACHMENTS:		
3	Pg 2 MURF	
	Pg 3 & 4 Teletec Printout	

REASON FOR SURVEY	
	Sample surveyed for release to go offsite. Gross area smears taken. Direct frisk inside drum
	Release # ~~[illegible]~~ 6737 N/A

SUMMARY:

N/A

No.	Distribution of Copies
1	Radiological Records
2	Files

Supervisor Notified	Time	Date	Notified by:
			000076

FS-F-1993-0 (REV. 04/18/95)

MATERIAL UNRESTRICTED RELEASE FORM

SURVEY # 95-05-G11-194

DATE: 5-17-95 | LOCATION: Lab | RCT: [redacted] | SIGNATURE: [redacted] | BADGE #: 10148/721

MODEL #	SERIAL NUMBER	TYPE ALPHA or BETA/GAMMA	CAL DUE DATE	BKGD. (CPM)	CF	MDA (DPM)	PMP/PERFORMANCE TEST YES	PMP/PERFORMANCE TEST NO
LB5100	7	α, β, γ	6-95	.2 / 1.72	.289 / .418	18.2 / 19.8	X	
M-3	77101	β, γ	10-95	60	30	3K	X	
			N					
				A				

TIME	RCT INIT	MATERIAL DESCRIPTION	RELEASE CRITERIA SURF or VOL	RESULTS ALPHA REMOVABLE	RESULTS ALPHA FIXED + REM	RESULTS BETA/GAMMA REMOVABLE	RESULTS BETA/GAMMA FIXED + REM	RELEASE JUSTIFICATION	RECIPIENT	MATERIAL RELEASE EVALUATOR BADGE # and SIGNATURE (1)
0700	bo/[illegible]	200153667	SURF	-0 *	N/A	0 *	<MDCR		Don Stack	
		200153668		2 *		4 *	<MDCR			
		200153669		2 *		4 *	<MDCR			
		200153666		-0 *		4 *	<MDCR			
		200153662		-0 *		0 *	<MDCR			
		200153665		-0 *		-1 *	<MDCR			
		200153664		2 *		-1 *	<MDCR			
		200153663		2 *		8 *	<MDCR			
		200153658 (AF)		-0 *		0 *	<MDCR	*		N/A
		200153659 (AF)		5 *		-1 *	<MDCR	*		
		200153660 (AF)		-0 *		0 *	<MDCR	*		
		200153657 (AF)		2 *		0 *	<MDCR	*		
		10 gal Can		-0 *		0 *	<MDCR			
					N					
						A				

* M:ESH:BCRC; 93 613

Comments: Release # 6737

(AF) = Air Filter

REVIEW: INITIAL | DATE

(1) Material Release Evaluator approval required in accordance with RC-DPT-019, (Release of Materials from the Fernald Environmental Management Project), if any of the following conditions exist:

a. Material has areas which are inaccessible for proper survey.
b. Process knowledge is used to support the release decision.
c. Material must be evaluated for the potential of contamination beneath any coating applied while the material was in the Controlled Area.
d. Material must be evaluated for the potential for any volume or in-depth radioactivity within the material matrix.
e. Special case items are being released, such as radioactive consumer products, industrial sources, etc.
f. Material has detectable activity present and the activity is below the contamination limits listed in Attachment A of RC-DPT-019.

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WED MAY 17, 1995 08:57:36
GROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1 MIN)

SAMPLE NUMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	08:58:45
2	1	4	2	4	09:00:06
3	1	4	2	4	09:01:27
4	0	4	-0	4	09:02:48
5	0	2	-0	0	09:04:10
6	0	1	-0	-1	09:05:30
7	1	1	2	-1	09:06:51
8	1	6	2	8	09:08:13
9	0	2	-0	0	09:09:34
10	2	1	5	-1	09:10:55
11	0	2	-0	0	09:12:16
12	1	2	2	0	09:13:37
~~12~~	~~0~~	~~5~~	~~-0~~	~~6~~	~~09:14:58~~ hd 5-17-95

OPERATION COMPLETE

FEMP RADIOLOGICAL S... REPORT pg 2 of 4
SURVEY # 9505-GH-194 ... 5-17-95
[redacted]

VED MAY 17, 1995 10:04:45 PE
GROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1 MIN)

7678

SAMPLE NUMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	10:05:55

OPERATION COMPLETE

FEMP RADIOLOGICAL SURVEY REPORT pg 4 of 4
SURVEY # 95-05-G11-194 DATED 5-17-95
(name) (signature)
RCT: [redacted]
REVIEWER:

7678

Section: ER 26 05/17/19 95

ERG93
GUIDE 26

ACETONE, 3, UN1090, II

POTENTIAL HAZARDS

FIRE OR EXPLOSION

Flammable/combustible material; may be ignited by heat, sparks or flames.
Vapors may travel to a source of ignition and flash back.
Container may explode in heat of fire.
Vapor explosion hazard indoors, outdoors or in sewers.
Runoff to sewer may create fire or explosion hazard.

HEALTH HAZARDS

May be poisonous if inhaled or absorbed through skin.
Vapors may cause dizziness or suffocation.
Contact may irritate or burn skin and eyes.
Fire may produce irritating or poisonous gases.
Runoff from fire control or dilution water may cause pollution.

EMERGENCY ACTION

Keep unnecessary people away; isolate hazard area and deny entry.
Stay upwind; keep out of low areas.
Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.
Isolate for 1/2 mile in all directions if tank, rail car or tank truck is involved in fire.
CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, CALL CHEMTREC AT 1-800-424-9300.
If water pollution occurs, notify the appropriate authorities.

FIRE

Small Fires: Dry chemical, CO2, water spray or alcohol-resistant foam.
Do not use dry chemical extinguishers to control fires involving nitromethane or nitroethane.
Large Fires: Water spray, fog or alcohol-resistant foam.
Move container from fire area if you can do it without risk.
Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.
For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

SPILL OR LEAK

Shut off ignition sources; no flares, smoking or flames in hazard area.
Stop leak if you can do it without risk.
Water spray may reduce vapor; but it may not prevent ignition in closed spaces.

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Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal.
Large Spills: Dike far ahead of liquid spill for later disposal.

IRST AID

Move victim to fresh air and call emergency medical care; if not breathing, give artificial respiration; if breathing is difficult, give oxygen.
In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water.
Remove and isolate contaminated clothing and shoes at the site.

SURVEY RECORD

Date: 5-18-95

By: MM

Survey Type: Meter: ✓ Smear: ✓ Leak Test: ___

Approved: ___ RSO

Date: ___

Survey Instrument:

Manufacturer: LUDLUM
Model Number 19
Serial Number: ~~159~~ 102872
Calib. Date: 9-30-94

FERMCO ~~MX-0199~~ IH. 5-18-95

BACKGROUND <0.011 mR/hr

Scintillation Counter:

Manufacturer: Ludlum
Model Number: 2929
Lab Instrument No.: 108227

Sample Count Time - 1 min.

	ALPHA	BETA
BLANK (CPM)	0.08	65.03
COUNTER EFFICIENCY (%)	0.3517	0.4083

Mixed Waste Lab Survey Location or Sealed Source Number	Instrument Reading	Disc Smears/Leak Test Swipes						Remarks
		Alpha			Beta			
		CPM	DPM	µCi	CPM	DPM	µCi	
M095 0341 OUTSIDE	<0.012 mR/hr	0			68			<0.011 mR/hr @ 1 METER
INSIDE	<0.012	0			63			
SAMPLE	<0.012	0			71			

DATACHEM LABORATORIES COOLER RECEIPT CHECKLIST

1. Client Name: FERMCO
2. Project/Task/Site: REL. #: 6737
3. Time/Date of Receipt: 1000 5-18-95
4. # Coolers Received: 1
5. Custody Seals?: (Circle) Present/Absent* Intact/Broken*
   Tamper Evident: Yes/No
6. Condition of Coolers: Acceptable/Unacceptable
7. Comments on Cooler Condition (#6): 1 DRUM
8. Ice Present: Yes/No* Frozen/Melted
   Comments: RAD CHEM ONLY
9. Temp Control: Present/Not Included
10. Location Temp Taken: Control/Between Samples
11. Taken by: (Signature) 5-18-95 MARK MENDENHALL (Printed Name) 5-18-95 1130 (Date/Time)
12. Are all temperatures within project specific guidelines? Yes/No*

*CONTACT PROJECT MANAGER. COMPLETE INCIDENT REPORT.

Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp
1	MC95 0341	20 °C	6	MC95	°C	11	MC95	°C
2	MC95	°C	7	MC95	°C	12	MC95	°C
3	MC95	°C	8	MC95	°C	13	MC95	°C
4	MC95	°C	9	MC95	°C	14	MC95	°C
5	MC95	°C	10	MC95	°C	15	MC95	°C

SAMPLE RECEIVING INCIDENT REPORT

Client Sample #'s Affected: _____ DCL Set I.D: _____

DCL Sample #'s Affected: _____

- ☐ Cooler Temps out of Range
- ☐ Missing Cooler
- ☐ Broken/Leaking Samples
- ☐ Missing Samples/Bottles
- ☐ Missing Paperwork
- ☐ Incorrect Preservation
- ☐ Low Sample Volume
- ☐ Incorrect Bottle Type
- ☐ Missing/Incorrect Bottle Labels
- ☐ Other

BRIEFLY DESCRIBE PROBLEM:

Delivered to: _____ Project Manager

Delivered by: _____ Signature/Date/Time

RESPONSE REQUIRED WITHIN 24 HOURS

PROJECT MANAGER'S COMMENTS:

Returned to Sample Receipt by: _____ (Date/Time/Signature)

Accepted for Sample Receipt by: _____ (Date/Time/Signature)

8/95

Project Protocol Worksheet

Client	Hayden Environmental
Project	FERMCO Emissions Tests
Project Manager	Keith Nicholson
Account Number	3025
Project Duration	1 Month

Date 5/17/95

Mailby Days 20 days

Sample Stream	Project/ Method Type	QC Requirements			Preparation Requirements			Reporting Requirements			LOD/MDL/IDL Requirements		
595	EPA Clean Air	**Inorganic**			**Inorganic**			Full CLP SOW			CLP SOW		
		Blank			CLP SOW			CLP Forms Only			SW-846 Rev.		
		LCS			SW-846 Rev.			CLP Disk			EPA Clean H2O		
		MS			USAEC 1990			RLIMS	X		USAEC 1990		
		MSD			USAEC 1993			Raw Data			USAEC 1993		
		MD			Microwave			Custom Disk			NIOSH		
		USAEC			Hotplate			ARF			DCL SOP		
		MSA			DCL SOP			QC Forms (specify below)	X		Client specified		
		Tracer			Other			Case Narrative	X		Other	X	Method
		Other			**Radiochemistry**			Calibration data	X		**QC Limits**		
		Radiochemistry			Hotplate leach			Continuing Cal. data			Method	X	
		Blank	X		Muffle furnace			Reporting Basis			Statistical		
		LCS	X		Total dissolution			IRDMIS			Client specified		
		MS	X	U only	Microwave			# of TICs					
		MSD	X	U only	DCL SOP			Counting Error (1 or 2 sigma)					
		Tracer			Other	X	Mthd. 114	TPU					
		Other	X	MD	**Organic**			RPD					
		Organic			CLP SOW			RER					
		Blank			SW-846 Rev.			Send raw data	X				
		LCS			USAEC 1990			Store raw data					
		MS/MSD			USAEC 1993			Other					
		USAEC			Sonication								
		Surrogate			Soxhlet								
		Other			Continuous								
					Separatory funnel								
					DCL SOP								
					Other								

David Robinson

Batch samples with other sets? (●) yes ( ) no

MS/MD/MSD sample identified? ( ) yes (●) no

Specific spiking levels identified? (●) Method ( ) DCL SOP ( ) other (see comments)

Comments: Analyze for U by EPA method 114 A-5, and by laser phosphoremetry - report results separately. Desired detection limits are 50 ug/sample for colorimetric U, and 1 ug/sample for phosphoremetry. Analyze for gamma, alpha, and beta for method 114 G-1, A-4 and B-4. Desired detection limits are 10 pCi for alpha and beta, a 20 pCi/sample as Cs-137 for gamma. Liquid samples and filters are to be analyzed for total particulates prior to other analyses. The client will specify how any compositing of liquid samples is to be conducted.

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DataChem Laboratories

PROJECT RESOURCE UTILIZATION SUMMARY

Date: 5/31/85

DCL Reference #: 585-458-AE

Company/Agency Name: Hayden Envir.

Analytes/Method: GRAV.

LABOR

Date	Personnel	Total Hours
5/31/85	[illegible]	1.5
6/6/85	R. [illegible]	15 min.

SUPPLIES

Item	Quantity

EQUIPMENT USAGE

Major Instrumentation	Total Hours
Sartorius Basic	.2

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DATA CHEM LABORATORIES

A SORENSON COMPANY

DataChem ID # 595-0498-AE

Analyte TOT. WT.

Filter Type GFF

Analyst Rosy

Instrument Saturn R100

Method Gravimetric

Date Analyzed 5/31/95

Results in milligrams

Sample Number	No. 1	No. 2	No. 3	Average	Range	Range/Ave	LOD
EO 38C8	0.407	0.407		0.407	0.000	Ø	NA
QL 39659	0.0777g	0.0777g					

Checked by Robert J. Dinsmore 6/6/95

000086

PAK 6/6/95

SALT LAKE CITY OFFICE
960 WEST LeVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
801 266-7700, FAX 801 268-9992

CINCINNATI OFFICE
4388 GLENDALE-MILFORD ROAD
CINCINNATI, OHIO 45242-3706
513 733-5336, FAX 513 733-5347

BALTIMORE OFFICE
10 JULIET LANE, SUITE #203
BALTIMORE, MARYLAND 21236-1220
410 494-3612, FAX 410 529-5355

RICHLAND OFFICE
313 WELLSIAN WAY
RICHLAND, WASHINGTON 99352-4116
509 943-5858, FAX 509 943-5654

LEADING ANALYTICAL CHEMISTRY INTO THE 21ST CENTURY[SM]

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DATA CHEM LABORATORIES
A Sorenson Company

COVER FORM (TYPE I)
SINGLE METHOD ANALYSES

SUMMARY INFORMATION

Form RLIMS63M-V1.0
06229511295286
Page 1

G954S00V

Date Reported.....: JUN 23 1995

Date Printed.....: 22-JUN-95 11:29
DCL Client Group..: S95-0498-FE

Client Ref Number.: Not Provided
Release Number....: Not Provided

Analysis Method...: EPA 114 A-5

Hayden Environmental Group, Inc.
Attention: David Robinson
561 Congress Park Drive
Dayton, OH 45459

Client Sample ID	Lab Sample ID
BL-57496-1	BL-57496-1
QC-57496-1	QC-57496-1
REAG BLK	EO 3881
EO-1	EO 3882
EO-1	EO 3882MD
LO-1	EO 3883
FLD BLK	EO 3884

000087

This report is 14 total pages.

Analyst: Robert B. Copenhafer

Reviewer: Norman K. Christensen

Laboratory Supervisor: Norman K. Christensen

001

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547 / (801) 266-7700
FAX (801) 268-9992

DATA CHEM LABORATORIES
A Sorenson Company

FORM H (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE GROUP COMMENTS

Date Printed.....: 22-JUN-95 11:29
DCL Client Group..: S95-0498-FE

Client Name.....: Hayden Environmental Group, Inc.

Release Number....: Not Provided

Sample Group Comments

Possible positive interferences could have been in the extract of sample EO 3882. The developed color of this sample was brownish-yellow, versus clear, bright yellow of the standards.

General Information

The DCL QC Database maintains all numerical figures which are input from the pertinent data source. These data have not been rounded to significant figures nor have they been moisture corrected. Reports generated from the system, however, list data which have been rounded to the number of significant figures requested by the client or deemed appropriate for the method. This may create minor discrepancies between data which appear on the QC Summary Forms (Forms B-G) and those that would be calculated from rounded analytical results. Additionally, if a moisture correction is performed, differences will be observed between the QC data and the surrogate data reported on Form A (or other report forms) and corresponding data reported on QC Summary Forms. In these cases, the Form A will indicate the "Report Basis" as well as the moisture value used for making the correction.

Symbol Definitions

ND - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry).
B - For organic analysis the qualifier indicates that this analyte was found in the method blank. For inorganic analysis the qualifier signifies the value is between the IDL and PQL.
J - The qualifier indicates that the value is between the MDL and the PQL. It is also used for indicating an estimated value for tentatively identified compounds in mass spectrometry where a 1:1 response is assumed.

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FAX (801) 268-9992

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06229511295286
Page 3

S955N03C

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: BL-57496-1
DCL Sample Name...: BL-57496-1

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: Not Applicable
Reporting Units...: ug/sample
☐As Received ☐Dried

Date Received.....: Not Applicable
DCL Client Group.....: S95-0498-FE

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Uranium	20-JUN-95 00:00		ND		1	50

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FAX (801) 268-9992

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S955N03D

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: QC-57496-1
DCL Sample Name...: QC-57496-1

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: Not Applicable
Reporting Units...: ug/sample
☐ As Received ☐ Dried

Date Received.....: Not Applicable
DCL Client Group.....: S95-0498-FE

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Uranium	20-JUN-95 00:00		2100		1	50

Sample Comments

Target = 2250 ug/sample

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547 / (801) 266-7700
FAX (801) 268-9992

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954S01F

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: REAG BLK |153657,62,66
DCL Sample Name...: EO 3881

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-FE

Matrix.....: F/LIQ
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: ug/sample
Report Basis.....: ☐As Received ☐Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Uranium	20-JUN-95 00:00		ND		1	50

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547 / (801) 266-7700
FAX (801) 268-9992

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954S01G

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: EO-1 |153658,63,67
DCL Sample Name...: EO 3882

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: 10-MAY-95 00:00
Reporting Units...: ug/sample
Report Basis.....: ☐As Received ☐Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-FE

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Uranium	20-JUN-95 00:00		1500		1	50

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547 / (801) 266-7700
FAX (801) 268-9992

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06229511295286

S955N03F

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: EO-1 |153658,63,67
DCL Sample Name...: EO 3882MD

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: Not Provided
Reporting Units...: ug/sample
Report Basis.....: ☐As Received ☐Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-FE

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Uranium	20-JUN-95 00:00		1500		1	50

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547 / (801) 266-7700
FAX (801) 268-9992

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06229511295286

S954S01H

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: LO-1 |153659,64,68
DCL Sample Name...: EO 3883

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: 09-MAY-95 00:00
Reporting Units...: ug/sample
Report Basis.....: ☐As Received ☐Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-FE

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Uranium	20-JUN-95 00:00		ND		1	50

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FAX (801) 268-9992

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: FLD BLK |153660,65,69
DCL Sample Name...: EO 3884

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: ug/sample
Report Basis.....: ☐As Received ☐Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-FE

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Uranium	20-JUN-95 00:00		ND		1	50

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FAX (801) 268-9992

DATA CHEM LABORATORIES
A Sorenson Company

FORM B (TYPE I)
SINGLE METHOD ANALYSES

Form RLIMS63B-V1.0
06229511295286

S955N03D

QUALITY CONTROL DATA SHEET
LABORATORY CONTROL SAMPLE (LCS)

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: F/LIQ
Reporting Units.....: ug/sample

LCS Source.....:

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5

Date Printed.....: 22-JUN-95 11:29
DCL Sample Name...: QC-57496-1

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Target	Result	Percent Recovery	QC Limits	QC Flag
Uranium	20-JUN-95 00:00	2250	2100	92.2		

NOTE: This data is from the LIMS not the QC database. (2073.8)

Sample Comments

Target = 2250 ug/sample

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FAX (801) 268-9992

DATA CHEM LABORATORIES
A Sorenson Company

FORM C (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
BLANK SAMPLE

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: F/LIQ
Reporting Units.....: ug/sample

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5

Date Printed.....: 22-JUN-95 11:29
DCL Sample Name...: BL-57496-1

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Result	CRDL
Uranium	20-JUN-95 00:00	ND	50

NOTE: This data is from the LIMS not the QC database.

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FAX (801) 268-9992

DATA CHEM LABORATORIES
A Sorenson Company

FORM E (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX DUPLICATE SAMPLE

S955N03F

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: F/LIQ
Reporting Units.....: ug/sample

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5

Date Printed.....: 22-JUN-95 11:29
DCL Sample Name...: BO 3882MD

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Duplicate Result	Mean	Range	RPD	QC Limits	QC Flag
Uranium	20-JUN-95 00:00	1500	1500	1500	0.000	0.00		

NOTE: This data is from the LIMS not the QC database.

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FAX (801) 268-9992

DATA CHEM
LABORATORIES
A SORENSON COMPANY

Case Narrative

Method: EPA 114 A-5
Analysis: Uranium
Preparation Method: EPA 114 A-5
LIMS Group #: G955N00Q
DCL Set ID: S95-0498-FE

Client: Hayden Environmental Group
Account: 3025
Matrix: F/LIQ

General Set Information: Samples were analyzed for uranium according to method EPA 114 A-5 using visible spectrophotometry.

Method Summary: The method was based on the measurement of a uranium-dibenzoylmethane complex. Absorbance was measured at 415nm. Uranium was first oxidized to uranium (VI) by potassium permanganate. An acid-deficient aluminum nitrate, tetrapropylammonium nitrate solution acted as a salting solution to quantitatively extract the uranium into a methyl isobutyl ketone (MIBK) solvent. The organic solvent was then scrubbed with an acid-deficient solution of aluminum nitrate containing tartrate, oxalate, and (ethylenedinitrilo)tetraacetic acid. Ferrous sulfamate was then added to remove interfering ions. Dibenzoylmethane, in a mixture of ethyl alcohol and pyridine, was added to the MIBK phase to develop the color.

Sample Preparation: The samples were prepared as composites of glass fiber filter samples and liquid samples.

Dilution(s): None required.

Method and Sample QC data: The method blank (BL-57496-1) was below the LOD. The LCS (QC-57496-1) recovery was 92.2%.

MD Analysis: The RPD between EO 3882 and EO 3882MD was 0.00.

Instrument QC: The ICV recovery was 91.8%, and the ICB was below the LOD. All other calibration verifications and blanks met method specified acceptance criteria

Flagging Codes: None.

NC/CAR: No NC/CARs were required for this set.

Miscellaneous Comments: The developed color of sample EO 3882 was brownish-yellow, and the developed color of the standards was a clear, bright yellow. It is possible that there were positive interferences in the sample.

Robert B. Copenhafer 6/22/95

Robert B. Copenhafer Date

DATA CHEM LABORATORIES
A SORENSON COMPANY

Datapackage Table of Contents

Information pertaining to this datapackage is divided into the four categories listed below (see colored divider sheets for an inventory list of each category). If an item on the inventory is not applicable, an "NA" is placed in the corresponding check box. A Case Narrative immediately precedes this Table of Contents and contains pertinent information about this datapackage.

Analytical Forms . . . . . Yellow
Sample Tracking Documentation . . . . . Pink
Analytical Documentation . . . . . Blue
Raw Data . . . . . Green

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Analytical Forms
Inventory Checklist

[X] Case Narrative

[N/A] IRDMIS	[N/A] Commercial Forms
[ ] Data Review and Approval Form	[ ] Analytical or Environmental Report Form
[ ] IRDMIS Reports	[ ] Set Comments
[ ] GC/MS TICs	[X] Applicable QC Sheets

[X] RLIMS Forms	
[X] Cover Form	[N/A] Matrix Spike/Matrix Spike Duplicate Sample (Form F)
[X] Sample Group Comments (Form H)	[N/A] Surrogate Summary (Form G)
[X] Sample Analysis Data Sheet (Form A)	[N/A] Initial Calibration Form
[X] Laboratory Control Sample (Form B)	[N/A] Continuing Calibration Form
[X] Blank Sample (Form C)	[N/A] Serial Dilution Form
[N/A] Matrix Spike Sample (Form D)	[N/A] Endrin Breakdown or BFB/DFTPP GC/MS Tuning Form
[X] Matrix Duplicate Sample (Form E)	[N/A] Internal Standard Form

Analytical Forms
Reviewer Checklist

X The Analytical Forms Inventory Checklist above is complete.

X The Case Narrative was completed in accordance with procedures in DCL SOP XX-DC-020, "Datapackage Preparation and Validation."

X Only the correct report forms are used (IRDMIS or Commercial Forms or RLIMS Forms).

X All fields on the report forms are complete with the correct information, including signatures.

X Results for all samples are reported per client request.

X Units, methods, and dates are correct.

X Sample and/or set comments are complete.

Assembled by: Bobby Cornhofer 6/22/95 (Signature, Date) Reviewed by: Norman K. Christensen 6/22/95 (Signature, Date)

/95

DATA CHEM LABORATORIES
A SORENSON COMPANY

7678

Sample Tracking Documentation
Inventory Checklist

- [x] LIMS Grouping Reports
- [x] DataChem Laboratories (DCL) Chain-of-Custody Record
- [x] DCL Sample Work Order
- [N/A] Copy of numbered Nonconformance/Corrective Action Report (NC/CAR)
- [N/A] Copy of Client-Related Problem Report (CPR)

Sample Tracking Documentation
Reviewer Checklist

X The Sample Tracking Documentation Inventory Checklist above is complete.

X DCL Chain-of-Custody Record provides signatures for the sample portion reported in this data package.

X DCL Chain-of-Custody Record was completed in accordance with procedures in DCL SOP XX-DC-006 "Chain-of-Custody and Laboratory Tracking."

X Methods specified on the Sample Work Order were performed or an explanation for deviations is provided.

X Special instructions on the Sample Work Order were followed.

X Project Management instructions on the Project Protocol Worksheet were followed.

X Client's requests were met or an explanation is provided in the Case Narrative.

NA NC/CAR and/or CPR were completed in accordance with procedures in DCL SOP QC-DC-006 "Nonconformance/Corrective Action Report (NC/CAR) Procedures."

000102

Assembled by: [signature] 6/21/95 Reviewed by: Norman K. Christensen 6/22/95
Signature Date Signature Date

DataChem Laboratories
LIMS - Sample Master System
Analysis Group Report

Date: 21-JUN-1995 10:01
User: COPENHAFER

RLIMS15-V1.1

Analysis Run Name: G955N00Q

Group ID: G955N00Q

Samples: 7

Pos	Laboratory Sample Name	Field Sample Name	Laboratory Sample ID	Laboratory Group Name	Accnt. Number
1	BL-57496-1	BL-57496-1	S955N03C	S95-0498-FE	03025
2	QC-57496-1	QC-57496-1	S955N03D	S95-0498-FE	03025
3	EO 3881	REAG BLK	S954S01F	S95-0498-FE	03025
4	EO 3882	EO-1	S954S01G	S95-0498-FE	03025
5	EO 3882MD	EO-1	S955N03F	S95-0498-FE	03025
6	EO 3883	LO-1	S954S01H	S95-0498-FE	03025
7	EO 3884	FLD BLK	S954S01J	S95-0498-FE	03025

----- END OF LISTING -----

Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498 *

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AM 9-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Reporting Group	CE	DE	DE	EE	# Bottles
						Analysis	Total Uranium	Gross Alpha	Gross Beta	Gamma scan	
11-May-1995	REAG BLK	EO 3881			F/LIQ		X	X	X	X	1
10-May-1995	EO-1	EO 3882			F/LIQ		X	X	X	X	1
9-May-1995	LO-1	EO 3883			F/LIQ		X	X	X	X	1
11-May-1995	FLD BLK	EO 3884			F/LIQ		X	X	X	X	1

Received: Date/Time/Signature 5-18-95 / 1000 / Amaryllis McClure

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Amaryllis McClure	06/07/95 1110	Dave Reddick	Prep Total U, α, β, γ α
Dave Reddick	06/07/95 1530	Max A. Barnett	γ Scan
Max A. Barnett	6/8/95 1600	Dave Reddick	Total U
Dave Reddick	6/9/95 0830	Robin Fully	gross α/β
Robin Fully	6/12/95 1600	Bobby Copenhafer	U anal.
Bobby Copenhafer	6/12/95 1605	R-84-1 RSC 6/12/95	Storage/R-84-1
R-84-1 RSC 6/20/95	6-20-95 0800	Bobby Copenhafer	U anal.

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: Uranium | Lab Notebook No.: 2930

Prepared/Analyzed by: RSC | Date/Time: 6-20-95 / 0800

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Bobby Copenhafer	6-20-95 0800	Bobby Copenhafer	U anal.

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Printed 5/22/1995 14:05

8292

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7678

Sample Work Order

QC Clearance: _____

Project Manager: Keith R. Nicholson Keith Hayes

Client: Hayden Environmental Group, Inc.

Account: 03025

Project/Task: COMM-ENV

Date Received: 18-May-1995

Date for Mailing Report: 7-Jun-1995 par

DCL Root Set ID: S95-0498-FE

DCL Lab. Name: EO 3881–EO 3884

Total # Samples: 4

Sample Medium: F/LIQ

Earliest Sampling Date: 9-May-1995

Preparation Type:

Rep. Group	Ion Chromatography/UV_VIS Analytes Requested	Latest Prep. Date	Latest Anal. Date	No. of Samp.	Split ID	Storage Location	Analysis/Prep. Method	Inst.	
FE	Uranium			4		Rad Lab	EPA 114 A-5	~~COLOR~~ VIS SPEC	

Special Instructions: See NKC for method.

Section Manager Approval: NKC 6/1/95

Norman K. Christensen Date

000105

Other Sections Receiving Sample Portions: IM, IW, WA

DataChem Laboratories/ 960 West LeVoy Drive / Salt Lake City, Utah 84123

Form: WO1.04-SWV2.12 PRINTED 5/25/1995 11:46

Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498-FE | Reporting Group: FE

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AM 5-23-96

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix					Analysis: Uranium									# Bottles
11-May-1995	REAG BLK	EO 3881			F/LIQ					X									1
10-May-1995	EO-1	EO 3882			F/LIQ					X									1
9-May-1995	LO-1	EO 3883			F/LIQ					X									1
11-May-1995	FLD BLK	EO 3884			F/LIQ					X									1

Received: Date/Time/Signature 5-18-95 / 1000 / Amaryllis McGhee

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Amaryllis McGhee			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

000106

8292

Check box if there is a continuation page ☐

Printed 5/25/1995 11:46

Form: COFC1.01-SWV2.30

RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO: SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFFL. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT 84123

	SAMPLE NUMBER		SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153657	REAG. BLK.	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* PARTICULATES ED 3868	ANALYSIS ED 3881
2	200153662	REAG. BLK.	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3869	
3	200153666	REAG. BLK.	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3870	
4	200153658	EO-1	G.F. FILTER	5/10/95 0930	PETRI DISH	1 x FLTR	NONE	* 3871	3882
5	200153663	EO-1	ACETONE	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3872	
6	200153667	EO-1	D.I. WATER	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3873	
7	200153659	LO-1	G.F. FILTER	5/9/95 1450	PETRI DISH	1 x FLTR	NONE	* 3874	3883
8	200153664	LO-1	ACETONE	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3875	
9	200153668	LO-1	D.I. WATER	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3876	
10	200153660	FLD BLK	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* 3877	3884
11	200153665	FLD BLK	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3879	

CAN SEAL NO. 2470

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOUOMETRY (AS LISTED IN METHOD 114)

* = TOTAL U (CE); GROSS A/B (DE); PARTICULATES (AE BE); GAMMA SCAN (EE)

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN		CAN					

5-17-95 COOLER SEALED w/ C-O-C TAPE

RELINQUISHED BY	DATE	TIME	RECEIVED DATE	RECEIVED TIME	RECEIVED BY
1. Matt Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaryllis McGlowe
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	*WHITE*	REMAIN WITH SAMPLES
2	*YELLOW*	OFF-SITE LAB
3	*PINK*	FERMCO DATA REVIEW AND REPORTING
4	*BLUE*	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

FS-F-3366 (REV. 12/31/92)

000107

8292

RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO.:
SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFFL. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT 84123

	SAMPLE NUMBER		SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153657	REAG. BLK.	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* PARTICULATES EO 3868	ANALYSIS EO 3881
2	200153662	REAG. BLK.	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3869	
3	200153666	REAG. BLK.	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3870	
4	200153658	EO-1	G.F. FILTER	5/10/95 0930	PETRI DISH	1 x FLTR	NONE	* 3871	3882
5	200153663	EO-1	ACETONE	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3872	
6	200153667	EO-1	D.I. WATER	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3873	
7	200153659	LO-1	G.F. FILTER	5/9/95 1450	PETRI DISH	1 x FLTR	NONE	* 3874	3883
8	200153664	LO-1	ACETONE	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3875	
9	200153668	LO-1	D.I. WATER	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3876	
10	200153660	FLD BLK	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* 3877	3884
11	200153665	FLD BLK	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3879	

CAN SEAL NO. 2970

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLUOMETRY (AS LISTED IN METHOD 114)

* = TOTAL U (CE); GROSS A/B (DE); PARTICULATES (AE); GAMMA SCAN (EE)

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				5-17-95 COOLER	CAN SEALED	w/ C-o-C	TAPE				

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. Matt Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1055	Angela McClure
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	WHITE	REMAIN WITH SAMPLES
2	YELLOW	OFF-SITE LAB
3.	PINK	FERMCO DATA REVIEW AND REPORTING
4	BLUE	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

FS-F-3368 (REV. 12/31/92)

000108

8292

Fernald Environmental Restoration Management Corporation
RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO:
SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFF. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT. 84123

	SAMPLE NUMBER	SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153669 FLD BLK	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	*EO 3880 PARTICULATES	EO 3884 ANALYSIS
2							CAN SEAL NO: 2970	
3								
4								
5								
6								
7								
8								
9								
10								
11								

LAST ENTRY MMC 5-17-95

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOUOMETRY (AS LISTED IN METHOD 114)

*= TOTAL U; GROSS A/B; PARTICULATES; GAMMA SCAN

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN COOLER SEALED W/C-O-C TAPE MMC 5-17-95							

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaly his McKewee
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	*WHITE*	REMAIN WITH SAMPLES
2	*YELLOW*	OFF-SITE LAB
3	*PINK*	FERMCO DATA REVIEW AND REPORTING
4	*BLUE*	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

FS-F-3366 (REV. 12/31/92)

000109

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RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

SAR/CR: SDL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFF. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT. 84123

	SAMPLE NUMBER	SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153669 FLD BLK	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	* PARTICULATES ED 3,880	ANALYSIS ED 38884
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

CAN SEAL NO. 2970

LAST ENTRY MM 5-17-95

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOUOMETRY (AS LISTED IN METHOD 114)

*= TOTAL U; GROSS A/B; PARTICULATES; GAMMA SCAN

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN COOLER		SEALED w/C-O-C TAPE					

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1025	Amelia Mathews
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	*WHITE*	REMAIN WITH SAMPLES
2	*YELLOW*	OFF-SITE LAB
3	*PINK*	FERMCO DATA REVIEW AND REPORTING
4	*BLUE*	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

FS-F-3366 (REV. 12/31/92)

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HAYDEN

DEN
NTAL GROUP, INC.

Post-it® Fax Note 7671	Date 11-21-94	# of pages ▶ 8
To Customer Service	From D. Robinson	
Co./Dept.	Co.	
Phone #	Phone #	
Fax # 801-268-9992	Fax #	

November 21, 1994

Customer Service
DataChem Laboratories
960 West Levoy Drive
Salt Lake City, UT 84123

Subject: Laboratory Services / Subcontracting
FERMCO RFP # PES-80706

Dear Sir or Madam:

We are submitting a proposal in response to the above request and would like to receive a quotation from your firm for laboratory services. Your firm's name was given to us by FERMCO as a qualified subcontract laboratory.

We request a firm, fixed cost proposal to provide analytical support for the scope of work included with this letter. To summarize the analytical scope of work:

1. Provide analysis by USEPA Method 5 (40CFR Part 61) for three field samples from Source EP8-013 and one field sample from EP11-002. Filter, probe rinse (Acetone), and backhalf (H_2O) samples will be included as well as quality control samples (see below). Samples are to be analyzed for total particulate.

2. Following particulate analysis, the fractions for each field sample shall be composited and analyzed to total activity and uranium per EPA Method 114, and according to the protocol shown in Table 2 of the scope of work.

3. Proposed cost shall include cost to analyze and report results for all field samples and quality control samples. Quality control samples to be included in the sample sets:

   - Performance evaluation sample, to be supplied by FERMCO, and analyzed for total Uranium in the same manner as the composites (Item 6, scope of work).

   - Two field blank acetone rinse samples, two field blank filters, two laboratory filter blanks (supplied by Hayden), laboratory matrix spike/spike duplicate, and two container blanks.

F010331.94

TALLY SHEET

RELEASE #: 1000006737 (Can 1 of 1)
PO #: 95-H053 (DCL-SLC)
DATE SHIPPED: 17-May-95
MATERIAL: Periodic Confirmatory Measurements – Filters, Acetone, Water

ANALYSIS: Total U; Gross A/B; Particulates; Gamma Scan

Composite Sample Number	Lot Number	Sample Container Size	AnaLis/ FACTS Number	Gross Weight lbs.	Tare Weight lbs.	Net Weight lbs.
REAG. BLK.	W050-725-P047-6737	PETRI DISH	200153657	0.106	0.088	0.018
REAG. BLK.	W050-725-P047-6737	1L PLST	200153662	0.511	0.141	0.370
REAG. BLK.	W050-725-P047-6737	1L PLST	200153666	0.943	0.141	0.802
EO-1	W050-725-P047-6737	PETRI DISH	200153658	0.106	0.088	0.018
EO-1	W050-725-P047-6737	1L PLST	200153663	0.423	0.141	0.282
EO-1	W050-725-P047-6737	1L PLST	200153667	1.128	0.141	0.987
LO-1	W050-725-P047-6737	PETRI DISH	200153659	0.101	0.088	0.013
LO-1	W050-725-P047-6737	1L PLST	200153664	0.542	0.141	0.401
LO-1	W050-725-P047-6737	1L PLST	200153668	0.934	0.141	0.793
FLD. BLK.	W050-725-P047-6737	PETRI DISH	200153660	0.106	0.088	0.018
FLD. BLK.	W050-725-P047-6737	1L PLST	200153665	0.476	0.141	0.335
FLD. BLK.	W050-725-P047-6737	1L PLST	200153669	1.163	0.141	1.022
				6.537	1.480	5.057

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FEMP	RADIOLOGICAL SURVEY REPORT COVER SHEET		SURVEY NUMBER: 95-05-G11-194	
DATE: 5-17-95	LOCATION: Lab	RCT: [redacted]	BADGE: 10148	PAGE: 1 OF 4
TIME: 0700	LEVEL: 580-	SIGNATURE: [redacted]		
WORK PERMIT NUMBER: N		REVIEWER:	BADGE:	
RWP NUMBER: N		SIGNATURE:	DATE:	

ATTACHMENTS: 3	
Pg 2 MURF	
Pg 3 & 4 Tennelco Printout	

REASON FOR SURVEY	
Sample surveyed for release to go offsite. Gross	
area smears taken. Direct frisk inside drum	
Release # ~~[illegible]~~ 6737 N/A	

SUMMARY:

N/A

No.	Distribution of Copies
1	Radiological Records
2	Files

Supervisor Notified	Time	Date	Notified by:
			000113

FS-F-1993-0 (REV. 04/18/95)

MATERIAL UNRESTRICTED RELEASE FORM

SURVEY # 95-05-G11-194

DATE: 5-17-95 | LOCATION: Lab | RCT [redacted] | [redacted] | BADGE #: 10148/721

MODEL	SERIAL NUMBER	TYPE ALPHA or BETA/GAMMA	CAL DUE DATE	BKGD. (CPM)	CT	MDA (DPM)	INSP./PERFORMANCE TEST YES	NO
LB5100	7	α, β, γ	6-95	.2 / 1.72	.289 / 4.18	18.2 / 19.8	X	
M-3	77101	β, γ	10-95	60	30	3K	X	
			N					
				A				

TIME	RCT INIT	MATERIAL DESCRIPTION	RELEASE CRITERIA SURF or VOL	RESULTS ALPHA REMOVABLE	ALPHA FIXED + REM	β/γ REMOVABLE	β/γ FIXED + REM	RELEASE JUSTIFICATION	RECIPIENT	MATERIAL RELEASE EVALUATOR BADGE # and SIGNATURE (1)
0700	bw/DC	200153667	SURF	-0 *	N/A	0 *	<MDCP		Doug Stack	
		200153668		2 *		4 *	<MDCP			
		200153669		2 *		4 *	<MDCP			
		200153666		-0 *		4 *	<MDCP			
		200153662		-0 *		0 *	<MDCP			
		200153665		-0 *		-1 *	<MDCP			
		200153664		2 *		-1 *	<MDCP			
		200153663		2 *		8 *	<MDCP			N/A
		200153658 (AF)		-0 *		0 *	<MDCP	*		
		200153659 (AF)		5 *		-1 *	<MDCP	*		
		200153660 (AF)		-0 *		0 *	<MDCP	*		
		200153657 (AF)		2 *		0 *	<MDCP	*		
		10 gal Can		-0 *		0 *	<MDCP			
					N					
						A				

* M:ESH:RCRC; 93 613

Comments: Release # 6737
(AF) = Air Filter

REVIEW:	INITIAL	DATE

(1) Material Release Evaluator approval required in accordance with RC-DPT-019, (Release of Materials from the Fernald Environmental Management Project), if any of the following conditions exist:

a. Material has areas which are inaccessible for proper survey.
b. Process knowledge is used to support the release decision.
c. Material must be evaluated for the potential of contamination beneath any coating applied while the material was in the Controlled Area.
d. Material must be evaluated for the potential for any volume or in-depth radioactivity within the material matrix.
e. Special case items are being released, such as radioactive consumer products, industrial sources, etc.
f. Material has detectable activity present and the activity is below the contamination limits listed in Attachment A of RC-DPT-019.

FS-F-3915 (06/22/94) equil.

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ED MAY 17, 1995 08:57:36
ROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1 MIN)

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AMPLE UMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	08:58:45
2	1	4	2	4	09:00:06
3	1	4	2	4	09:01:27
4	0	4	-0	4	09:02:48
5	0	2	-0	0	09:04:10
6	0	1	-0	-1	09:05:30
7	1	1	2	-1	09:06:51
8	1	6	2	8	09:08:13
9	0	2	-0	0	09:09:34
10	2	1	5	-1	09:10:55
11	0	2	-0	0	09:12:16
12	1	2	2	0	09:13:37
~~12~~	~~0~~	~~5~~	~~0~~	~~6~~	~~09:14:58~~ bad 5-17-95

PERATION COMPLETE

FEMP RADIOLOGICAL S... REPORT pg 3 of 4
SURVEY # 95-05-GH-194 ...D 5-17-95
[redacted]

ED MAY 17, 1995 10:04:45 WE
ROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1 MIN)

7678

AMPLE UMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	10:05:55

PERATION COMPLETE OF

FEMP RADIOLOGICAL SURVEY REPORT pg 4 of 4
SURVEY # 95-05-G11-194 DATED 5-17-95
(name) (signature)
RCT: [redacted]
REVIEWER:

ACETONE, 3, UN 1090, II

POTENTIAL HAZARDS

IRE OR EXPLOSION

Flammable/combustible material; may be ignited by heat, sparks or flames.
Vapors may travel to a source of ignition and flash back.
Container may explode in heat of fire.
Vapor explosion hazard indoors, outdoors or in sewers.
Runoff to sewer may create fire or explosion hazard.

EALTH HAZARDS

May be poisonous if inhaled or absorbed through skin.
Vapors may cause dizziness or suffocation.
Contact may irritate or burn skin and eyes.
Fire may produce irritating or poisonous gases.
Runoff from fire control or dilution water may cause pollution.

EMERGENCY ACTION

Keep unnecessary people away; isolate hazard area and deny entry.
Stay upwind; keep out of low areas.
Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.
Isolate for 1/2 mile in all directions if tank, rail car or tank truck is involved in fire.
CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, CALL CHEMTREC AT 1-800-424-9300.
If water pollution occurs, notify the appropriate authorities.

RE

mall Fires: Dry chemical, CO2, water spray or alcohol-resistant foam.
o not use dry chemical extinguishers to control fires involving nitromethane or nitroethane.
arge Fires: Water spray, fog or alcohol-resistant foam.
ove container from fire area if you can do it without risk.
pply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.
or massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
ithdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

ILL OR LEAK

hut off ignition sources; no flares, smoking or flames in hazard area.
top leak if you can do it without risk.
ater spray may reduce vapor; but it may not prevent ignition in closed spaces.

Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal.
Large Spills: Dike far ahead of liquid spill for later disposal.

FIRST AID

Move victim to fresh air and call emergency medical care; if not breathing, give artificial respiration; if breathing is difficult, give oxygen.
In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water.
Remove and isolate contaminated clothing and shoes at the site.

SURVEY RECORD

Date: 5-18-95 Survey Type: Meter: ✓ Smear: ✓ Leak Test: ___ Approved: ___ RSO Date: ___

By: MM

Survey Instrument:

Manufacturer: LUDLUM
Model Number 19
Serial Number: ~~159~~ 102872
Calib. Date: 9-30-94

FERMCO ~~MX-0199~~ IH. MM 5-18-95

BACKGROUND <0.011 mR/hr

Scintillation Counter:

Manufacturer: Ludlum
Model Number: 2929
Lab Instrument No.: 108227

Sample Count Time - 1 min.

	ALPHA	BETA
BLANK (CPM)	0.08	65.03
COUNTER EFFICIENCY (%)	0.3517	0.4083

Mixed Waste Lab Survey Location or Sealed Source Number	Instrument Reading	Disc Smears/Leak Test Swipes						Remarks
		Alpha			Beta			
		CPM	DPM	µCi	CPM	DPM	µCi	
MC95 0341 OUTSIDE	<0.012 mR/hr	0			68			<0.011 mR/hr @ 1 METER
INSIDE	<0.012	0			63			
SAMPLE	<0.012	0			71			

7678

DATACHEM LABORATORIES COOLER RECEIPT CHECKLIST

1. Client Name: FERMCO
2. Project/Task/Site: REL. #: 6737
3. Time/Date of Receipt: 1000 5-18-95
4. # Coolers Received: 1
5. Custody Seals?: (Circle) Present/Absent* Intact/Broken*
   Tamper Evident: Yes/No
6. Condition of Coolers: Acceptable/Unacceptable
7. Comments on Cooler Condition (#6): 1 DRUM
8. Ice Present: Yes/No* Frozen/Melted
   Comments: RAD CHEM ONLY
9. Temp Control: Present/Not Included
10. Location Temp Taken: Control/Between Samples
11. Taken by: (Signature) MARK MENDENHALL (Printed Name) 5-18-95 1130 (Date/Time)
12. Are all temperatures within project specific guidelines? Yes/No*

*CONTACT PROJECT MANAGER. COMPLETE INCIDENT REPORT.

Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp
1	MC95 0341	20 °C	6	MC95	°C	11	MC95	°C
2	MC95	°C	7	MC95	°C	12	MC95	°C
3	MC95	°C	8	MC95	°C	13	MC95	°C
4	MC95	°C	9	MC95	°C	14	MC95	°C
5	MC95	°C	10	MC95	°C	15	MC95	°C

SAMPLE RECEIVING INCIDENT REPORT

Client Sample #'s Affected: _____ DCL Set I.D: _____

DCL Sample #'s Affected: _____

- ☐ Cooler Temps out of Range
- ☐ Missing Cooler
- ☐ Broken/Leaking Samples
- ☐ Missing Samples/Bottles
- ☐ Missing Paperwork
- ☐ Incorrect Preservation
- ☐ Low Sample Volume
- ☐ Incorrect Bottle Type
- ☐ Missing/Incorrect Bottle Labels
- ☐ Other

BRIEFLY DESCRIBE PROBLEM:

Delivered to: _____ Project Manager

Delivered by: _____ Signature/Date/Time

RESPONSE REQUIRED WITHIN 24 HOURS

PROJECT MANAGER'S COMMENTS:

Returned to Sample Receipt by: _____ (Date/Time/Signature)

Accepted for Sample Receipt by: _____ (Date/Time/Signature)

Project Protocol Worksheet

Client	Hayden Environmental
Project	FERMCO Emissions Tests
Project Manager	Keith Nicholson
Account Number	3025
Project Duration	1 Month

Date 5/17/95

Mailby Days 20 days

Sample Stream	Project/ Method Type	QC Requirements			Preparation Requirements			Reporting Requirements			LOD/MDL/IDL Requirements		
S95	EPA Clean Air	**Inorganic**			**Inorganic**			Full CLP SOW			CLP SOW		
		Blank			CLP SOW			CLP Forms Only			SW-846 Rev.		
		LCS			SW-846 Rev.			CLP Disk			EPA Clean H2O		
		MS			USAEC 1990			RLIMS	X		USAEC 1990		
		MSD			USAEC 1993			Raw Data			USAEC 1993		
		MD			Microwave			Custom Disk			NIOSH		
		USAEC			Hotplate			ARF			DCL SOP		
		MSA			DCL SOP			QC Forms (specify below)	X		Client specified		
		Tracer			Other			Case Narrative	X		Other	x	Method
		Other			**Radiochemistry**			Calibration data	X		**QC Limits**		
		Radiochemistry			Hotplate leach			Continuing Cal. data			Method	X	
		Blank	X		Muffle furnace			Reporting Basis			Statistical		
		LCS	X		Total dissolution			IRDMIS			Client specified		
		MS	X	U only	Microwave			# of TICs					
		MSD	X	U only	DCL SOP			Counting Error (1 or 2 sigma)					
		Tracer			Other	X	Mthd. 114	TPU					
		Other	X	MD	**Organic**			RPD					
		Organic			CLP SOW			RER					
		Blank			SW-846 Rev.			Send raw data	X				
		LCS			USAEC 1990			Store raw data					
		MS/MSD			USAEC 1993			Other					
		USAEC			Sonication								
		Surrogate			Soxhlet								
		Other			Continuous								
					Separatory funnel								
					DCL SOP								
					Other								

David Robinson

Batch samples with other sets? (●) yes ( ) no

MS/MD/MSD sample identified? ( ) yes (●) no

Specific spiking levels identified? (●) Method ( ) DCL SOP ( ) other (see comments)

Comments: Analyze for U by EPA method 114 A-5, and by laser phosphoremetry - report results separately. Desired detection limits are 50 ug/sample for colorimetric U, and 1 ug/sample for phosphoremetry. Analyze for gamma, alpha, and beta for method 114 G-1, A-4 and B-4. Desired detection limits are 10 pCi for alpha and beta, a 20 pCi/sample as Cs-137 for gamma. Liquid samples and filters are to be analyzed for total particulates prior to other analyses. The client will specify how any compositing of liquid samples is to be conducted.

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Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498-FE | Reporting Group: FE

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AM 5-23-96

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Analysis: Uranium	# Bottles
11-May-1995	REAG BLK	EO 3881			F/LIQ	X	1
10-May-1995	EO-1	EO 3882			F/LIQ	X	1
9-May-1995	LO-1	EO 3883			F/LIQ	X	1
11-May-1995	FLD BLK	EO 3884			F/LIQ	X	1

Received: Date/Time/Signature 5-18-95 / 1000 / Amaryllis McGhee

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Amaryllis McGhee			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

000122

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Check box if there is a continuation page ☐

Printed 5/25/1995 11:46

Form: COFC1.01-SWV2.30

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DATA CHEM

SAMPLE DISPOSAL CONTROL FORM

DataChem Laboratories ID Number: S95-0498-FE Analyst: NSC

Date of Analysis: 6/20/95 Analyzed For: Uranium

DISPOSAL CLASSIFICATION†

Sample Number	Not Hazardous	Hazardous	Code‡	Explanation
EO 3881	[✓]	[ ]		
*EO 3882	[✓]	[ ]		* Analysis done by rad. chem. group
EO 3883	[✓]	[ ]		Confirms samp. as not Hazardous.
EO 3884	[✓]	[ ]		
	[ ]	[ ]		
	[ ]	[ ]		
	[ ]	[ ]		
	[ ]	[ ]		

†A sample (either solid or liquid) is to be classified as hazardous waste upon disposal if it exhibits any of the following conditions:

‡Code (if classified as hazardous)

1. If it or its extract contains levels of the contaminants ≥ those specified in Table 1.
2. If it contains significant levels of organic solvents.
3. If it is corrosive (pH ≤ 2 or ≥ 12.5).
4. If it is reactive or explosive.
5. If it contains ≥ 50ppm PCB.
6. If it is determined by the chemist or manager that the sample is hazardous, poisonous, or toxic (e.g., some of the pesticide formulations). If this code is used, an explanation must be provided.

TABLE 1 TCLP levels.

EPA HW No.	Contaminant	Limit (mg/l)
D004	Arsenic	5.000
D005	Barium	100.0
D018	Benzene	0.5
D006	Cadmium	1.0
D019	Carbon Tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0
D022	Chloroform	6.0
D007	Chromium	5.0
D023	o-Cresol	200.0*
D024	m-Cresol	200.0*
D025	p-Cresol	200.0*
D026	Cresol	200.0*
D016	2,4-D	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D012	Endrin	0.02
D031	Heptachlor	0.008
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D008	Lead	5.0
D013	Lindane	0.4
D009	Mercury	0.2
D014	Methoxychlor	10.0
D035	Methyl Ethyl Ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D010	Selenium	1.0
D011	Silver	5.0
D039	Tetrachloroethylene	0.7
D015	Toxaphene	0.5
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D017	2,4,5-TP Silvex	1.0
D043	Vinyl Chloride	0.2

* If the concentrations for o-, m-, and p-cresol can not be differentiated, the total cresol concentration is used.

The constituents in bold are the original EP toxicity constituents.

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DataChem Laboratories

PROJECT RESOURCE UTILIZATION SUMMARY

Date: 6/21/95

DCL Reference #: S95-0498-FE

Company/Agency Name: Hayden Environmental Group, Inc

Analytes/Method: Uranium / ASTM E 318-91

LABOR

Date	Personnel	Total Hours
6/19/95	KSC	9
6/20/95	KSC	10
6/20/95	SJS	8
6/21/95	KSC	8.5
6/22/95	KSC	1.5

SUPPLIES

Item	Quantity
Evergreen Disp. Centrifuge tubes	25

EQUIPMENT USAGE

Major Instrumentation	Total Hours
Hitachi 100-20	1.5

DATA CHEM
LABORATORIES
A SORENSON COMPANY

Case Narrative

Analysis:	Gross Alpha/ Gross Beta	**Client:**	Hayden Environmental Group
		Account:	3025
Preparation SOP#:	WR-DC-200	**Matrix:**	Filter/ Liquid
Analysis SOP#:	WR-EP-300		
DCL Set ID's:	S95-0498-DE		

General Set Information: The above sample set consisted of four filter samples with additional liquid material that was added upon completion of the dissolution of the filter.

Method Summary: The sample was ashed in a muffle furnace, wet ashed using hydrofluoric acid followed by ashing with concentrated nitric acid. At this point, the additional liquid sample material was added and the combined volume was reduced to approximately 3 mL. The sample was transferred into a PMP container and diluted to 50 mL. A 10 mL aliquot was removed to prepare the sample for analysis. The sample was evaporated and transferred to a flamed, acid-washed, stainless steel planchet and dried under infra-red lamps. After cooling, the prepared sample was counted on a gas proportional counter.

Sample Preparation: The samples were analyzed according to procedure with no exceptions.

Quality Control Data:

Laboratory Control Sample: One LCS was analyzed within this data set and met all QC requirements.

Blank: One blank was analyzed within this data set and was within QC requirements.

Matrix Spike/ Matrix Spike Duplicate: One matrix spike and matrix spike duplicate was analyzed within this data set. The recovery for the matrix spike was 105% and was flagged by QC. Upon review, it was determined that this result was acceptable.

This report is 13 total pages.

Instrument QC: All initial and continued calibrations were within QC requirements.

NC/CAR: No NC/ CARs were required for this lot.

Miscellaneous Comments: The contractual control limits of 10 pCi/ sample for alpha and beta were met for all samples.

Robin Lully 6/14/95

Robin Lully Date

DATA CHEM LABORATORIES
A Sorenson Company

COVER FORM (TYPE I)
SINGLE METHOD ANALYSES

SUMMARY INFORMATION

Form RLIMS63M-V1.0
06149509532299
Page 1

G954P01Y

Date Reported.....:

Date Printed.....: 14-JUN-95 09:53
DCL Client Group..: S95-0498-DE

Client Ref Number.: Not Provided
Release Number....: Not Provided

Analysis Method...: WR-EP-300

Hayden Environmental Group, Inc.
Attention: David Robinson
561 Congress Park Drive
Dayton, OH 45459

Client Sample ID	Lab Sample ID
BL-57147-1	BL-57147-1
QC-57147-1	QC-57147-1
REAG BLK	EO 3881
EO-1	EO 3882
LO-1	EO 3883
FLD BLK	EO 3884

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Analyst: Robin D. Lully

Reviewer:

Laboratory Supervisor:

003

DATA CHEM LABORATORIES
A Sorenson Company

FORM H (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE GROUP COMMENTS

G954P01Y

Date Printed.....: 14-JUN-95 09:53
DCL Client Group..: S95-0498-DE

Client Name.....: Hayden Environmental Group, Inc.

Release Number....: Not Provided

General Information

The DCL QC Database maintains all numerical figures which are input from the pertinent data source. These data have not been rounded to significant figures nor have they been moisture corrected. Reports generated from the system, however, list data which have been rounded to the number of significant figures requested by the client or deemed appropriate for the method. This may create minor discrepancies between data which appear on the QC Summary Forms (Forms B-G) and those that would be calculated from rounded analytical results. Additionally, if a moisture correction is performed, differences will be observed between the QC data and the surrogate data reported on Form A (or other report forms) and corresponding data reported on QC Summary Forms. In these cases, the Form A will indicate the "Report Basis" as well as the moisture value used for making the correction.

Symbol Definitions

ND - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry).
B - For organic analysis the qualifier indicates that this analyte was found in the method blank. For inorganic analysis the qualifier signifies the value is between the IDL and PQL.
J - The qualifier indicates that the value is between the MDL and the PQL. It is also used for indicating an estimated value for tentatively identified compounds in mass spectrometry where a 1:1 response is assumed.

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06149511294388
Page 3

S955802Q

Date Printed.....: 14-JUN-95 11:29
Client Sample Name: BL-57147-1
DCL Sample Name...: BL-57147-1

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: Not Applicable
Reporting Units...: pCi/sample
☐As Received ☐Dried

Date Received.....: Not Applicable
DCL Client Group.....: S95-0498-DE

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-DC-200
Aliquot Weight/Volume: 350.0 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000-A2
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Detection Limit	Result±Error ±TPU Error	Flag	Dilution	CRDL
Gross Alpha	09-JUN-95 00:00	1.2E-1	1.6E-1±8.1E-2 ±8.7E-2		1	10
Gross Beta	09-JUN-95 00:00	3.4E-1	9.9E-1±2.1E-1 ±2.9E-1		1	10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06149509532299
Page 4

S955802R

Date Printed.....: 14-JUN-95 09:53
Client Sample Name: QC-57147-1
DCL Sample Name...: QC-57147-1

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: Not Applicable
Reporting Units...: pCi/~~Lit~~ Sample
☐ As Received ☐ Dried

Date Received.....: Not Applicable
DCL Client Group.....: S95-0498-DE

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-DC-200
Aliquot Weight/Volume: 350.0 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000-A3
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Detection Limit	Result±Error ±TPU Error	Flag	Dilution	CRDL
Gross Alpha	09-JUN-95 00:00	1.8E-1	7.0E1±1.3E0 ±1.4E1		1	10
Gross Beta	09-JUN-95 00:00	3.8E-1	5.6E1±1.0E0 ±1.1E1		1	10

R. Gilley
6/14/95

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06149509532299
Page 5

S954P067

Date Printed.....: 14-JUN-95 09:53
Client Sample Name: REAG BLK |153657,62,66
DCL Sample Name...: EO 3881

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-DE

Matrix.....: F/LIQ
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: pCi/~~Lit~~ Sample
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-DC-200
Aliquot Weight/Volume: 10.0 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000-A2
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Detection Limit	Result±Error ±TPU Error	Flag	Dilution	CRDL
Gross Alpha	09-JUN-95 00:00	5.6E-1	5.1E0±6.8E-1 ±1.2E0		5	10
Gross Beta	09-JUN-95 00:00	8.9E-1	5.5E0±7.3E-1 ±1.3E0		5	10

R. Jolly
6/14/95

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06149509532299
Page 6

S954P068

Date Printed.....: 14-JUN-95 09:53
Client Sample Name: EO-1 |153658,63,67
DCL Sample Name...: EO 3882

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: 10-MAY-95 00:00
Reporting Units...: pCi/~~Lit~~ Sample
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-DE

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-DC-200
Aliquot Weight/Volume: 10.0 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000 -A3
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Detection Limit	Result±Error ±TPU Error	Flag	Dilution	CRDL
Gross Alpha	09-JUN-95 00:00	8.6E-1	4.2E0±7.8E-1 ±1.1E0		5	10
Gross Beta	09-JUN-95 00:00	9.9E-1	2.0E0±7.4E-1 ±8.4E-1		5	10

R. Tilley
6/14/95

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06149509532299
Page 7

S954P069

Date Printed.....: 14-JUN-95 09:53
Client Sample Name: LO-1 |153659,64,68
DCL Sample Name...: EO 3883

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: 09-MAY-95 00:00
Reporting Units...: pCi/~~Lit~~ Sample
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-DE

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-DC-200
Aliquot Weight/Volume: 10.0 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000-A4
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Detection Limit	Result±Error ±TPU Error	Flag	Dilution	CRDL
Gross Alpha	09-JUN-95 00:00	7.7E-1	6.5E0±8.4E-1 ±1.5E0		5	10
Gross Beta	09-JUN-95 00:00	1.1E0	2.9E0±8.3E-1 ±1.0E0		5	10

R. Tulley
6/14/95

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06149509532299
Page 8

S954P06B

Date Printed.....: 14-JUN-95 09:53
Client Sample Name: FLD BLK |153660,65,69
DCL Sample Name...: EO 3884

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: pCi/~~Lit~~ Sample
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-DE

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-DC-200
Aliquot Weight/Volume: 10.0 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000-B2
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Detection Limit	Result±Error ±TPU Error	Flag	Dilution	CRDL
Gross Alpha	09-JUN-95 00:00	7.1E-1	5.3E0±7.6E-1 ±1.3E0		5	10
Gross Beta	09-JUN-95 00:00	8.6E-1	4.4E0±6.9E-1 ±1.1E0		5	10

R. Jolly
6/14/95

DATA CHEM LABORATORIES
A Sorenson Company

FORM B (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
LABORATORY CONTROL SAMPLE (LCS)

Form RLIMS63B-V1.0
06149511185670
Page 3

S955802R

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: F/LIQ
Reporting Units.....: pCi/L Sample

LCS Source.....: Pu-239 ISL 2/15
Sr-90 ISL 2/25

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-DC-200

Date Printed.....: 14-JUN-95 11:18
DCL Sample Name...: QC-57147-1

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000
Column Type.....: Not Applicable

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Target	Result	Percent Recovery	QC Limits	QC Flag
Gross Alpha	09-JUN-95 00:00	68.8	69.7	101.	40.0/160.	
Gross Beta	09-JUN-95 00:00	50.4	55.8	111.	50.0/150.	

R. Jelly
6/14/95

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DATA CHEM LABORATORIES
A Sorenson Company

FORM C (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
BLANK SAMPLE

S955802Q

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: F/LIQ
Reporting Units.....: pCi/sample

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-DC-200

Date Printed.....: 14-JUN-95 11:18
DCL Sample Name...: BL-57147-1

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Result	CRDL
Gross Alpha	09-JUN-95 00:00	0.163	1
Gross Beta	09-JUN-95 00:00	0.992	4

R. Gulley
6/14/95

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DATA CHEM LABORATORIES
A Sorenson Company

FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

Form RLIMS63F-V1.0
06149511185670
Page 5

S954Y05L

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: WATER
Reporting Units.....: pCi/L Sample

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-EP-300

Date Printed.....: 14-JUN-95 11:18
DCL Sample Name...: MXS 03847MS

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: ~~GPC~~ HT-1000
Column Type.....: Not Applicable

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
Gross Alpha	12-JUN-95 00:00	0.159	73.3	69.4	105.	45.0/105.	*
Gross Beta	12-JUN-95 00:00	1.13	50.6	51.9	95.3	45.0/105.	

S954Y05M

DCL Sample Name...: MXS 03847MSD

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
Gross Alpha	12-JUN-95 00:00	66.9	96.1	70.1	6.42	9.2	0.000/50.0	
Gross Beta	12-JUN-95 00:00	51.9	101.	51.3	1.35	2.6	0.000/50.0	

R. Jolley
6/14/95

DATA CHEM LABORATORIES
A SORENSON COMPANY

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Datapackage Table of Contents

Information pertaining to this datapackage is divided into the four categories listed below (see colored divider sheets for an inventory list of each category). If an item on the inventory is not applicable, an "NA" is placed in the corresponding check box. A Case Narrative immediately precedes this Table of Contents and contains pertinent information about this datapackage.

Analytical Forms ..... Yellow
Sample Tracking Documentation ..... Pink
Analytical Documentation ..... Blue
Raw Data ..... Green

♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦

Analytical Forms
Inventory Checklist

[X] Case Narrative

[NA] IRDMIS	[NA] Commercial Forms
[ ] Data Review and Approval Form	[ ] Analytical or Environmental Report Form
[ ] IRDMIS Reports	[ ] Set Comments
[ ] GC/MS TICs	[ ] Applicable QC Sheets

[X] RLIMS Forms	
[X] Cover Form	[X] Matrix Spike/Matrix Spike Duplicate Sample (Form F)
[X] Sample Group Comments (Form H)	[NA] Surrogate Summary (Form G)
[X] Sample Analysis Data Sheet (Form A)	[NA] Initial Calibration Form
[X] Laboratory Control Sample (Form B)	[NA] Continuing Calibration Form
[X] Blank Sample (Form C)	[NA] Serial Dilution Form
[NA] Matrix Spike Sample (Form D)	[NA] Endrin Breakdown or BFB/DFTPP GC/MS Tuning Form
[NA] Matrix Duplicate Sample (Form E)	[NA] Internal Standard Form

Analytical Forms
Reviewer Checklist

X The Analytical Forms Inventory Checklist above is complete.

X The Case Narrative was completed in accordance with procedures in DCL SOP XX-DC-020, "Datapackage Preparation and Validation."

X Only the correct report forms are used (IRDMIS or Commercial Forms or RLIMS Forms).

X All fields on the report forms are complete with the correct information, including signatures.

X Results for all samples are reported per client request.

X Units, methods, and dates are correct.

X Sample and/or set comments are complete.

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Assembled by: Robin Jelly (Signature) 6/14/95 (Date) Reviewed by: Christy Webster (Signature) 6-15-95 (Date)

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DATA CHEM LABORATORIES
A SORENSON COMPANY

Sample Tracking Documentation
Inventory Checklist

- [X] LIMS Grouping Reports
- [X] DataChem Laboratories (DCL) Chain-of-Custody Record
- [X] DCL Sample Work Order
- [NA] Copy of numbered Nonconformance/Corrective Action Report (NC/CAR)
- [NA] Copy of Client-Related Problem Report (CPR)

Sample Tracking Documentation
Reviewer Checklist

X The Sample Tracking Documentation Inventory Checklist above is complete.

X DCL Chain-of-Custody Record provides signatures for the sample portion reported in this data package.

X DCL Chain-of-Custody Record was completed in accordance with procedures in DCL SOP XX-DC-006 "Chain-of-Custody and Laboratory Tracking."

X Methods specified on the Sample Work Order were performed or an explanation for deviations is provided.

X Special instructions on the Sample Work Order were followed.

X Project Management instructions on the Project Protocol Worksheet were followed.

X Client's requests were met or an explanation is provided in the Case Narrative.

NA NC/CAR and/or CPR were completed in accordance with procedures in DCL SOP QC-DC-006 "Nonconformance/Corrective Action Report (NC/CAR) Procedures."

000139

Assembled by: Robin Tully 6/14/95 Reviewed by: Christy Webster 6/5-95
Signature Date Signature Date

DataChem Laboratories
LIMS - Sample Master System
Preparation Group Report

Date: 14-JUN-1995 13:41
User: LULLY

RLIMS15-V1.1

Preparation Run Name: G955802X

Group ID: G955802X

Samples: 18

Pos	Laboratory Sample Name	Field Sample Name	Laboratory Sample ID	Laboratory Group Name	Accnt. Number
1	BL-57147-1	BL-57147-1	S955802Q	S95-0498-DE	03025
2	QC-57147-1	QC-57147-1	S955802R	S95-0498-DE	03025
3	EO 3881	REAG BLK	S954P067	S95-0498-DE	03025
4	EO 3882	EO-1	S954P068	S95-0498-DE	03025
5	EO 3883	LO-1	S954P069	S95-0498-DE	03025
6	EO 3884	FLD BLK	S954P06B	S95-0498-DE	03025
7	MXS 03841	E14SW0800390	S954Y05C	RX-0047-BC	03107
8	MXS 03842	E14SW0800393	S954Y05D	RX-0047-BC	03107
9	MXS 03843	E14SW0800395	S954Y05F	RX-0047-BC	03107
10	MXS 03844	E14SW0800398	S954Y05G	RX-0047-BC	03107
11	MXS 03845	E14SW0800400	S954Y05H	RX-0047-BC	03107
12	MXS 03846	E14SW0800403	S954Y05J	RX-0047-BC	03107
13	MXS 03847	E14SW0800406	S954Y05K	RX-0047-BC	03107
14	MXS 03847MS	4SW0800406MS	S954Y05L	RX-0047-BC	03107
15	MXS 03847MSD	SW0800406MSD	S954Y05M	RX-0047-BC	03107
16	MXS 03848	E14SW0800409	S954Y05N	RX-0047-BC	03107
17	MXS 03849	E14SW0800412	S954Y05P	RX-0047-BC	03107
18	MXS 03850	E14SW0800415	S954Y05Q	RX-0047-BC	03107

----- END OF LISTING -----

R. Lully
6/14/95

Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498 *

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AMG 5-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Reporting Group / Analysis: CE Total Uranium	DE Gross Alpha	DE Gross Beta	EE Gamma scan	# Bottles
1-May-1995	REAG BLK	EO 3881			F/LIQ	X	X	X	X	1
0-May-1995	EO-1	EO 3882			F/LIQ	X	X	X	X	1
-May-1995	LO-1	EO 3883			F/LIQ	X	X	X	X	1
1-May-1995	FLD BLK	EO 3884			F/LIQ	X	X	X	X	1

Received: Date/Time/Signature 5-18-95 / 1600 / Amaryllis McClure

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Amaryllis McClure	06/07/95 1110	Dave Reddick	Prep Total U, α, β, γ
Dave Reddick	06/07/95 1530	Mark A. Barnett	γ Scan
Mark A. Barnett	6/8/95 1600	Dave Reddick	Total U
Dave Reddick	6/9/95 0830	Robin Tully	gross α/β
Robin Tully	6/12/95 1600	Sally Copelyn	U and.
Sally Copelyn	6/12/95 1605	R-84-1 6/12/95	Storage/R-84-1

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Form: CO-001.01-SWV2.30

Printed 5/22/1995 14:05

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Sample Work Order

QC Clearance: _____
Project Manager: Keith R. Nicholson
Client: Hayden Environmental Group, Inc.
Account: 03025
Project/Task: COMM-ENV
Date Received: 18-May-1995
Date for Mailing Report: 17-Jun-1995

RUSH

DCL Root Set ID: S95-0498 *
DCL Lab. Name: EO 3881–EO 3884
Total # Samples: 4
Sample Medium: F/LIQ

Earliest Sampling Date: 9-May-1995
Preparation Type:

Rep. Group	Radiochemistry Analytes Requested	Latest Prep. Date	Latest Anal. Date	No. of Samp.	Split ID	Storage Location	Analysis/Prep. Method	Inst.	
CE	Total Uranium	29-May-1995[c]	8-Jul-1995[c]	4		Rab lab			
DE	Gross Alpha	8-Jun-1995[c]	8-Jul-1995[c]	4					
DE	Gross Beta	8-Jun-1995[c]	8-Jul-1995[c]	4					
EE	Gamma scan	29-May-1995[c]	8-Jul-1995[c]	4					

[c]Based on date of collection

Special Instructions: _____

Section Manager Approval: Charlie C. Walker — 5-24-95 Date

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Other Sections Receiving Sample Portions: IM, IW

Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498 • | Reporting Group

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AMG 9-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix						CE Total Uranium	DE Gross Alpha	DE Gross Beta	EE Gamma scan						# Bottles
11-May-1995	REAG BLK	EO 3881			F/LIQ						X	X	X	X						1
10-May-1995	EO-1	EO 3882			F/LIQ						X	X	X	X						1
9-May-1995	LO-1	EO 3883			F/LIQ						X	X	X	X						1
11-May-1995	FLD BLK	EO 3884			F/LIQ						X	X	X	X						1

Received: Date/Time/Signature 5-18-95 / 1000 / Amarylis McClure

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Amarylis McClure			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

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Check box if there is a continuation page ☐

Printed 5/22/1995 14:05

Form: COFC1.01-SWV2.30

Fernald Environmental Restoration Management Corporation

RSO - ANALYTICAL LABORATORY SERVICES

Page 1 of 2

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO:

SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFFL. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT 84123

	SAMPLE NUMBER		SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153657	REAG. BLK.	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* PARTICULATES ED 3868	ANALYSIS ED 3881
2	200153662	REAG. BLK.	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3869	
3	200153666	REAG. BLK.	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3870	
4	200153658	EO-1	G.F. FILTER	5/10/95 0930	PETRI DISH	1 x FLTR	NONE	* 3871	3882
5	200153663	EO-1	ACETONE	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3872	
6	200153667	EO-1	D.I. WATER	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3873	
7	200153659	LO-1	G.F. FILTER	5/9/95 1450	PETRI DISH	1 x FLTR	NONE	* 3874	3883
8	200153664	LO-1	ACETONE	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3875	
9	200153668	LO-1	D.I. WATER	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3876	
10	200153660	FLD BLK	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* 3877	3884
11	200153665	FLD BLK	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3879	

CAN SEAL NO. 2470

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORIMETRY OR FLUOROMETRY (AS LISTED IN METHOD 114)

* = TOTAL U (CE); GROSS A/B (DE); PARTICULATES (AE); GAMMA SCAN (BE); (EE)

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN w/ 5-17-95 COOLER	SEALED	w/ C-O-C	TAPE				

RELINQUISHED BY	DATE	TIME	RECEIVED DATE	TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaryllis McGuire
3.			3.		

NO.		DISTRIBUTION OF COPIES
1	WHITE	REMAIN WITH SAMPLES
2	YELLOW	OFF-SITE LAB
3	PINK	FERMCO DATA REVIEW AND REPORTING
4	BLUE	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

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Fernald Environmental Restoration Management Corporation

RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO.: SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO P.O. BOX 398704 CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFF. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT. 84123

	SAMPLE NUMBER	SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153669 FLD BLK	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	~~PRECIPITATIONS~~ *ED 3880	~~ANALYSIS~~ ED 3884
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

CAN SEAL NO: 2970

LAST ENTRY MNL 5-17-95

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOUDMETRY (AS LISTED IN METHOD 114)

*= TOTAL U; GROSS A/B; PARTICULATES; GAMMA SCAN

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN COOLER SEALED w/C-O-C TAPE 5-17-95							

RELINQUISHED BY	DATE	TIME	RECEIVED DATE	RECEIVED TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaly his McKewee
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	WHITE	REMAIN WITH SAMPLES
2	YELLOW	OFF-SITE LAB
3	PINK	FERMCO DATA REVIEW AND REPORTING
4	BLUE	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

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HAYDEN

DEN
ENTAL GROUP, INC.

Post-it® Fax Note 7671	Date 11-21-94 # of pages ▶ 8
To Customer Service	From D. Robinson
Co./Dept.	Co.
Phone #	Phone #
Fax # 801-268-9992	Fax #

November 21, 1994

Customer Service
DataChem Laboratories
960 West Levoy Drive
Salt Lake City, UT 84123

Subject: Laboratory Services / Subcontracting
FERMCO RFP # PES-80706

Dear Sir or Madam:

We are submitting a proposal in response to the above request and would like to receive a quotation from your firm for laboratory services. Your firm's name was given to us by FERMCO as a qualified subcontract laboratory.

We request a firm, fixed cost proposal to provide analytical support for the scope of work included with this letter. To summarize the analytical scope of work:

1. Provide analysis by USEPA Method 5 (40CFR Part 61) for three field samples from Source EP8-013 and one field sample from EP11-002. Filter, probe rinse (Acetone), and backhalf (H_2O) samples will be included as well as quality control samples (see below). Samples are to be analyzed for total particulate.

2. Following particulate analysis, the fractions for each field sample shall be composited and analyzed to total activity and uranium per EPA Method 114, and according to the protocol shown in Table 2 of the scope of work.

3. Proposed cost shall include cost to analyze and report results for all field samples and quality control samples. Quality control samples to be included in the sample sets:

   - Performance evaluation sample, to be supplied by FERMCO, and analyzed for total Uranium in the same manner as the composites (Item 6, scope of work).

   - Two field blank acetone rinse samples, two field blank filters, two laboratory filter blanks (supplied by Hayden), laboratory matrix spike/spike duplicate, and two container blanks.

F010331.94

TALLY SHEET

RELEASE #: 1000006737 (Can 1 of 1)
PO #: 95-H053 (DCL-SLC)
DATE SHIPPED: 17-May-95
MATERIAL: Periodic Confirmatory Measurements – Filters, Acetone, Water

ANALYSIS: Total U; Gross A/B; Particulates; Gamma Scan

Composite Sample Number	Lot Number	Sample Container Size	AnaLis/ FACTS Number	Gross Weight lbs.	Tare Weight lbs.	Net Weight lbs.
REAG. BLK.	W050-725-P047-6737	PETRI DISH	200153657	0.106	0.088	0.018
REAG. BLK.	W050-725-P047-6737	1L PLST	200153662	0.511	0.141	0.370
REAG. BLK.	W050-725-P047-6737	1L PLST	200153666	0.943	0.141	0.802
EO-1	W050-725-P047-6737	PETRI DISH	200153658	0.106	0.088	0.018
EO-1	W050-725-P047-6737	1L PLST	200153663	0.423	0.141	0.282
EO-1	W050-725-P047-6737	1L PLST	200153667	1.128	0.141	0.987
LO-1	W050-725-P047-6737	PETRI DISH	200153659	0.101	0.088	0.013
LO-1	W050-725-P047-6737	1L PLST	200153664	0.542	0.141	0.401
LO-1	W050-725-P047-6737	1L PLST	200153668	0.934	0.141	0.793
FLD. BLK.	W050-725-P047-6737	PETRI DISH	200153660	0.106	0.088	0.018
FLD. BLK.	W050-725-P047-6737	1L PLST	200153665	0.476	0.141	0.335
FLD. BLK.	W050-725-P047-6737	1L PLST	200153669	1.163	0.141	1.022
				6.537	1.480	5.057

FEMP	RADIOLOGICAL SURVEY REPORT COVER SHEET		SURVEY NUMBER: 95-05-G11-194	
DATE: 5-17-95	LOCATION: Lab	RC [redacted]	BADGE: 10148	PAGE: 1 OF 4
TIME: 0700	LEVEL: 580-	SIGNATURE [redacted]		
WORK PERMIT NUMBER: N/A		REVIEWER:	BADGE:	
RWP NUMBER:		SIGNATURE:	DATE:	

ATTACHMENTS:		
3	Pg 2 MURF	
	Pg 3 & 4 Tennelco Printout	

REASON FOR SURVEY	
	Sample surveyed for release to go offsite. Gross area smears taken. Direct frisk inside drum
	Release # ~~[illegible]~~ 6737 N/A

SUMMARY:

N/A

No.	Distribution of Copies
1	Radiological Records
2	Files

Supervisor Notified	Time	Date	Notified by:

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MATERIAL UNRESTRICTED RELEASE FORM

SURVEY # 95-05-G11-194

RCT [redacted]

[redacted]

BADGE #: 10148/721

DATE: 5-17-95

LOCATION: Lab

MODEL	SERIAL NUMBER	TYPE ALPHA or BETA/GAMMA	CAL DUE DATE	BKGD. (CPM)	CP	MIN (CPM)	ENR/PERFORMANCE TEST YES	NO
LB5100	7	α, β, γ	6-95	.2 / 1.72	.289 / 418	18.2 / 19.8	X	
M-3	77101	β, γ	10-95	60	30	3K	X	
			N					
				A				

TIME	RCT INIT	MATERIAL DESCRIPTION	RELEASE CRITERIA SURF or VOL	RESULTS ALPHA REMOVABLE	ALPHA FIXED + REM	BETA/GAMMA REMOVABLE	BETA/GAMMA FIXED + REM	RELEASE JUSTIFICATION	RECIPIENT	MATERIAL RELEASE EVALUATOR BADGE # and SIGNATURE (1)
0700	bw/DB	2001536667	SURF	-0 *	N/A	0 *	<MDCP		Don Slack	
		2001536668		2 *		4 *	<MDCP			
		2001536669		2 *		4 *	<MDCP			
		2001536666		-0 *		4 *	<MDCP			
		2001536662		-0 *		0 *	<MDCP			
		2001536665		-0 *		-1 *	<MDCP			
		2001536664		2 *		-1 *	<MDCP			
		2001536663		2 *		8 *	<MDCP			N/A
		2001536658 (AF)		-0 *		0 *	<MDCP	*		
		2001536659 (AF)		5 *		-1 *	<MDCP	*		
		2001536666 (AF)		-0 *		0 *	<MDCP	*		
		2001536657 (AF)		2 *		0 *	<MDCP	*		
		10 gal Can		-0 *		0 *	<MDCP			
					N					
						A				

* M:ESH:BCRC: 93 613

Comments: Release # 6737
(AF) = Air Filter

REVIEW: INITIAL ____ DATE ____

(1) Material Release Evaluator approval required in accordance with RC-DPT-019, (Release of Materials from the Fernald Environmental Management Project), if any of the following conditions exist:

a. Material has areas which are inaccessible for proper survey.
b. Process knowledge is used to support the release decision.
c. Material must be evaluated for the potential of contamination beneath any coating applied while the material was in the Controlled Area.
d. Material must be evaluated for the potential for any volume or in-depth radioactivity within the material matrix.
e. Special case items are being released, such as radioactive consumer products, industrial sources, etc.
f. Material has detectable activity present and the activity is below the contamination limits listed in Attachment A of RC-DPT-019.

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'ED MAY 17, 1995 08:57:36
'ROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1 MIN)

'AMPLE 'UMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	08:58:45
2	1	4	2	4	09:00:06
3	1	4	2	4	09:01:27
4	0	4	-0	4	09:02:48
5	0	2	-0	0	09:04:10
6	0	1	-0	-1	09:05:30
7	1	1	2	-1	09:06:51
8	1	6	2	8	09:08:13
9	0	2	-0	0	09:09:34
10	2	1	5	-1	09:10:55
11	0	2	-0	0	09:12:16
12	1	2	2	0	09:13:37
~~12~~	~~0~~	~~5~~	~~0~~	~~6~~	~~09:14:58~~ had 5-17-95

)PERATION COMPLETE

FEMP RADIOLOGICAL S... REPORT pg 2 of 4
SURVEY # 9505-G1-194 ... 5-17-95
[redacted]

GROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1MIN)

SAMPLE NUMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	10:05:55

OPERATION COMPLETE

05

TST000

FEMP RADIOLOGICAL SURVEY REPORT pg 4 of 4
SURVEY # 95-05-G11-194 DATED 5-15-95
(name) (signature)
RCT: [redacted]
REVIEWER:

8292

ection: ER 26 05/17/19 95

RG93
UIDE 26

ACETONE, 3, UN1090, II

POTENTIAL HAZARDS

IRE OR EXPLOSION

Flammable/combustible material; may be ignited by heat, sparks or flames.
Vapors may travel to a source of ignition and flash back.
Container may explode in heat of fire.
Vapor explosion hazard indoors, outdoors or in sewers.
Runoff to sewer may create fire or explosion hazard.

EALTH HAZARDS

May be poisonous if inhaled or absorbed through skin.
Vapors may cause dizziness or suffocation.
Contact may irritate or burn skin and eyes.
Fire may produce irritating or poisonous gases.
Runoff from fire control or dilution water may cause pollution.

EMERGENCY ACTION

Keep unnecessary people away; isolate hazard area and deny entry.
Stay upwind; keep out of low areas.
Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.
Isolate for 1/2 mile in all directions if tank, rail car or tank truck is involved in fire.
CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, CALL CHEMTREC AT 1-800-424-9300.
If water pollution occurs, notify the appropriate authorities.

RE

mall Fires: Dry chemical, CO2, water spray or alcohol-resistant foam.
o not use dry chemical extinguishers to control fires involving nitromethane or nitroethane.
arge Fires: Water spray, fog or alcohol-resistant foam.
ove container from fire area if you can do it without risk.
pply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.
or massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
ithdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

ILL OR LEAK

hut off ignition sources; no flares, smoking or flames in hazard area.
top leak if you can do it without risk.
ater spray may reduce vapor; but it may not prevent ignition in closed spaces.

Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal.
Large Spills: Dike far ahead of liquid spill for later disposal.

IRST AID

Move victim to fresh air and call emergency medical care; if not breathing, give artificial respiration; if breathing is difficult, give oxygen.
In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water.
Remove and isolate contaminated clothing and shoes at the site.

SURVEY RECORD

Date: 5-18-95

By: MM

Survey Type: Meter: ✓ Smear: ✓ Leak Test: ___

Approved: ___ RSO

Date: ___

Survey Instrument:

Manufacturer: LUDLUM
Model Number 19
Serial Number: ~~102872~~ 102872
Calib. Date: 9-30-94

FERMCO ~~MX-0199~~ IH. mm 5-18-95

BACKGROUND <0.011 mR/hr

Scintillation Counter:

Manufacturer: Ludlum
Model Number: 2929
Lab Instrument No.: 108227

Sample Count Time - 1 min.

	ALPHA	BETA
BLANK (CPM)	0.08	65.03
COUNTER EFFICIENCY (%)	0.3517	0.4083

Mixed Waste Lab Survey Location or Sealed Source Number	Instrument Reading	Disc Smears/Leak Test Swipes						Remarks
		Alpha			Beta			
		CPM	DPM	pCi	CPM	DPM	pCi	
M095 0341 OUTSIDE	<0.012 mR/hr	0			68			<0.011 mR/hr @ 1 METER
INSIDE	<0.012	0			63			
SAMPLE	<0.012	0			71			

DATACHEM LABORATORIES COOLER RECEIPT CHECKLIST

1. Client Name: FERMCO
2. Project/Task/Site: REL. #: 6737
3. Time/Date of Receipt: 1000 5-18-95
4. # Coolers Received: 1
5. Custody Seals?: (Circle) Present/Absent* Intact/Broken*
   Tamper Evident: Yes/No
6. Condition of Coolers: Acceptable/Unacceptable
7. Comments on Cooler Condition (#6): 1 DRUM
8. Ice Present: Yes/No* Frozen/Melted
   Comments: RAD CHEM ONLY
9. Temp Control: Present/Not Included
10. Location Temp Taken: Control/Between Samples
11. Taken by: (Signature) [signature] 5-18-95 MARK MENDENHALL (Printed Name) 5-18-95 1130 (Date/Time)
12. Are all temperatures within project specific guidelines? Yes/No*

*CONTACT PROJECT MANAGER. COMPLETE INCIDENT REPORT.

Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp
1	MC95 0341	20 °C	6	MC95	°C	11	MC95	°C
2	MC95	°C	7	MC95	°C	12	MC95	°C
3	MC95	°C	8	MC95	°C	13	MC95	°C
4	MC95	°C	9	MC95	°C	14	MC95	°C
5	MC95	°C	10	MC95	°C	15	MC95	°C

SAMPLE RECEIVING INCIDENT REPORT

Client Sample #'s Affected: _____ DCL Set I.D: _____

DCL Sample #'s Affected: _____

- ☐ Cooler Temps out of Range
- ☐ Missing Cooler
- ☐ Broken/Leaking Samples
- ☐ Missing Samples/Bottles
- ☐ Missing Paperwork
- ☐ Incorrect Preservation
- ☐ Low Sample Volume
- ☐ Incorrect Bottle Type
- ☐ Missing/Incorrect Bottle Labels
- ☐ Other

BRIEFLY DESCRIBE PROBLEM:

Delivered to: _____ Project Manager

Delivered by: _____ Signature/Date/Time

RESPONSE REQUIRED WITHIN 24 HOURS

PROJECT MANAGER'S COMMENTS:

000155

Returned to Sample Receipt by: _____ (Date/Time/Signature)

Accepted for Sample Receipt by: _____ (Date/Time/Signature)

Project Protocol Worksheet

Client	Hayden Environmental
Project	FERMCO Emissions Tests
Project Manager	Keith Nicholson
Account Number	3025
Project Duration	1 Month

Date 5/17/95

Mailby Days 20 days

Sample Stream	Project/ Method Type	QC Requirements			Preparation Requirements			Reporting Requirements			LOD/MDL/IDL Requirements		
S95	EPA Clean Air	**Inorganic**			**Inorganic**			Full CLP SOW			CLP SOW		
		Blank			CLP SOW			CLP Forms Only			SW-846 Rev.		
		LCS			SW-846 Rev.			CLP Disk			EPA Clean H2O		
		MS			USAEC 1990			RLIMS	X		USAEC 1990		
		MSD			USAEC 1993			Raw Data			USAEC 1993		
		MD			Microwave			Custom Disk			NIOSH		
		USAEC			Hotplate			ARF			DCL SOP		
		MSA			DCL SOP			QC Forms (specify below)	X		Client specified		
		Tracer			Other			Case Narrative	X		Other	X	Method
		Other			**Radiochemistry**			Calibration data	X		**QC Limits**		
		Radiochemistry			Hotplate leach			Continuing Cal. data			Method	X	
		Blank	X		Muffle furnace			Reporting Basis			Statistical		
		LCS	X		Total dissolution			IRDMIS			Client specified		
		MS	X	U only	Microwave			# of TICs					
		MSD	X	U only	DCL SOP			Counting Error (1 or 2 sigma)					
		Tracer			Other	X	Mthd. 114	TPU					
		Other	X	MD	**Organic**			RPD					
		Organic			CLP SOW			RER					
		Blank			SW-846 Rev.			Send raw data	X				
		LCS			USAEC 1990			Store raw data					
		MS/MSD			USAEC 1993			Other					
		USAEC			Sonication								
		Surrogate			Soxhlet								
		Other			Continuous								
					Separatory funnel								
					DCL SOP								
					Other								

David Robinson

Batch samples with other sets? (●) yes ( ) no

MS/MD/MSD sample identified? ( ) yes (●) no

Specific spiking levels identified? (●) Method ( ) DCL SOP ( ) other (see comments)

Comments: Analyze for U by EPA method 114 A-5, and by laser phosphoremetry - report results separately. Desired detection limits are 50 ug/sample for colorimetric U, and 1 ug/sample for phosphoremetry. Analyze for gamma, alpha, and beta for method 114 G-1, A-4 and B-4. Desired detection limits are 10 pCi for alpha and beta, a 20 pCi/sample as Cs-137 for gamma. Liquid samples and filters are to be analyzed for total particulates prior to other analyses. The client will specify how any compositing of liquid samples is to be conducted.

0001156

8292

DATA CHEM

SAMPLE DISPOSAL CONTROL FORM

DataChem Laboratories ID Number:_____ Analyst:_____

Date of Analysis:_____ Analyzed For:_____

DISPOSAL CLASSIFICATION†

Sample Number	Not Hazardous	Hazardous	Code‡	Explanation
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____

†A sample (either solid or liquid) is to be classified as hazardous waste upon disposal if it exhibits any of the following conditions:

‡Code (if classified as hazardous)

1. If it or its extract contains levels of the contaminants ≥ those specified in Table 1.
2. If it contains significant levels of organic solvents.
3. If it is corrosive (pH ≤ 2 or ≥ 12.5).
4. If it is reactive or explosive.
5. If it contains ≥ 50ppm PCB.
6. If it is determined by the chemist or manager that the sample is hazardous, poisonous, or toxic (e.g., some of the pesticide formulations). If this code is used, an explanation must be provided.

TABLE 1 TCLP levels.

EPA HW No.	Contaminant	Limit (mg/l)
D004	Arsenic	5.000
D005	Barium	100.0
D018	Benzene	0.5
D006	Cadmium	1.0
D019	Carbon Tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0
D022	Chloroform	6.0
D007	Chromium	5.0
D023	o-Cresol	200.0*
D024	m-Cresol	200.0*
D025	p-Cresol	200.0*
D026	Cresol	200.0*
D016	2,4-D	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D012	Endrin	0.02
D031	Heptachlor	0.008
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D008	Lead	5.0
D013	Lindane	0.4
D009	Mercury	0.2
D014	Methoxychlor	10.0
D035	Methyl Ethyl Ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D010	Selenium	1.0
D011	Silver	5.0
D039	Tetrachloroethylene	0.7
D015	Toxaphene	0.5
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D017	2,4,5-TP Silvex	1.0
D043	Vinyl Chloride	0.2

* If the concentrations for o-, m-, and p-cresol can not be differentiated, the total cresol concentration is used.

The constituents in bold are the original EP toxicity constituents.

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DataChem Laboratories

PROJECT RESOURCE UTILIZATION SUMMARY

Date: _____

DCL Reference #: _____

Company/Agency Name: _____

Analytes/Method: _____

LABOR

Date	Personnel	Total Hours

SUPPLIES

Item	Quantity

EQUIPMENT USAGE

Major Instrumentation	Total Hours

DataChem Laboratories/ 960 West LeVoy Drive / Salt Lake City, Utah 84123

DATA CHEM LABORATORIES
A SORENSON COMPANY

Analytical Documentation
Inventory Checklist

- [NA] Copy of TCLP Preparation Logbook Pages
- [X] Copy of Sample Preparation Notebook/Logbook Pages
- [X] Copy of Analyst's Notebook/Method Logbook Pages
- [X] Copy of Instrument Injection Logbook/Instrument Logbook/Run Log Pages
- [NA] Percent Solids/Percent Moisture Results
- [NA] Copy of Reagent Logbook Pages
- [NA] Copy of Working Standard Preparation Logbook Pages
- [X] Copy of Secondary or Intermediate Standard Preparation Logbook Pages
- [X] Copy of Primary Standard or Concentrated Stock Standard Preparation Logbook Pages
- [X] Certificates of Analysis for Standards
- [NA] Copy of Standard Verification Logbook Pages (including documentation for spiking solutions and calibration standards)
- [NA] Copy of Preparation Logbooks for solutions prepared by QC

All other miscellaneous documentation associated with this set (describe)

[NA] _____

Analytical Documentation
Reviewer Checklist

- [X] The Analytical Documentation Inventory Checklist above is complete.
- [X] Basic documentation procedures were followed in accordance with DCL SOP XX-DC-004 "Analytical Data Record Keeping."
- [X] All notebook and logbook pages contain page number, book number, title, and available space for pagination (if required).
- [X] All notebook and logbook pages were signed and dated by the analyst and reviewer before copying.
- [X] All copies are legible.
- [X] Standard preparation is documented in accordance with DCL SOP XX-DC-019 "Standards Purity, Preparation, Traceability and Verification" or by WR-DC-001 "The Acquisition, Preparation, and use of Radioactive Standard Reference Materials."
- [X] Documentation is provided to verify that standard calibration solutions and spiking solutions are traceable to a vendor certificate.

Assembled by: Robin Tully 6/14/95 Reviewed by: Christy Webster 6-15-95
Signature Date Signature Date

From Page No.

Client	Acct. No.	Set No.	Matrix	Requested Anal.	Balance ID	Furnace ID
Hayden Enviro. Group	3025	595-0498	Filter / Liquid	Tot. U, Gross α, β, γ	102 695	RCL-FN-1

The glass fiber - air filters (EO 3868, 71, 74, 77) were placed in 250 mL pyrex griffin beakers and placed in a muffle furnace at 525 °C for ≈ 72 hrs. After the samples had cooled to room temperature the samples were transferred to teflon beakers with conc. HNO_3. HF acid was then added to the beakers and they were placed on the hotplate until dissolution had taken place and the sample was near dryness. The samples were then wet ashed twice with conc. HNO_3 to expel off the HF. The samples were then brought up to ≈ 5-10 mL with conc. HNO_3.

The liquid samples, which were delivered to us after the Total Solids Analysis, were dissolved in HNO_3 and transferred into the Filters accordingly:

EO 3881 (REAG. BLK)	EO 3882 (EO-1)	EO 3883 (LO-1)	EO 3884 (FLD BLK)
EO 3868 (F)	EO 3871 (F)	EO 3874 (F)	EO 3877 (F)
EO 3869 (Liq.)	EO 3872 (Liq.)	EO 3875 (Liq.)	EO 3879 (Liq.)
EO 3870 (Liq.)	EO 3873 (Liq.)	EO 3876 (Liq.)	EO 3880 (Liq.)

The combined F/LIQ samples (EO 3881, 82, 83, 84) were then placed on a hotplate and were reduced to ≈ 2-3 mL. The samples were then transferred into 4 oz PMP containers and diluted to the indicated amounts with 4 M HNO_3.

SAMPLE ID	Dilution
EO 3881	50.032 g.
EO 3882	50.025 g.
EO 3883	50.025 g.
EO 3884	50.043 g.

The Following are the amounts of sample that were remaining following the RADCHEM analysis.

SAMPLE ID	Dilution Amount Remaining.
EO 3881	34.086 g.
EO 3882	33.917 g.
EO 3883	22.325 g.
EO 3884	33.997 g.

To Page No.

Witnessed & Understood by me,	Date	Invented by	Date	
Kerry Kern	6/9/95	Recorded by Dave Leddick	6/2/95	000160

Book No. 4046 Page No. 121

Gross Alpha/Beta Proportional Counting Log

Client #1 : NA Acct No.: 3025 Set No.: S95-0498-DE

Client #2 : NA Acct No.: 3107 Set No.: RX-0047-BE

Client #3 : NA Acct No.: NA Set No.: NA

Prep. Group ID: 6955802X Date Prepared: 6/2/95 Matrix: water

Instrument: HT-1000 Date Analysis Started: 6/2/95 Pipet Used: 100µl Balance Used: R2000 B310P, MC-1LC4200

LCS No.: QC-57147-1 MD No.: MXS-03847MSD Blank No.: BL-57147-1

Activity (pCi) = Conc (pCi/ml or g) x (Volume (ml) or Mass(g))

Decay Corrected Activity = Original Activity ($e^{-(0.693/T_{1/2})(\Delta T)}$)

Alpha Standard Solution			
Source ID	Concentration (pCi/mL or g)	Aliquot Added (mL or g)	Decay Corrected Activity (pCi)
Pu-239 TSL 2/15	649 pCi/g	0.106	68.794
Beta Standard Solution			
Source ID	Concentration (pCi/mL or g)	Aliquot Added (mL or g)	Decay Corrected Activtiy (pCi)
Sr-90 TSL 2/35	250.493 Sr-90 ox	0.104	242.516 pCi/g Sr-90 ox

11 July 94

06/12/95

Sr/y-90 act: 50.443 pCi

Self Absorption Correction Factor = a + b • log(c + x)

Self Absorption Curve → Date: 2/7/95 Notebook: NA Page: NA α Coefficients → a: 0.9470 b: -0.2795 c: 0.6265

Self Absorption Curve → Date: 2/7/95 Notebook: NA Page: NA ß Coefficients → a: 0.9505 b: -0.0426 c: 0.0725

Sample						
Carrier	ID	Planchet	S.A.(mg)	Vol(mL)	Mass(g)	Filename
A2	BL-57147-1	F686	1.19	350.0	NA	RL0612A
A3	QC-57147-1	F687	1.30	350.0		RL0612A
A2	E03881	F688	82.17	10.0		RL0613A1
A3	3882	F689	74.16	↓		↓
A4	3883	F690	96.33	↓		RL0613A1
B2	3884	F691	105.17	10.0		RL0613B1
A4	MXS-03841	F692	44.28	350.0		RL0612A
B2	3842	F693	41.83	↓		RL0612B
B3	3843	F694	2.08	↓		↓
B4	3844	F695	1.80	350.0		RL0612B
C1	3845	F696	58.92	300.0		RL0612C
C2	3846	F697	37.91	350.0		↓
C3	3847	F698	28.29	300.0		RL0612C
A2	3847MS	F699	28.28	300.0		RL0613A
A3	3847MSD	F700	27.42	300.0		
A4	3848	F701	31.66	350.0		RL0613A
B2	3849	F702	35.17	350.0	↓	RL0613B
B3	3850	F703	68.80	250.0	NA	RL0613B

Robin Finley 6/13/95

Comments: Act. MS/MSD

	Pu-239 (g)	Added (Act)	Sr-90 (mL)	Act Added
MS	0.107	~~649~~ 69.44 pCi	0.107	51.898
MSD	0.1067	69.44 pCi	0.104	50.443 pCi

*N/A = Not Applicable

000161

Recorded by: Robin F. [illegible]

Book No. 4046 Page No. 122

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Sample Numbers	Planchet Number	Tare wt(g)	TOTAL wt(g)	Sample wt(mg)	Count time(m)
BL-57147-1	F686	7.55778	7.55897	1.19	240
QC-57147-1	F687	7.47909	7.48039	1.30	240
E03881	F688	7.58649	7.66866	82.17	1000
3882	F689	7.54566	7.61982	74.16	↓
3883	F690	7.50894	7.60527	96.33	↓
3884	F691	7.57682	7.68199	105.17	1000
MXS-03841	F692	7.53608	7.58036	44.28	240
-03842	F693	7.46602	7.50785	41.83	↓
-03843	F694	7.51699	7.51907	2.08	↓
-03844	F695	7.54597	7.54777	1.80	↓
-03845	F696	7.52654	7.58506	58.52	↓
-03846	F697	7.53564	7.57355	37.91	↓
-03847	F698	7.50627	7.53456	28.29	↓
-03847MS	F699	7.55683	7.58511	28.28	↓
-03847MSD	F700	7.51630	7.54372	27.42	↓
-03848	F701	7.43377	7.46543	31.66	↓
-03849	F702	7.52102	7.55619	35.17	↓
-03850	F703	7.57964	7.64844	68.80	240

Samples E03881 → E03884 were hygroscopic and were flamed. Samples "mushroomed" upon flaming. Mashed residue into smaller particles and fixed using 0.1 M HNO_3. - All samples were wet ashed using 2x10ml HNO_3 (conc) before transferring to planchets with 0.1 M HNO_3.

R. Lully 6/13/95. Activity corrections have been made on the QC samples to reflect Activity/Sample.

Recorded by: Robin Lully Date: 6/13/95 Reviewed by: Ray Kenn Date: 6/13/95

Activity corrections have also been made to reflect dilutions on samples E03881 → 3884. For dilution information - see notebook DCL# 2616 pg. 31. Dilution was $\frac{1\ FT}{50\ m\ sam} \times \frac{10\ mL\ Aliq.}{Samp.} = 1\ FT/5\ sam.$ R. Lully 6/13/95 So calculation

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RUN LOG

Instrument: HT-1000-1

000163

6/9/95	A1-A4	RLK	CKS0609A	CKS-1A ; 2A ; 3A ; 4A
	B1-B4		CKS0609B	
	C1-C4		CKS0609C	
6/9/95	D1-D4	RLK	CKS0609D	CKS-1A ; 2A ; 3A ; 4A
6/9/95	B1-B4	RLK	RK0609B	BLANK; LCS; ST0526; EN-1729
	C1-C4	RLK	RK0609C	EO-2978 A; B; C; D
6/9/95	D1-D4	RLK	RK0609D	EO-0568 A; B; C; D
6/12/95	A1-A4	RL	CKS-0612A	CKS-001A → CKS-004A
	B1-B4		CKS0612B	void RL 6/12/95 ~~BL-57147-1, QC-57147-1, MXS-03844~~
	C1-C4		CKS0612C	RL clears MK
	D1-D4		CKS0612D	CKS-001A → CKS-004A
	A2-A4		RL0612A	BL-57147-1, QC-57147-1, MXS-03841
	B2-B4		RL0612B	MXS-03842 → 03844
6/12/95	C1-C3	RL	RL0612C	MXS-03845 → 03847
6/13/95	A1-A4	RL	CKS0613A	CKS-001A → CKS-004A
	B1-B4		CKS0613B	
	C1-C4		CKS0613C	CKS-001A → CKS-004A
	A2-A4		RL0613A	MXS-03847MS, 3847MSD, 3848
6/13/95	B2-B3	RL	RL0613B	MXS-03849, 03850
6/13/95	A2-A4	RL	RL0613A1	EO 3881 → 3883
6/13/95	B2	RL	RL0613B1	EO 3884

RADIOCHEMISTRY LABORATORY
RADIOACTIVE MATERIAL INVENTORY
INTERMEDIATE STANDARD LOG

Intermediate Standard ID: ISL 215 Standard Source ID: 2510-1

Reference Date/Time*: 347/1990/0500 MST RMI Source Log Ref. Book/Page: 2/8

*Use Julian date and military time

DCL Balance ID No.: 102683 for act.
102695 for tot. wt.

Date	Inits.	Solvent	Activity (pCi)†	Final Weight	Conc. (pCi/g)†	Witness
3/15/94	[illegible]	2M HNO3	66094.4	101.834	649.04	[illegible] RL 5/2/9[illegible]

Pu-239

Usage:

	Date	Inits.	Aliquot	Activity (pCi)†	Balance (pCi)†	Destination
1.	4/9/95	RL	0.320	207.693	42845.901	QC, MS, MSD 6953801D
2.	4/18/95	RL	0.320	207.693	42638.208	QC, MS, MSD 6953C01S
3.	4/24/95	OR	0.1	64.904	42573.304	Training Gross α/β & QC
4.	4/24/95	RL	0.321	208.342	42364.962	QC, MS, MSD 6953R010
5.	4/24/95	RL	0.319	207.044	42157.918	QC, MS, MSD 6953R00G
6.	5/5/95	RL	0.106	68.798	42089.120	QC-6954400B OR RL 5/5/95
7.	5/17/95	RL	0.106	68.798	42020.322	QC - EPA AUDIT 6954J006
8.	5/30/95	RL	0.105	68.798	41951.524	QC - DOE AUDIT 6954Y031
9.	5/30/95	RL	0.105	68.149	41883.375	QC - DOE AUDIT 6954Y031
10.	5/31/95	RL	1.754	1138.416	40744.959	QC - DOE AUDIT S95-0170
11.	5/31/95	RL	0.240	155.76	40589.199	QC - DOE AUDIT S95-0170
12.	6/9/95	RL	0.320	207.693	40381.506	QC, MS, MSD C955802X
13.						
14.						
15.						
16.						
17.						
18.						

† All activities are referenced to the source date/time. Decay corrections are to be made on the following page.

To Page:_____

RADIOCHEMISTRY LABORATORY
RADIOACTIVE MATERIAL INVENTORY
STANDARD SOURCE LOG

Vendor: U.S. EPA Vendor Source ID: 2510-1

Date Received: _____ Received By: _____

CAUTION
RADIOACTIVE MATERIAL
SOL# 2510-1 WT. 5.0g
AMT. 118,000 pancuries/g
ISOTOPE Pu-239
DATE 12/13/90;0400PST
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY—LAS VEGAS

Place Source Label Above

Source Reference Date/Time*: 347/1990/0500MST Solvent: 4M HNO_3

ISOTOPE(S)	CONC. (pCi/g)	ISOTOPE(S)	CONC. (pCi/g)
Pu-239	3/15/94 113,800 ~~118,000~~		

*Use Julian date and military time

Usage:

DCL Balance ID No.: 102683 for wt of activity 102695 for total weight

Date	Inits.	Aliquot	Activity (pCi)	Balance (pCi)	Destination	Witness
3/15/94	ich	5.5991	16069.4	Ø	ISL-2/15	[illegible]

7678

Rec - 4-2-92

U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory-Las Vegas
Nuclear Radiation Assessment Division

Calibration Certificate

Description

Principal radionuclide: PLUTONIUM-239 Half-life: 2.4×10^4 years

Nominal activity: 59 nano curies

Nominal volume: 5 ml in ampoule/bottle number: 2510-1

Measurement Activity of principal radionuclide

Activity per gram of this solution

11.8 nano curies of Plutonium-239

at 0400 hours PST on December 13, 1990

Activity of daughter radionuclide

The principal activity was accompanied at the quoted time by

_____ curies Per gram

of the daughter nuclide _____

Total mass of this solution

APPROX. 5.0 grams

Method of measurement

The activity of the primary solution was measured by an internal gas flow proportional counter.

The activity of the dilution was measured by liquid scintillation counting.

Useful Life

This radionuclide has decayed through _____ half lives since it was obtained by EMSL-LV

We recommend that this solution should not be used after _____

000167

Purity

The manufacturer states that activities other than that of the principal nuclide and of its daughter nuclides, if any, were estimated/known to be:

(1) see remarks	less than equal to	%	of the principal activity
(2)	less than equal to	%	of the principal activity
(3)	less than equal to	%	of the principal activity

The activity of impurity (1) is not (2) is not (3) is not included in the quoted figures of the principal activity.

Random Errors

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than ± 0.13 %
(The 99.7% confidence limits are given by t(sm) where t is obtained from the student t factor for the degree of freedom (n-1)).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error ($+\delta - \delta'$). These have been estimated not to exceed

+ 2.7 % or - 2.7 %

the overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error [t(sm)] at the 99.7% confidence limits and the worst case estimate of the systematic errors ($+\delta, -\delta'$)
The overall uncertainty is therefore calculated on the basis of + [t(sm) $+\delta$], - [t(sm) $+\delta$]
and is + 3.1 %, - 3.1 % of the quoted radioactive concentration.

Decay Schemes

This standardization is based on the following assumptions of the principle nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Plutonium-239 and impurities were assumed to decay 100 percent by alpha emission.

Chemical Composition of Solution

Carrier content per gram of solution:

Other components:

4M Nitric acid

Preservative:

Remarks

IMPURITIES:

Pu-238	0.033%	of the total activity
Pu-240	4.6×10^{-5}%	of the total activity
Pu-241	1.5×10^{-3}%	of the total activity
Pu-242	8.8×10^{-6}%	of the total activity
Pu-244	6.2×10^{-9}%	of the total activity

000168

Date Certificate Prepared December 13, 1990

Approval Signature Paul B. Hahn

Revised

Book No. 2 Page 61

RADIOCHEMISTRY LABORATORY
RADIOACTIVE MATERIAL INVENTORY
INTERMEDIATE STANDARD LOG

Intermediate Standard ID: ISL - 2/35 Standard Source ID: 2454-4

Reference Date/Time*: 42/1994/0500 RMI Source Log Ref. Book/Page: 2/12

*Use Julian date and military time

DCL Balance ID No.: 102695

Sr-90

Date	Inits.	Solvent	Activity (pCi)†	Final Weight	Conc. (pCi/g)†	Witness
10/4/95	CMW	2N HNO3	25059.840	100.042g	250.493	

Usage:

	Date	Inits.	Aliquot	Activity (pCi)†	Balance (pCi)†	Destination
1.	6/9/95	RL	0.315	78.905	2326.062	QC, MS, MSD 6955802X
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						000169

† All activities are referenced to the source date/time. Decay corrections are to be made on the following page.

To Page:_____

7678

RADIOCHEMISTRY LABORATORY
RADIOACTIVE MATERIAL INVENTORY
STANDARD SOURCE LOG

Vendor: EPA Vendor Source ID: 7454-4

Date Received: 10-3-94 Received By: CCW

CAUTION
RADIOACTIVE MATERIAL
SOLN 2454-4 WT. 5.0g
AMT. 5020 nanocuries/g
ISOTOPE Sr-90
DATE 2/11/94 0400PST
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY—LAS VEGAS

Place Source Label Above

Source Reference Date/Time*: 42/1994/05:00 Solvent: 0.1M HCl

ISOTOPE(S)	CONC. (pCi/g)	ISOTOPE(S)	CONC. (pCi/g)
Sr-90	5020		

*Use Julian date and military time

Usage:

DCL Balance ID No.: 102695

Date	Inits.	Aliquot	Activity (pCi)	Balance (pCi)	Destination	Witness
10-4-94	CMW	4.992g	25059.840	Ø	ISL-2/35	PMR

7678

Rec. 10-3-94
(CCA)

U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory-Las Vegas
Nuclear Radiation Assessment Division

Calibration Certificate

Description

Principal radionuclide: Strontium-90 Half-life: 28.6 years

Nominal activity: 25 nano curies

Nominal volume: 5 ml in ampoule/bottle number: 2454-4

Measurement Activity of principal radionuclide

Activity per gram of this solution

5.02 nano curies of Strontium-90

at 0400 hours PST on February 11, 1994

Activity of daughter radionuclide

The principal activity was accompanied at the quoted time by

5.02 nano curies Per gram

of the daughter nuclide Yttrium-90

Total mass of this solution

Approx. 5.0 grams

Method of measurement

The activity of the primary solution was measured by four pi efficiency tracing.

The activity of the dilution was measured by liquid scintillation counting.

Useful Life

This radionuclide has decayed through 0.3 half lives since it was obtained by EMSL-LV

We recommend that this solution should not be used after December 1999

Purity

The manufacturer states that activities other than that of the principal nuclide and of its daughter nuclides, if any, were estimated/known to be:

(1) others	less than ~~equal to~~	0.01 %	of the principal activity
(2)	less than equal to	%	of the principal activity
(3)	less than equal to	%	of the principal activity

The activity of impurity (1) is not (2) is not (3) is not included in the quoted figures of the principal activity.

Random Errors

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than ± 0.2 %

(The 99.7% confidence limits are given by t(sm) where t is obtained from the student t factor for the degree of freedom (n-1)).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error ($+\delta - \delta'$). These have been estimated not to exceed

+ 2.1 % or - 2.1 %

the overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error [t(sm)] at the 99.7% confidence limits and the worst case estimate of the systematic errors ($+\delta, -\delta'$)
The overall uncertainty is therefore calculated on the basis of + [t(sm) $+\delta$], - [t(sm) $+\delta'$]
and is + 2.5 %, - 2.5 % of the quoted radioactive concentration.

Decay Schemes

This standardization is based on the following assumptions of the principle nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Strontium-90 decays 100 percent by beta emission to yttrium-90. Yttrium-90 decays also by beta emission.

Chemical Composition of Solution

Carrier content per gram of solution:

100 micrograms strontium

100 micrograms yttrium

Other components:

0.1 M HCl

Preservative:

Remarks

Date Certificate Prepared February 14, 1994

Approval Signature George Wellbrock

DATA CHEM LABORATORIES
A SORENSON COMPANY

7678

Raw Data
Radiochemistry/Mixed-Waste Department
Proportional Counting
Inventory Checklist

[x] Section 1. Sample and QC Data

[x] Section 2. Instrument Performance and Calibration Data

The following signatures verify that the raw data and all inventory and reviewer checklists in each raw data section (all green sheets) are complete and accurate.

000173

Assembled by: Robin Jolley 6/14/95 Reviewed by: Christy Webster 6-15-95

Signature Date Signature Date

Section 1. Sample and QC Data
Proportional Counting
Inventory Checklist

- [X] Laboratory Control Sample (LCS) Instrument Print-Out
- [X] Blank Instrument Print-Out
- [X] Accuracy Sample (MS) Instrument Print-Out
- [X] Precision Sample (MSD/MD) Instrument Print-Out
- [X] Field Sample Instrument Print-Out
- [NA] Summary Instrument Print-Outs specifying appropriate backgrounds, efficiencies (unless corrected for a particular isotope of interest), and cross-talk values
- [X] Computer/Manual Calculation Sheets summarizing all calculational inputs and results

RL 6/15/95

Section 1. Sample and QC Data
Proportional Counting
Reviewer Checklist

- X The Sample and QC Data Inventory Checklist above is complete.
- X All appropriate QC for the project was performed.
- X All appropriate QC data met acceptance criteria. Unacceptable QC data were documented, and justifications were provided for data used.
- X Print-outs are initialed and dated.

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 12, 1995 10:21 pm

Data File
RL0612A.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer A:	1330	High	14400 sec.

Detector Parameters				
Alpha:	**Window**	**Efficiency**	**Background**	**Crosstalk**
Det A/1	65.9-100%	33.30%	0.37599999	7.5802469
Det A/2	65.4-100%	33.04%	0.044	9.2323008
Det A/3	69.6-100%	33.45%	0.122	7.116519
Det A/4	70.3-100%	34.13%	0.086	7.5292134
Beta:	**Window**	**Efficiency**	**Background**	**Crosstalk**
Det A/1	0 - 65.8%	44.30%	3.312	0.99590111
Det A/2	0 - 65.3%	44.49%	1.028	0.99997914
Det A/3	0 - 69.5%	42.67%	1.1900001	1.0001959
Det A/4	0 - 70.2%	45.59%	1.682	0.99723953

Det A/1	Sample:	MT	Sample Factor:	1		Jun 12, 1995 18:21:15	
Alpha	Gross:	28	Net:	0.00E+00	±0.094379	pCi:	0.00E+00 ±0.1276563
Beta	Gross:	269	Net:	0.00E+00	±0.2802	pCi:	0.00E+00 ±0.2849027
Det A/2	Sample:	BL-57147-1	Sample Factor:	1		Jun 12, 1995 18:21:15	
Alpha	Gross:	37	Net:	1.10E-01	±0.0529694	pCi:	1.50E-01 ±0.0722076
Beta	Gross:	468	Net:	9.12E-01	±0.1974144	pCi:	9.23E-01 ±0.1998666
Det A/3	Sample:	QC-57147-1	Sample Factor:	1		Jun 12, 1995 18:21:15	
Alpha	Gross:	10162	Net:	4.22E+01	±0.8238242	pCi:	5.69E+01 ±1.109368
Beta	Gross:	12879	Net:	4.95E+01	±0.9074386	pCi:	5.22E+01 ±0.9579056
Det A/4	Sample:	MXS-03841	Sample Factor:	1		Jun 12, 1995 18:21:15	
Alpha	Gross:	47	Net:	1.10E-01	±0.0616068	pCi:	1.45E-01 ±0.0813111
Beta	Gross:	691	Net:	1.19E+00	±0.2426894	pCi:	1.17E+00 ±0.2397748

R. Tully
6/13/95

000175

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 13, 1995 01:57 pm

Data File
RL0613A.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer A:	1330	High	14400 sec.

Detector Parameters					
Alpha:		Window	Efficiency	Background	Crosstalk
	Det A/1	65.9-100%	33.30%	0.37599999	7.5802469
	Det A/2	65.4-100%	33.04%	0.044	9.2323008
	Det A/3	69.6-100%	33.45%	0.122	7.116519
	Det A/4	70.3-100%	34.13%	0.086	7.5292134
Beta:		Window	Efficiency	Background	Crosstalk
	Det A/1	0 - 65.8%	44.30%	3.312	0.99590111
	Det A/2	0 - 65.3%	44.49%	1.028	0.99997914
	Det A/3	0 - 69.5%	42.67%	1.1900001	1.0001959
	Det A/4	0 - 70.2%	45.59%	1.682	0.99723953

Det A/1	Sample:	MT	Sample Factor:	1		Jun 13, 1995 09:56:12		
Alpha	Gross:	26	Net:	0.00E+00	±0.094379	pCi:	0.00E+00	±0.1276563
Beta	Gross:	265	Net:	0.00E+00	±0.2802	pCi:	0.00E+00	±0.2849027
Det A/2	Sample:	MXS-03847MS	Sample Factor:	1		Jun 13, 1995 09:56:12		
Alpha	Gross:	6435	Net:	2.68E+01	±0.6553753	pCi:	3.65E+01	±0.8934045
Beta	Gross:	11389	Net:	4.40E+01	±0.855327	pCi:	4.45E+01	±0.8659514
Det A/3	Sample:	MXS-03847MSD	Sample Factor:	1		Jun 13, 1995 09:56:12		
Alpha	Gross:	6145	Net:	2.55E+01	±0.6409171	pCi:	3.43E+01	±0.8630639
Beta	Gross:	11113	Net:	4.33E+01	±0.8505125	pCi:	4.57E+01	±0.8978137
Det A/4	Sample:	MXS-03848	Sample Factor:	1		Jun 13, 1995 09:56:12		
Alpha	Gross:	57	Net:	1.52E-01	±0.0668007	pCi:	2.01E-01	±0.0881664
Beta	Gross:	623	Net:	9.02E-01	±0.233059	pCi:	8.91E-01	±0.23026

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 12, 1995 10:23 pm

Data File
RL0612C.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer C:	1330	High	14400 sec.

Detector Parameters					
Alpha:		Window	Efficiency	Background	Crosstalk
	Det C/1	67.1-100%	33.45%	0.112	7.9523106
	Det C/2	70.2-100%	33.25%	0.062	9.0144672
	Det C/3	76.8-100%	32.90%	0.114	8.3989506
	Det C/4	72.9-100%	32.80%	0.178	8.399148
Beta:		Window	Efficiency	Background	Crosstalk
	Det C/1	0 - 67.0%	45.02%	1.256	1.0026717
	Det C/2	0 - 70.1%	44.81%	1.262	0.99805158
	Det C/3	0 - 76.7%	42.73%	1.252	0.99131513
	Det C/4	0 - 72.8%	43.56%	1.63	1.0033267

Det C/1	Sample:	MXS-03845	Sample Factor:	1		Jun 12, 1995 18:21:15		
Alpha	Gross:	51	Net:	1.00E-01	±0.0652835	pCi:	1.35E-01	±0.0879113
Beta	Gross:	1007	Net:	2.93E+00	±0.2769665	pCi:	2.93E+00	±0.2771122
Det C/2	Sample:	MXS-03846	Sample Factor:	1		Jun 12, 1995 18:21:15		
Alpha	Gross:	33	Net:	7.60E-02	±0.0517424	pCi:	1.03E-01	±0.0700989
Beta	Gross:	779	Net:	1.98E+00	±0.2481209	pCi:	1.99E+00	±0.2494169
Det C/3	Sample:	MXS-03847	Sample Factor:	1		Jun 12, 1995 18:21:15		
Alpha	Gross:	44	Net:	6.90E-02	±0.0617288	pCi:	9.45E-02	±0.084527
Beta	Gross:	527	Net:	9.38E-01	±0.2114261	pCi:	9.89E-01	±0.2229007
Det C/4	Sample:	MT	Sample Factor:	1		Jun 12, 1995 18:21:15		
Alpha	Gross:	24	Net:	0.00E+00	±0.0649369	pCi:	0.00E+00	±0.0891874
Beta	Gross:	271	Net:	0.00E+00	±0.1965814	pCi:	0.00E+00	±0.203297

R. Gilly
6/13/95

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 14, 1995 07:47 am

Data File
RL0613A1.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer A:	1330	High	60000 sec.

Detector Parameters				
Alpha:	Window	Efficiency	Background	Crosstalk
Det A/1	65.9-100%	33.30%	0.37599999	7.5802469
Det A/2	65.4-100%	33.04%	0.044	9.2323008
Det A/3	69.6-100%	33.45%	0.122	7.116519
Det A/4	70.3-100%	34.13%	0.086	7.5292134
Beta:	Window	Efficiency	Background	Crosstalk
Det A/1	0 - 65.8%	44.30%	3.312	0.99590111
Det A/2	0 - 65.3%	44.49%	1.028	0.99997914
Det A/3	0 - 69.5%	42.67%	1.1900001	1.0001959
Det A/4	0 - 70.2%	45.59%	1.682	0.99723953

Det A/1	Sample:	MT	Sample Factor:	1		Jun 13, 1995 15:08:04		
Alpha	Gross:	102	Net:	0.00E+00	±0.065828	pCi:	0.00E+00	±0.0890385
Beta	Gross:	1111	Net:	0.00E+00	±0.1954355	pCi:	0.00E+00	±0.1987156
Det A/2	Sample:	EO 3881	Sample Factor:	1		Jun 13, 1995 15:08:04		
Alpha	Gross:	341	Net:	2.97E-01	±0.0405961	pCi:	4.05E-01	±0.0553405
Beta	Gross:	1982	Net:	9.27E-01	±0.1241817	pCi:	9.39E-01	±0.1257242
Det A/3	Sample:	EO 3882	Sample Factor:	1		Jun 13, 1995 15:08:04		
Alpha	Gross:	376	Net:	2.54E-01	±0.0488036	pCi:	3.42E-01	±0.0657193
Beta	Gross:	1537	Net:	3.29E-01	±0.1224343	pCi:	3.47E-01	±0.1292435
Det A/4	Sample:	EO 3883	Sample Factor:	1		Jun 13, 1995 15:08:04		
Alpha	Gross:	457	Net:	3.71E-01	±0.0491565	pCi:	4.90E-01	±0.0648788
Beta	Gross:	2206	Net:	4.96E-01	±0.1459592	pCi:	4.90E-01	±0.1442063

R. Fully
6/14/95

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 14, 1995 07:48 am

Data File
RL0613B1.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer B:	1330	High	60000 sec.

Detector Parameters					
Alpha:		Window	Efficiency	Background	Crosstalk
	Det B/1	74.3-100%	33.09%	0.148	7.6540756
	Det B/2	77.3-100%	33.96%	0.066	7.2033896
	Det B/3	78.4-100%	31.44%	0.09	9.5462275
	Det B/4	77.8-100%	32.95%	0.11	8.0109806
Beta:		Window	Efficiency	Background	Crosstalk
	Det B/1	0 - 74.2%	43.91%	1.516	0.99632984
	Det B/2	0 - 77.2%	44.30%	0.95200002	0.99805003
	Det B/3	0 - 78.3%	42.62%	1.368	1.0187516
	Det B/4	0 - 77.7%	42.82%	1.62	1.0118318

Det B/1	Sample:	MT	Sample Factor:	1		Jun 13, 1995 15:08:13		
Alpha	Gross:	110	Net:	0.00E+00	±0.0412998	pCi:	0.00E+00	±0.0562227
Beta	Gross:	1440	Net:	0.00E+00	±0.132218	pCi:	0.00E+00	±0.1356371
Det B/2	Sample:	EO 3884	Sample Factor:	1		Jun 13, 1995 15:08:13		
Alpha	Gross:	361	Net:	2.95E-01	±0.0435191	pCi:	3.91E-01	±0.0577234
Beta	Gross:	1711	Net:	7.38E-01	±0.1175397	pCi:	7.50E-01	±0.1195187
Det B/3	Sample:	MT	Sample Factor:	1		Jun 13, 1995 15:08:13		
Alpha	Gross:	110	Net:	2.00E-02	±0.0333776	pCi:	2.87E-02	±0.0478207
Beta	Gross:	2023	Net:	6.53E-01	±0.135222	pCi:	6.90E-01	±0.1429025
Det B/4	Sample:	MT	Sample Factor:	1		Jun 13, 1995 15:08:13		
Alpha	Gross:	154	Net:	4.40E-02	±0.0379046	pCi:	6.02E-02	±0.0518197
Beta	Gross:	1618	Net:	0.00E+00	±0.1366726	pCi:	0.00E+00	±0.143762

R. Fulley
6/14/95

.3-JUN-1995 10:08 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

:ROUP ID..... : G955802X
:AMPLE NAME..... : BL-57147-1
:AMPLE ID..... : S955802Q

:OUNTER ID..... : HT1000
OSITION NUMBER..... : A2
AMPLE ALPHA COUNT..... : 37.0
AMPLE BETA COUNT..... : 468.0
AMPLE COUNT TIME..... : 240.0 MIN.
AMPLE ALPHA BACK GROUND. : 0.0440
AMPLE BETA BACK GROUND.. : 1.0280
AMPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 0.3500 L
AMPLE ALPHA EFF..... : 0.3304
AMPLE BETA EFF ..... : 0.4449
AMPLE ALPHA ATTN..... : 0.8745
AMPLE BETA ATTN..... : 0.9462
LPHA TO BETA X TALK..... : 0.09232
ETA TO ALPHA X TALK..... : 0.01000
YSTEMATIC ERROR..... : 0.1000

RESULTS ALPHA

Activity/sample

LPHA ACTIVITY..... : 4.648E-01 pCi/L x 0.350 L = 0.163 pCi/sam
LPHA TWO SIG COUNT ERROR..... : 2.320E-01 x 0.350 L = 0.0812 pCi/sam
LPHA TPU..... : 2.492E-01 pCi/L x 0.350 L = 0.0872 pCi/sam
LPHA LLD..... : 2.414E-01 pCi/L x 0.350 L = 0.08449 pCi/sam
LPHA MDC..... : 3.309E-01 pCi/L x 0.350 L = 0.1158 pCi/sam

RESULTS BETA

ETA ACTIVITY..... : 2.835E+00 pCi/L x 0.350 L = 0.992 pCi/sam
ETA TWO SIG COUNT ERROR..... : 6.052E-01 x 0.350 L = 0.2118 pCi/sam
ETA TPU..... : 8.216E-01 pCi/L x 0.350 L = 0.2876 pCi/sam
ETA LLD..... : 8.008E-01 pCi/L x 0.350 L = 0.2803 pCi/sam
ETA MDC..... : 9.654E-01 pCi/L x 0.350 L = 0.3379 pCi/sam

R. Tully
6/13/95

3-JUN-1995 10:08 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
AMPLE NAME..... : QC-57147-1
AMPLE ID..... : S955802R

OUNTER ID..... : HT1000
OSITION NUMBER..... : A3
AMPLE ALPHA COUNT..... : 10162.0
AMPLE BETA COUNT..... : 12879.0
AMPLE COUNT TIME..... : 240.0 MIN.
AMPLE ALPHA BACK GROUND. : 0.1220
AMPLE BETA BACK GROUND.. : 1.1900
AMPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 0.3500 L
AMPLE ALPHA EFF..... : 0.3345
AMPLE BETA EFF ..... : 0.4267
AMPLE ALPHA ATTN..... : 0.8674
AMPLE BETA ATTN..... : 0.9447
PHA TO BETA X TALK..... : 0.07117
TA TO ALPHA X TALK..... : 0.01000
STEMATIC ERROR..... : 0.1000

RESULTS ALPHA

				Activity/Sample
PHA ACTIVITY..... :	1.991E+02 pCi/L	x 0.350 L	=	69.69 pCi/sam
PHA TWO SIG COUNT ERROR..... :	3.767E+00	x 0.350 L	=	1.318 pCi/sam
PHA TPU..... :	3.920E+01 pCi/L	x 0.350 L	=	13.72 pCi/sam
PHA LLD..... :	4.003E-01 pCi/L	x 0.350 L	=	0.140 pCi/sam
PHA MDC..... :	5.154E-01 pCi/L	x 0.350 L	=	0.180 pCi/sam

RESULTS BETA

TA ACTIVITY..... :	1.595E+02 pCi/L	x 0.350 L	=	55.83 pCi/sam
TA TWO SIG COUNT ERROR..... :	2.905E+00	x 0.350 L	=	1.017 pCi/sam
TA TPU..... :	3.140E+01 pCi/L	x 0.350 L	=	10.99 pCi/sam
TA LLD..... :	8.998E-01 pCi/L	x 0.350 L	=	0.315 pCi/sam
TA MDC..... :	1.082E+00 pCi/L	x 0.350 L	=	0.379 pCi/sam

R. Jolly
6/13/95

3-JUN-1995 16:15 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
AMPLE NAME..... : MXS 03847MS
AMPLE ID..... : S954Y05L

OUNTER ID..... : HT1000
OSITION NUMBER..... : A2
AMPLE ALPHA COUNT..... : 6435.0
AMPLE BETA COUNT..... : 11389.0
AMPLE COUNT TIME..... : 240.0 MIN.
AMPLE ALPHA BACK GROUND. : 0.0440
AMPLE BETA BACK GROUND.. : 1.0280
AMPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 0.3000 L
AMPLE ALPHA EFF..... : 0.3304
AMPLE BETA EFF ..... : 0.4449
AMPLE ALPHA ATTN..... : 0.5387
AMPLE BETA ATTN..... : 0.8887
LPHA TO BETA X TALK..... : 0.09232
ETA TO ALPHA X TALK..... : 0.01000
YSTEMATIC ERROR..... : 0.1000

RESULTS ALPHA

Activity/sample

PHA ACTIVITY..... :	2.444E+02	pCi/L	x 0.300 L =	73.32 pCi/sam
PHA TWO SIG COUNT ERROR..... :	5.751E+00		x 0.300 L =	1.725 pCi/sam
PHA TPU..... :	4.825E+01	pCi/L	x 0.300L =	14.48 pCi/sam
PHA LLD..... :	4.572E-01	pCi/L	x 0.300L =	0.1372 pCi/sam
PHA MDC..... :	6.267E-01	pCi/L	x 0.300L =	0.1880 pCi/sam

RESULTS BETA

TA ACTIVITY..... :	1.686E+02	pCi/L	x 0.300L =	50.58 pCi/sam
TA TWO SIG COUNT ERROR..... :	3.256E+00		x 0.300L =	0.9768 pCi/sam
TA TPU..... :	3.321E+01	pCi/L	x 0.300L =	9.963 pCi/sam
TA LLD..... :	9.947E-01	pCi/L	x 0.300L =	0.2984 pCi/sam
TA MDC..... :	1.199E+00	pCi/L	x 0.300L =	0.3597 pCi/sam

R. Fully
6/13/95

3-JUN-1995 16:15 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
AMPLE NAME..... : MXS 03847MSD
AMPLE ID..... : S954Y05M

OUNTER ID..... : HT1000
OSITION NUMBER..... : A3
AMPLE ALPHA COUNT..... : 6145.0
AMPLE BETA COUNT..... : 11113.0
AMPLE COUNT TIME..... : 240.0 MIN.
AMPLE ALPHA BACK GROUND. : 0.1220
AMPLE BETA BACK GROUND.. : 1.1900
AMPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 0.3000 L
AMPLE ALPHA EFF..... : 0.3345
AMPLE BETA EFF ..... : 0.4267
AMPLE ALPHA ATTN..... : 0.5423
AMPLE BETA ATTN..... : 0.8893
PHA TO BETA X TALK..... : 0.07117
TA TO ALPHA X TALK..... : 0.01000
STEMATIC ERROR..... : 0.1000

RESULTS ALPHA

			Activity / Sample
PHA ACTIVITY..... :	2.230E+02	pCi/L	x 0.300 L = 66.90 pCi/sam
PHA TWO SIG COUNT ERROR..... :	5.454E+00		x 0.300 L = 1.636 pCi/sam
PHA TPU..... :	4.405E+01	pCi/L	x 0.300 L = 13.22 pCi/sam
PHA LLD..... :	7.469E-01	pCi/L	x 0.300 L = 0.2241 pCi/sam
PHA MDC..... :	9.617E-01	pCi/L	x 0.300 L = 0.2885 pCi/sam

RESULTS BETA

A ACTIVITY..... :	1.731E+02	pCi/L	x 0.300 L = 51.93 pCi/sam
A TWO SIG COUNT ERROR..... :	3.377E+00		x 0.300 L = 1.013 pCi/sam
A TPU..... :	3.409E+01	pCi/L	x 0.300 L = 10.23 pCi/sam
A LLD..... :	1.115E+00	pCi/L	x 0.300 L = 0.3345 pCi/sam
A MDC..... :	1.341E+00	pCi/L	x 0.300 L = 0.4023 pCi/sam

J. Fully
6/13/95

3-JUN-1995 10:08 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
AMPLE NAME..... : MXS 03847
AMPLE ID..... : S954Y05K

OUNTER ID..... : HT1000
OSITION NUMBER..... : C3
AMPLE ALPHA COUNT..... : 44.0
AMPLE BETA COUNT..... : 527.0
AMPLE COUNT TIME..... : 240.0 MIN.
AMPLE ALPHA BACK GROUND. : 0.1140
AMPLE BETA BACK GROUND.. : 1.2520
AMPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 0.3000 L
AMPLE ALPHA EFF..... : 0.3290
AMPLE BETA EFF ..... : 0.4273
AMPLE ALPHA ATTN..... : 0.5386
AMPLE BETA ATTN..... : 0.8887
LPHA TO BETA X TALK..... : 0.08399
ETA TO ALPHA X TALK..... : 0.00991
YSTEMATIC ERROR..... : 0.1000

RESULTS ALPHA

Activity /sam

LPHA ACTIVITY..... : 5.286E-01 pCi/L x 0.300L = 0.1586 pCi/sam
LPHA TWO SIG COUNT ERROR..... : 5.154E-01 x 0.300L = 0.1546 pCi/sam
LPHA TPU..... : 5.257E-01 pCi/L x 0.300L = 0.1577 pCi/sam
LPHA LLD..... : 7.392E-01 pCi/L x 0.300L = 0.2218 pCi/sam
LPHA MDC..... : 9.550E-01 pCi/L x 0.300L = 0.2865 pCi/sam

RESULTS BETA

ETA ACTIVITY..... : 3.758E+00 pCi/L x 0.300L = 1.127 pCi/sam
ETA TWO SIG COUNT ERROR..... : 8.376E-01 x 0.300L = 0.25128 pCi/sam
ETA TPU..... : 1.115E+00 pCi/L x 0.300L = 0.3345 pCi/sam
ETA LLD..... : 1.143E+00 pCi/L x 0.300L = 0.3429 pCi/sam
ETA MDC..... : 1.374E+00 pCi/L x 0.300L = 0.4122 pCi/sam

R. Jolly
6/13/95

4-JUN-1995 09:13 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
AMPLE NAME..... : EO 3881
AMPLE ID..... : S954P067

OUNTER ID..... : HT1000
OSITION NUMBER..... : A2
AMPLE ALPHA COUNT..... : 341.0
AMPLE BETA COUNT..... : 1982.0
AMPLE COUNT TIME..... : 1000.0 MIN.
AMPLE ALPHA BACK GROUND. : 0.0440
AMPLE BETA BACK GROUND.. : 1.0280
AMPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 1.0000 Filter
AMPLE ALPHA EFF..... : 0.3304
AMPLE BETA EFF ..... : 0.4449
AMPLE ALPHA ATTN..... : 0.4109
AMPLE BETA ATTN..... : 0.8690
LPHA TO BETA X TALK..... : 0.09232
ETA TO ALPHA X TALK..... : 0.01000
YSTEMATIC ERROR..... : 0.1000

RESULTS ALPHA

Activity/Sample

LPHA ACTIVITY..... : 1.028E+00 pCi/flt x 5 = 5.14 pCi
LPHA TWO SIG COUNT ERROR..... : 1.367E-01 x 5 = 0.6835 pCi
LPHA TPU..... : 2.435E-01 pCi/flt x 5 = 1.217 pCi
LPHA LLD..... : 1.254E-01 pCi/flt x 5 = 0.627 pCi
LPHA MDC..... : 1.114E-01 pCi/flt x 5 = 0.557 pCi

RESULTS BETA

ETA ACTIVITY..... : 1.098E+00 pCi/flt x 5 = 5.49 pCi
ETA TWO SIG COUNT ERROR..... : 1.449E-01 x 5 = 0.725 pCi
ETA TPU..... : 2.594E-01 pCi/flt x 5 = 1.297 pCi
ETA LLD..... : 2.129E-01 pCi/flt x 5 = 1.0645 pCi
ETA MDC..... : 1.770E-01 pCi/flt x 5 = 0.885 pCi

Prepared sample was a 1:5 dilution

R. Jolley
6/14/95

4-JUN-1995 08:57 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
AMPLE NAME..... : EO 3882
AMPLE ID..... : S954P068

OUNTER ID..... : HT1000
OSITION NUMBER..... : A3
AMPLE ALPHA COUNT..... : 376.0
AMPLE BETA COUNT..... : 1537.0
AMPLE COUNT TIME..... : 1000.0 MIN.
AMPLE ALPHA BACK GROUND. : 0.1220
AMPLE BETA BACK GROUND.. : 1.1900
AMPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 1.0000 Filter
AMPLE ALPHA EFF..... : 0.3345
AMPLE BETA EFF ..... : 0.4267
AMPLE ALPHA ATTN..... : 0.4233
AMPLE BETA ATTN..... : 0.8709
LPHA TO BETA X TALK..... : 0.07117
ETA TO ALPHA X TALK..... : 0.01000
YSTEMATIC ERROR..... : 0.1000

RESULTS ALPHA

				Activity/sample
LPHA ACTIVITY..... :	8.470E-01 pCi/flt	x5	=	4.235 pCi
LPHA TWO SIG COUNT ERROR..... :	1.568E-01	x5	=	0.784 pCi
LPHA TPU..... :	2.283E-01 pCi/flt	x5	=	1.141 pCi
LPHA LLD..... :	2.002E-01 pCi/flt	x5	=	1.001 pCi
LPHA MDC..... :	1.721E-01 pCi/flt	x5	=	0.8605 pCi

RESULTS BETA

ETA ACTIVITY..... :	4.067E-01 pCi/flt	x5	=	2.033 pCi
ETA TWO SIG COUNT ERROR..... :	1.485E-01	x5	=	0.7425 pCi
ETA TPU..... :	1.685E-01 pCi/flt	x5	=	0.8425 pCi
ETA LLD..... :	2.383E-01 pCi/flt	x5	=	1.191 pCi
ETA MDC..... :	1.978E-01 pCi/flt	x5	=	0.989 pCi

Prepared sample was a 1:5 dilution.

R. Jully
6/14/95

4-JUN-1995 08:57 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
AMPLE NAME..... : EO 3883
AMPLE ID..... : S954P069

OUNTER ID..... : HT1000
OSITION NUMBER..... : A4
AMPLE ALPHA COUNT..... : 457.0
AMPLE BETA COUNT..... : 2206.0
AMPLE COUNT TIME..... : 1000.0 MIN.
AMPLE ALPHA BACK GROUND. : 0.0860
AMPLE BETA BACK GROUND.. : 1.6820
AMPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 1.0000 Filter
AMPLE ALPHA EFF..... : 0.3413
AMPLE BETA EFF ..... : 0.4559
AMPLE ALPHA ATTN..... : 0.3918
AMPLE BETA ATTN..... : 0.8661
LPHA TO BETA X TALK..... : 0.07529
ETA TO ALPHA X TALK..... : 0.00997
YSTEMATIC ERROR..... : 0.1000

RESULTS ALPHA

Activity / Sample

LPHA ACTIVITY..... : 1.295E+00 pCi/flt x5 = 6.475 pCi
LPHA TWO SIG COUNT ERROR..... : 1.673E-01 x5 = 0.8365 pCi
LPHA TPU..... : 3.040E-01 pCi/flt x5 = 1.52 pCi
LPHA LLD..... : 1.780E-01 pCi/flt x5 = 0.89 pCi
LPHA MDC..... : 1.545E-01 pCi/flt x5 = 0.7725 pCi

RESULTS BETA

ETA ACTIVITY..... : 5.834E-01 pCi/flt x5 = 2.917 pCi
ETA TWO SIG COUNT ERROR..... : 1.667E-01 x5 = 0.8335 pCi
ETA TPU..... : 2.021E-01 pCi/flt x5 = 1.011 pCi
ETA LLD..... : 2.666E-01 pCi/flt x5 = 1.333 pCi
ETA MDC..... : 2.208E-01 pCi/flt x5 = 1.104 pCi

prepare sample was a 1:5 dilution

R. Jullp
6/14/95

4-JUN-1995 08:57 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
AMPLE NAME..... : EO 3884
AMPLE ID..... : S954P06B

OUNTER ID..... : HT1000
OSITION NUMBER..... : B2
AMPLE ALPHA COUNT..... : 361.0
AMPLE BETA COUNT..... : 1711.0
AMPLE COUNT TIME..... : 1000.0 MIN.
AMPLE ALPHA BACK GROUND. : 0.0660
AMPLE BETA BACK GROUND.. : 0.9520
AMPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 1.0000 Filter
AMPLE ALPHA EFF..... : 0.3396
AMPLE BETA EFF ..... : 0.4430
AMPLE ALPHA ATTN..... : 0.3812
AMPLE BETA ATTN..... : 0.8645
LPHA TO BETA X TALK..... : 0.07203
ETA TO ALPHA X TALK..... : 0.00998
YSTEMATIC ERROR..... : 0.1000

RESULTS ALPHA

			Activity / Sample
LPHA ACTIVITY..... :	1.060E+00 pCi/flt	x 5 =	5.30 pCi
LPHA TWO SIG COUNT ERROR..... :	1.529E-01	x 5 =	0.7645 pCi
LPHA TPU..... :	2.579E-01 pCi/flt	x 5 =	1.2895 pCi
LPHA LLD..... :	1.611E-01 pCi/flt	x 5 =	0.8055 pCi
LPHA MDC..... :	1.410E-01 pCi/flt	x 5 =	0.705 pCi

RESULTS BETA

ETA ACTIVITY..... :	8.821E-01 pCi/flt	x 5 =	4.4105 pCi
ETA TWO SIG COUNT ERROR..... :	1.384E-01	x 5 =	0.692 pCi
ETA TPU..... :	2.215E-01 pCi/flt	x 5 =	1.1075 pCi
ETA LLD..... :	2.068E-01 pCi/flt	x 5 =	1.034 pCi
ETA MDC..... :	1.720E-01 pCi/flt	x 5 =	0.860 pCi

Prepared sample was a 1:5 dilution

R. Jolly
6/14/95

Section 2. Instrument Performance and Calibration Data
Proportional Counting
Inventory Checklist

- [x] Instrument ID
- [x] Date and Time Calibrated, Calibration Check, Analysis Initials
- [x] NIST Traceable Certificate(s), and Activity of Standard(s)
- [x] Attenuation/Absorption Curve(s)
- [x] Instrument Efficiencies
- [x] Alpha/Beta Crosstalk
- [NA] Statistical Results Used to Demonstrate Detector Reliability
- [NA] Results of Chi-Square Tests Used to Evaluate Efficiency Checks
- [x] Background Counts Obtained for Each Detector
- [x] Background Count Duration
- [NA] Statistical Results Used to Demonstrate Background Reliability

Section 2. Instrument Performance and Calibration Data
Proportional Counting
Reviewer Checklist

- X The Instrument Performance and Calibration Data Inventory Checklist above is complete.
- X Specified analytical protocols are followed for particular contract requirements.
- X Conditions of instrument setup are noted.
- X NCR(s) noted, and affected instruments not used.

7678

CALIBRATION/MAINTENANCE LOG

Instrument: HT-1000-1

	DATE	ANALYST	CALIBRATION/MAINTENANCE
10 min	4/26/95	RLK	Check Sources all detectors
500 min	5/2/95	RLK	Backgrounds all detectors
200 min	5/10/95	RLK	BACKGROUND Collect all detectors
	5/10/95	RLK	Check sources Drawers A, B, + C
23 days (2200 lbs)	5/10/95	RLK	Changed gas bottles + filter
100 min	5/11/95	RLK	Calibrated all detectors
			Background collect all detectors
10 min	5/11/95	RLK	Check Sources All drawers/detectors
500 min	5/12/95	RLK	BACKGROUND COLLECT All detectors
10 min	5/21/95	[illegible]	Check sources Drawer A / detectors 1-4
100 min	5/21/95	[illegible]	Bkg collect Drawer A detectors 1-4
500 min	5-22-95	cmw	Background Collect: all detectors
	5-24-95	[illegible]	Check Sources all detectors
10 min	5-25-95	[illegible]	Check sources Drawer A, B, detectors 1-4
500 min (2200 lbs)	5-26-95	cmw	Background collect: all detectors
26 days	6-5-95	cmw	Changed gas bottles + filters
	6-5-95	RLK	Calibrated drawers A, B, + C
500 min	6-5-95	cmw	Background collect drawers A, B + C
	6-6-95	cmw	Calibrated drawer D
	6-6-95	cmw	Check sources drawers A, B
500 min	6-6-95	cmw	Background collect drawer D
	6-9-95	[illegible]	Check sources / all detectors
	6-9-95	[illegible]	Background collect

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOURCE

Radionuclide:	Pu-239	Customer:	DATACHEM LABORATORIES
Half Life:	(2.411 ± 0.003) x 10^4 years	P.O.No.:	7302
Catalog No.:	EAB-239	Reference Date:	July 1 1991 12:00 PST.
Source No.:	Q-088	Contained Radioactivity:	6,080 dpm.

Description of Source

a. Capsule type:	PL
b. Nature of active deposit:	Electrodeposited and diffusion bonded oxide
c. Active area/ diameter/volume:	45 mm
d. Backing:	0.254 mm stainless steel
e. Cover:	100 μgram/cm^2 gold

CAUTION!
DELICATE SURFACE
DO NOT WIPE
ACTIVE AREA

Radioimpurities

None detected

Method of Calibration

The source was assayed using a windowless internal gas flow proportional counter.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	± 1.3%
b. Random uncertainty in assay:	± 1.4%
c. Random uncertainty in weighing(s):	± 0.0%
d. Total uncertainty at the 99% confidence level:	± 2.7%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Notes

1. Nuclear data were taken from "Table of Isotopes", Seventh Edition, edited by Virginia S. Shirley.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials. (As in NRC Regulatory Guide 4.15)

QUALITY CONTROL

ISOTOPE PRODUCTS LABORATORIES
1800 No. Keystone Street.,
Burbank, California 91504
(818) 843 - 7000

000192

IPL Ref. No.: 388-4-1

CERTIFICATE OF CALIBRATION
BETA STANDARD SOURCE

Radionuclide:	Sr-90	Customer:	DATACHEM LABORATORIES
Half Life:	28.5 ± 0.2 years	P.O.No.:	7302
Catalog No.:	EAB-090	Reference Date:	June 15 1991 12:00 PST.
Source No.:	P-638	Contained Radioactivity:	30,200 dpm.

Description of Source

a. Capsule type:	PL
b. Nature of active deposit:	Distributed and evaporated metallic salts
c. Active diameter/volume:	45 mm
d. Backing:	Stainless steel
e. Cover:	0.9 mg/cm² aluminized myl

CAUTION!
DELICATE SURFACE
DO NOT WIPE
ACTIVE AREA

Radioimpurities

None detected

Method of Calibration

The source was prepared from a e concentration in μCi/gram was determined by a liquid scintiliatio

MYLAR COVER WILL REDUCE ACTIVITY BY ~~3.37%~~.
3% - Sr-90
.37% - Y-90

Uncertainty of Measurement

a. Systematic uncertainty in instru	
b. Random uncertainty in assay:	± 0.5%
c. Random uncertainty in weighing(s):	± 0.2%
d. Total uncertainty at the 99% confidence level:	± 2.2%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Notes

1. Nuclear data were taken from "Table of Isotopes", Seventh Edition, edited by Virginia S. Shirley.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials. (As in NRC Regulatory Guide 4.15)

QUALITY CONTROL

ISOTOPE PRODUCTS LABORATORIES
1800 No. Keystone Street.,
Burbank, California 91504
(818) 843 - 7000

000193

IPL Ref. No.: 379-75-7

DCL/RCL

TITLE DCL/RCL /CHECK SOURCES

Project No.

Book No. 2694

From Page No. 27 | Pu-239-001-IS (Activity = 656 pC/mL)

1/11/94 SR-90-001-IS (Act. = 220.7 pC/mL)

	Pu-239-001-IS wt.(g)	Pu-239-001-IS mL	SR-90-001-IS wt(g)	SR-90-001-IS mL	Activity Pu-239	Activity SR-90
CKS-001	1.0006	1.0022	1.0010	1.0026	657.4	221.3
CKS-002	1.0088	1.0104	1.0077	1.0093	662.8	222.8
CKS-003	1.0052	1.0068	1.0013	1.0029	660.5	221.3
CKS-004	1.0096	1.0112	1.0004	1.0020	663.3	221.1
CKS-001	1.5064	1.5085	1.5070	1.5091	989.6	333.1
CKS-002	1.5098	1.5119	1.5100	1.5121	991.8	333.7
CKS-003	1.5017	1.5038	1.5179	1.5200	986.5	335.5
CKS-004	1.5003	1.5024	1.5348	1.53692	985.6	339.2

	Pu-239	SR-90 (10/7/91)	Decay corrected SR-90 activity (1/12/94)
CKS-001	1647.0 pC/	554.4	1025.2 pC/
CKS-002	1654.6 pC/	556.5	1029.1 pC/
CKS-003	1647.0 pC/	556.8	1029.7 pC/
CKS-004	1648.9 pC/	560.3	1036.1 pC/

CKS-001 Activities 10 minute counts

	Det 1		Det. 2		Det 3		Det 4	
File Name	α	β	α	β	α	β	α	β
KS-0118 A	1260	909	1220	889	1340	930	1410	983
KS-0118 B	1490	1020	1390	1000	1500	1010	1480	998
KS-0118 C	1230	871	1270	963	1320	913	1370	949
KS-0118 D	1390	1010	~~1460~~ 1350	~~998~~	1300	923	1360	970
KS-0118 E	1290	874	1270	939	1400	971	1340	941
KS-0119 A	1200	847	1320	966	1300	908	1380	969
$\bar{X}$	1310	922	1303	958	1360	943	1390	968
S	109.7	74.9	61.9	40.0	78.0	39.9	49.8	21.1
2σ	219	150	124	80	156	80	100	42
Target	1647	1025.2	1647	1025.2	1647	1025.2	1647.	1025.2
%	79.5%	89.9%	79.1%	93.4%	82.6%	92.0%	84.4%	94.4%

N=24 $\bar{X}_\alpha$ = 1341 ; S = 81.6 ; 2σ = 163 % rec = 81.42

$\bar{X}_\beta$ = 946 ; S = 48.3 ; 2σ = 97 % rec 92.47

Q00194

To Page No. 28

Witnessed & Understood by me,	Date	Invented by	Date
[signature]	2-1-94	[signature]	1/20/94
		Recorded by [signature]	

DCL/RCL Project No.

LE DCL/RCL Check sources Book No. 2694

m Page No. 27 | RK-0121A | 60 min counts

Sample	Planchet	Tare wt.	Planchet + Sample	Sample wt. (mg)	Self-Absorption Alpha Eff	Self-Absorption Beta Eff	Activity α	Activity β	Target α	Target β
-001	C-614	7.34259	7.34525	2.66	0.79062	0.93306	1640	1030	1647.0	1025.0
-002	C-615	7.33647	7.33938	2.91	0.78099	0.93112	1610	1050	1654.6	1028.9
-003	C-616	7.19858	7.20055	1.97	0.82145	0.93946	1650	1020	1647.0	1029.4
-004	C-617	7.33915	7.34113	1.98	0.82094	0.93935	1670	1040	1648.9	1035.9

% Recovery

CSC-001 α	CSC-001 β	CSC-002 α	CSC-002 β	CSC-003 α	CSC-003 β	CSC-004 α	CSC-004 β
99.57	100.5	~~100.3~~ 103.3	102.1	100.2	99.09	101.3	100.4

Sample	Detector 1 ALPHA	Detector 1 BETA	Detector 2 ALPHA	Detector 2 BETA	Detector 3 ALPHA	Detector 3 BETA	Detector 4 ALPHA	Detector 4 BETA	$\bar{X}$ ± 2s (α)	$\bar{X}$ ± 2s (β)
-001	1570	1010	1560	1010	1660	992	1570	987	1590 ± 94	1000 ± 24
-002	1680	1030	1680	1040	1750	1020	1650	1010	1680 ± 99	1025 ± 26
-003	1640	1050	1600	1040	1770	1030	1740	1040	1688 ± 161	1040 ± 16
-004	1590	1040	1580	1070	1640	1040	1630	1050	1610 ± 57	1050 ± 28

Sample	Detector 1 α	Detector 1 β	Detector 2 α	Detector 2 β	Detector 3 α	Detector 3 β	Detector 4 α	Detector 4 β	$\bar{X}$ ± 2s α	$\bar{X}$ ± 2s β
S-001	95.32	98.54	94.72	98.54	100.79	96.78	95.32	96.29	96.54 ± 5.70	97.54 ± 2.35
S-002	99.12	100.11	101.5	101.1	105.77	99.13	99.72	98.16	101.53 ± 6.01	99.63 ± 2.53
S-003	99.57	102.0	97.15	101.03	107.5	100.1	105.65	101.03	102.47 ± 9.81	101.04 ± 1.55
S-004	96.43	100.40	95.82	103.29	99.46	100.40	98.85	101.36	97.64 ± 3.57	101.36 ± 2.72
$\bar{X}$ ± 2s	97.61 ± 4.12	100.26 ± 2.84	97.30 ± 5.95	100.99 ± 3.88	103.38 ± 7.73	99.10 ± 3.28	99.89 ± 8.58	99.21 ± 4.84	99.55 ± 5.79	99.89 ± 3.48

α) $\bar{X}$ = 99.54 ± 7.38 N = 16

β) $\bar{X}$ = 99.89 ± 3.75 N = 16

1/25/94

000195

To Page No. 28

Witnessed & Understood by me,	Date	Invented by	Date
	2-1-94	Recorded by	1/25/94

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 12, 1995 02:44 pm

Data File
CKS0612A.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer A:	1330	High	600 sec.

Detector Parameters				
Alpha:	Window	Efficiency	Background	Crosstalk
Det A/1	65.9-100%	33.30%	0.37599999	7.5802469
Det A/2	65.4-100%	33.04%	0.044	9.2323008
Det A/3	69.6-100%	33.45%	0.122	7.116519
Det A/4	70.3-100%	34.13%	0.086	7.5292134
Beta:	Window	Efficiency	Background	Crosstalk
Det A/1	0 - 65.8%	44.30%	3.312	0.99590111
Det A/2	0 - 65.3%	44.49%	1.028	0.99997914
Det A/3	0 - 69.5%	42.67%	1.1900001	1.0001959
Det A/4	0 - 70.2%	45.59%	1.682	0.99723953

Det A/1	Sample:	CKS-001A	Sample Factor:	1		Jun 12, 1995 14:34:41		
Alpha	Gross:	7959	Net:	7.96E+02	±17.485875	pCi:	1.08E+03	±23.651264
Beta	Gross:	8693	Net:	8.06E+02	±17.679556	pCi:	8.19E+02	±17.976281
Det A/2	Sample:	CKS-002A	Sample Factor:	1		Jun 12, 1995 14:34:41		
Alpha	Gross:	9147	Net:	9.15E+02	±18.745438	pCi:	1.25E+03	±25.553691
Beta	Gross:	9609	Net:	8.75E+02	±18.431018	pCi:	8.86E+02	±18.659958
Det A/3	Sample:	CKS-003A	Sample Factor:	1		Jun 12, 1995 14:34:41		
Alpha	Gross:	7951	Net:	7.95E+02	±17.47703	pCi:	1.07E+03	±23.534703
Beta	Gross:	8344	Net:	7.77E+02	±17.331055	pCi:	8.20E+02	±18.294919
Det A/4	Sample:	CKS-004A	Sample Factor:	1		Jun 12, 1995 14:34:41		
Alpha	Gross:	8025	Net:	8.02E+02	±17.558163	pCi:	1.06E+03	±23.173982
Beta	Gross:	8371	Net:	7.75E+02	±17.32431	pCi:	7.66E+02	±17.116251

R. Tulley
6/13/95

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 12, 1995 03:19 pm

Data File
CKS0612B.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer B:	1330	High	600 sec.

Detector Parameters				
Alpha:	Window	Efficiency	Background	Crosstalk
Det B/1	74.3-100%	33.09%	0.148	7.6540756
Det B/2	77.3-100%	33.96%	0.066	7.2033896
Det B/3	78.4-100%	31.44%	0.09	9.5462275
Det B/4	77.8-100%	32.95%	0.11	8.0109806
Beta:	Window	Efficiency	Background	Crosstalk
Det B/1	0 - 74.2%	43.91%	1.516	0.99632984
Det B/2	0 - 77.2%	44.30%	0.95200002	0.99805003
Det B/3	0 - 78.3%	42.62%	1.368	1.0187516
Det B/4	0 - 77.7%	42.82%	1.62	1.0118318

Det B/1	Sample:	CKS-001A	Sample Factor:	1	Jun 12, 1995 15:09:31	
Alpha	Gross:	8089	Net:	8.09E+02 ±17.62805	pCi:	1.10E+03 ±23.997631
Beta	Gross:	8865	Net:	8.23E+02 ±17.849637	pCi:	8.44E+02 ±18.311231
Det B/2	Sample:	CKS-002A	Sample Factor:	1	Jun 12, 1995 15:09:31	
Alpha	Gross:	8954	Net:	8.95E+02 ±18.546626	pCi:	1.19E+03 ±24.600102
Beta	Gross:	9431	Net:	8.78E+02 ±18.420567	pCi:	8.92E+02 ±18.730712
Det B/3	Sample:	CKS-003A	Sample Factor:	1	Jun 12, 1995 15:09:31	
Alpha	Gross:	7386	Net:	7.39E+02 ±16.844621	pCi:	1.06E+03 ±24.133603
Beta	Gross:	8305	Net:	7.59E+02 ±17.16269	pCi:	8.02E+02 ±18.137521
Det B/4	Sample:	CKS-004A	Sample Factor:	1	Jun 12, 1995 15:09:31	
Alpha	Gross:	7231	Net:	7.23E+02 ±16.666942	pCi:	9.88E+02 ±22.785503
Beta	Gross:	7546	Net:	6.95E+02 ±16.414393	pCi:	7.31E+02 ±17.265828

R. Fully
6/13/95

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 12, 1995 03:31 pm

Data File
CKS0612C.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer C:	1330	High	600 sec.

Detector Parameters				
Alpha:	Window	Efficiency	Background	Crosstalk
Det C/1	67.1-100%	33.45%	0.112	7.9523106
Det C/2	70.2-100%	33.25%	0.062	9.0144672
Det C/3	76.8-100%	32.90%	0.114	8.3989506
Det C/4	72.9-100%	32.80%	0.178	8.399148
Beta:	Window	Efficiency	Background	Crosstalk
Det C/1	0 - 67.0%	45.02%	1.256	1.0026717
Det C/2	0 - 70.1%	44.81%	1.262	0.99805158
Det C/3	0 - 76.7%	42.73%	1.252	0.99131513
Det C/4	0 - 72.8%	43.56%	1.63	1.0033267

Det C/1	Sample:	CKS-001A	Sample Factor:	1		Jun 12, 1995 15:21:36		
Alpha	Gross:	8458	Net:	8.46E+02	±18.025631	pCi:	1.14E+03	±24.273454
Beta	Gross:	9148	Net:	8.46E+02	±18.101343	pCi:	8.47E+02	±18.110867
Det C/2	Sample:	CKS-002A	Sample Factor:	1		Jun 12, 1995 15:21:36		
Alpha	Gross:	8801	Net:	8.80E+02	±18.387488	pCi:	1.19E+03	±24.910761
Beta	Gross:	9607	Net:	8.80E+02	±18.475496	pCi:	8.85E+02	±18.572001
Det C/3	Sample:	CKS-003A	Sample Factor:	1		Jun 12, 1995 15:21:36		
Alpha	Gross:	7573	Net:	7.57E+02	±17.056531	pCi:	1.04E+03	±23.355999
Beta	Gross:	8411	Net:	7.76E+02	±17.342085	pCi:	8.18E+02	±18.28328
Det C/4	Sample:	CKS-004A	Sample Factor:	1		Jun 12, 1995 15:21:36		
Alpha	Gross:	8120	Net:	8.12E+02	±17.661802	pCi:	1.11E+03	±24.257579
Beta	Gross:	8455	Net:	7.76E+02	±17.344337	pCi:	8.02E+02	±17.936857

R. Tully
6/13/95

000198

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 13, 1995 08:53 am

Data File
CKS0613A.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer A:	1330	High	600 sec.

Detector Parameters				
Alpha:	**Window**	**Efficiency**	**Background**	**Crosstalk**
Det A/1	65.9-100%	33.30%	0.37599999	7.5802469
Det A/2	65.4-100%	33.04%	0.044	9.2323008
Det A/3	69.6-100%	33.45%	0.122	7.116519
Det A/4	70.3-100%	34.13%	0.086	7.5292134
Beta:	**Window**	**Efficiency**	**Background**	**Crosstalk**
Det A/1	0 - 65.8%	44.30%	3.312	0.99590111
Det A/2	0 - 65.3%	44.49%	1.028	0.99997914
Det A/3	0 - 69.5%	42.67%	1.1900001	1.0001959
Det A/4	0 - 70.2%	45.59%	1.682	0.99723953

Det A/1	Sample:	CKS-001A	Sample Factor:	1		Jun 13, 1995 08:42:47		
Alpha	Gross:	8213	Net:	8.21E+02	±17.7627	pCi:	1.11E+03	±24.025696
Beta	Gross:	8640	Net:	7.98E+02	±17.602474	pCi:	8.12E+02	±17.897905
Det A/2	Sample:	CKS-002A	Sample Factor:	1		Jun 13, 1995 08:42:47		
Alpha	Gross:	8927	Net:	8.93E+02	±18.518639	pCi:	1.22E+03	±25.244519
Beta	Gross:	9472	Net:	8.64E+02	±18.30704	pCi:	8.74E+02	±18.53444
Det A/3	Sample:	CKS-003A	Sample Factor:	1		Jun 13, 1995 08:42:47		
Alpha	Gross:	7738	Net:	7.74E+02	±17.241344	pCi:	1.04E+03	±23.217327
Beta	Gross:	8455	Net:	7.89E+02	±17.469129	pCi:	8.33E+02	±18.440672
Det A/4	Sample:	CKS-004A	Sample Factor:	1		Jun 13, 1995 08:42:47		
Alpha	Gross:	8132	Net:	8.13E+02	±17.674829	pCi:	1.07E+03	±23.327963
Beta	Gross:	8307	Net:	7.68E+02	±17.244911	pCi:	7.59E+02	±17.037805

R. Tully
6/13/95

000199

RADIOCHEMISTRY LABORATORY

7678

RADIOACTIVE MATERIAL INVENTORY
INTERMEDIATE STANDARD LOG

23

I.S. ID: Pu-239-001-IS
Solvent: 0.8 N HNO3
Concentration: 656 pCi/ml

Date: 4-8-92
Final Volume: 100 ml
Source I.D.: 2510-1

Usage:
continued from page 13

Date	Amount	Activity (µCi)	Running Total (µCi)	I.D.
11/30/92	10 ml	6560 10^{-6} µCi/ml	0.041454	CAL 11-54 MDB
3/17/93	0.8132 mL	0.000533^{5} µCi	0.040921	NB 2345 P 32 self absorption $
3/17/93	2.4396 mL	0.001600^{4}	0.039326	NB 2345 P 32 self absorption $
3/18/93	0.8132 mL	0.000533^{5}	0.03879^{3}	NB 2345 P 32 self absorption $
3/19/93	2.4396 mL	0.001600^{4}	0.03719^{3}	NB 2345 P 34 self abs. $'s
3/25/93	1.6264 mL	0.001066^{7}	0.03612^{6}	NB 2345 P 36 self abs $'s
4/2/93	0.8132 mL	0.0005335	0.03559^{3}	NB 2345 P 36 self abs $'s
4/7/93	0.6099 mL	0.0004000^{9}	0.03519^{3}	NB 2345 P 44 LCS for SX-0086 + CLP
4/9/93	0.4066	0.0002667^{3}	0.03492^{6}	NB 2345 P 44 LCS for SX-0086 + ARAFL-310-1
4/21/93	6.0864	0.003992^{7}	0.03093^{3}	Pu-239 standards
4/30/93	0.19903	0.0001305^{6}	0.03080^{2}	LC0430 for S93-0244 EM-1054 - 1056
5-18/93	0.20016	0.0001313^{0}	0.03067^{1}	LC0418 for CLP 13301-13 + ABYL002; NB 2436 p17
5-21-93	2.977	0.001952^{9}	0.02871^{8}	Pu standards for self abs. p21 NB2436
5-21-93	0.6087	0.000399^{3}	0.02831^{9}	self abs. p22 NB 2436
6-16-93	0.09976	0.0000654^{4}	0.02825^{3}	LC0616, U93-0080, 0096, S93-310, 028
6-23-93	0.09976	0.0000654^{4}	0.02818^{7}	LC0623 A B C for training
6-25-93	0.09976	0.0000654^{4}	0.02812^{2}	LC625 for S93-0294 + S93-040
7-9-93 MAB	17.117 g	0.01122875	0.01689	U-Pu-Am WS Lab Book #2360 p 72
8-9-93	0.09990 mL	8/9/93 0.0000655^{3}	0.01682	LC-0809 for EPA Audit EM 2066
11-17-93	4.1773	0.0027403	0.01415^{0}	LCS for EPA Audit
1-11-94	4.0305	0.0026440	0.01150^{6}	check stds Source CKS-001-4
1-12-94	6.0182	0.0039473	0.007558^{1}	check Source stds CKS-001-004
2/1/94 RL	0.300	0.000457	0.007101	Gross α/β LCS
2/7/94 RL	0.100	0.0000656	0.007035	Gross α/β LCS
5/10/94 RL	1.021	0.0006698	0.006365	Gross α/β LCS

RADIOCHEMISTRY LABORATORY 7678

RADIOACTIVE MATERIAL INVENTORY
INTERMEDIATE STANDARD LOG

23

I.S. ID: Pu-239-001-IS
Solvent: 0.8 N HNO_3
Concentration: 6656 pCi/ml

Date: 4-8-92
Final Volume: 100 ml
Source I.D.: 2510-1

Usage:
continued from page 13

Date	Amount	Activity (µCi)	Running Total (µCi)	I.D.
11/30/92	10 ml	65.60	0.041454	CAL 11-54
3/17/93	0.8132 mL	0.000533	0.040921	NB 2345 P 32 self absorption $
3/17/93	2.4396 mL	0.001600	0.039326	NB 2345 P 32 self absorption $
3/18/93	0.8132 mL	0.000533	0.03879	NB 2345 P 32 self absorption $
3/19/93	2.4396 mL	0.001600	0.03719	NB 2345 P 34 self abs. $'s
3/25/93	1.6264 mL	0.001066	0.03612	NB 2345 P 36 self abs $'s
4/2/93	0.8132 mL	0.0005335	0.03559	NB 2345 P 36 self abs $'s
4/7/93	0.6099 mL	0.0004000	0.03519	NB 2345 P 44 LCS for SX-0086 +
4/9/93	0.4066	0.0002667	0.03492	NB 2345 P 44 LCS for SX-0086 +
4/21/93	6.0864	0.003992	0.03093	Pu-239 standards
4/30/93	0.19903	0.0001305	0.03080	LC 0430 for EM-10 S93-0244 - 10
5-18-93	0.20016	0.0001313	0.03067	LC 0418 for CLP 13301 + ABYL 002, NB 2436 p
5-21-93	2.977	0.001952	0.02871	Pu standards for self abs. P21 NB 243
5-21-93	0.6087	0.000399	0.02831	self absorp. P 22 NB 2436
6-16-93	0.09976	0.0000654	0.02825	LC 0616, U93-008 0096, S93-310, 0
6-23-93	0.09976	0.0000654	0.02818	LC 0623 A B C for training
6-25-93	0.09976	0.0000654	0.02812	LC 625 for S93-0294 + S93-
7-9-93	17.117 g	0.01122875	0.01689	U-Pu-Am WS Lab Book #2360 p.
8-9-93	0.09990 mL	8/9/93 0.0000655	0.01682	LC-0809 for EPA Audit EM 2066
11-17-93	4.1773	0.002740	0.01415	LCS for EPA Audit
1-11-94	4.0305	0.002640	0.01150	check source stds CKS-001-
1-12-94	6.0182	0.003947	0.007558	check source stds CKS-001-
2/1/94 RL	0.300	0.000457	0.007101	gross α/β
2/7/94 RL	0.100	0.0000656	0.007035	gross α/β
5/10/94 RL	1.021	0.0006698	0.006365	gross α

7678

KES - 4-2-92

U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory-Las Vegas
Nuclear Radiation Assessment Division

Calibration Certificate

Description

Principal radionuclide: PLUTONIUM-239 Half-life: 2.4×10^4 years

Nominal activity: 59 nano curies

Nominal volume: 5 ml in ampoule/bottle number: 2510-1

Measurement Activity of principal radionuclide

Activity per gram of this solution

11.8 nano curies of Plutonium-239

at 0400 hours PST on December 13, 1990

Activity of daughter radionuclide

The principal activity was accompanied at the quoted time by

curies Per gram

of the daughter nuclide

Total mass of this solution

APPROX. 5.0 grams

Method of measurement

The activity of the primary solution was measured by an internal gas flow proportional counter.

The activity of the dilution was measured by liquid scintillation counting.

Useful Life

This radionuclide has decayed through half lives since it was obtained by EMSL-LV

We recommend that this solution should not be used after

000202

Purity

The manufacturer states that activities other than that of the principal nuclide and of its daughter nuclides, if any, were estimated/known to be:

(1) see remarks	less than equal to	%	of the principal activity
(2)	less than equal to	%	of the principal activity
(3)	less than equal to	%	of the principal activity

The activity of impurity (1) is not (2) is not (3) is not included in the quoted figures of the principal activity.

Random Errors

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than ± 0.13 %

(The 99.7% confidence limits are given by t(sm) where t is obtained from the student t factor for the degree of freedom (n-1)).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error ($+\delta - \delta'$). These have been estimated not to exceed

+2.7 % or - 2.7 %

the overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error [t(sm)] at the 99.7% confidence limits and the worst case estimate of the systematic errors ($+\delta, -\delta'$)
The overall uncertainty is therefore calculated on the basis of $+ [t(sm) + \delta], - [t(sm) + \delta]$

and is + 3.1 %, - 3.1 % of the quoted radioactive concentration.

Decay Schemes

This standardization is based on the following assumptions of the principle nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Plutonium-239 and impurities were assumed to decay 100 percent by alpha emission.

Chemical Composition of Solution

Carrier content per gram of solution:

Other components:

4M Nitric acid

Preservative:

Remarks

IMPURITIES:

Pu-238	0.033%	of the total activity
Pu-240	4.6×10^{-5}%	of the total activity
Pu-241	1.5×10^{-3}%	of the total activity
Pu-242	8.8×10^{-6}%	of the total activity
Pu-244	6.2×10^{-9}%	of the total activity

Date Certificate Prepared December 13, 1990

Approval Signature Paul B. Hahn

Revised 1/84

CONTINUED FROM Pg. 35

RADIOCHEMISTRY LABORATORY

RADIOACTIVE MATERIAL INVENTORY
INTERMEDIATE STANDARD LOG

I.S. ID: Sr-90-001-IS
Solvent: 1.0 M HNO_3
Concentration: 220.7 pCi/mL

Date: 10-9-91
Final Volume: 100 mL
Source I.D.: 2454-2

Usage:

Date	Amount	Activity (µCi)	Running Total (µCi)	I.D.
10-19-93	0.99786 mL	0.0002202	0.00685482	Y-20-CS4
11-25-93	0.09837 mL	0.0000217	0.0068331	TEFA-19
↓	↓	↓	0.00681142	20
↓	↓	↓	0.00687897 2	21
11/17/93	4.19528 mL	0.0009259	0.0059531	LCS for EPA Audit
1-4-94	0.99786 mL	0.0002202	0.0057329	T1 for Total Sr by LSC
↓	↓	↓	0.0055127	T2
↓	↓	↓	0.0052925	T3
↓	↓	↓	0.0050723	T5
1-4-94	0.99786	0.0002202	0.0048521	STDSPK1
↓	↓	↓	0.0046319	STDSPK2
1-11-94	4.0104	0.0008851	0.0037468	check source stds CKS-001-4
1-12-94	6.0697	0.001339	0.0024072	check source stds CKS-001-004
2-1-94 RL	RL ~~0.099~~ 0.303 mL	0.000137	0.00227	gross α/β LCS
2-7-94 RL	0.100	0.00002207	0.0022493	gross α/β LCS

RADIOCHEMISTRY LABORATORY

RADIOACTIVE MATERIAL INVENTORY SOURCE LOG

CAUTION
RADIOACTIVE MATERIAL
SOU 2454-2 ~5.0g
AMT. 4.58 nanoCi/g
ISOTOPE Sr-90
DATE 9/5/91 0400PST
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY—LAS VEGAS

Vendor I.D.: SPM 2454-2
Date Received: 9-30-91
RCL I.D.: 2454-2

THIS STD ACTIVITY IS NOT CORRECTED FOR Y-90 EQUILIBRIUM. CCW

Isotopes/Form	Activity (µCi)	Mass	Date
Sr-90/LIQ	0.022067	4.9541g	10-7-91

Usage:

Date	Amount	Activity (µCi)	Running Total (µCi)	I.D.
10-7-91	4.9541 g	0.022067	Ø	SR-90-001-IS

U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory-Las Vegas
Nuclear Radiation Assessment Division

Calibration Certificate

Description

Principal radionuclide: STRONTIUM-90 Half-life: 28.6 years

Nominal activity: 22.9 nano curies

Nominal volume: 5 ml in ampoule/bottle number: 2454-2

Measurement

Activity of principal radionuclide

Activity per gram of this solution

4.58 nano curies of Strontium-90

at 0400 hours PST on September 5, 1990

Activity of daughter radionuclide

The principal activity was accompanied at the quoted time by

4.58 nano curies per gram

of the daughter nuclide Yttrium-90

Total mass of this solution

APPROX. 5.0 grams

Method of measurement

The activity of the primary solution was measured by four pi efficiency tracing.

The activity of the dilution was measured by liquid scintillation counting.

Useful Life

This radionuclide has decayed through [ ] half lives since it was obtained by EMSL-LV

We recommend that this solution should not be used after September 1995

Purity

The manufacturer states that activities other than that of the principal nuclide and of its daughter nuclides, if any, were estimated/known to be:

(1) others	less than ~~xxxxxxx~~	0.01 %	of the principal activity
(2)	less than equal to	%	of the principal activity
(3)	less than equal to	%	of the principal activity

The activity of impurity (1) is not (2) is not (3) is not included in the quoted figures of the principal activity.

Random Errors

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than ± 0.11 %
(The 99.7% confidence limits are given by t(sm) where t is obtained from the student t factor for the degree of freedom (n-1)).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error ($+\delta - \delta'$). These have been estimated not to exceed

+ 1.1 % or - 1.1 %

the overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error [t(sm)] at the 99.7% confidence limits and the worst case estimate of the systematic errors ($+\delta$, $-\delta'$)
The overall uncertainty is therefore calculated on the basis of + [t(sm) + δ], - [t(sm) + δ]
and is + 2.5 %. - 2.5 % of the quoted radioactive concentration.

Decay Schemes

This standardization is based on the following assumptions of the principle nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Strontium-90 decays 100 percent by beta emission to yttrium-90.

Yttrium-90 decays also by beta emission.

Chemical Composition of Solution

Carrier content per gram of solution:

100 micrograms strontium

100 micrograms yttrium

Preservative:

Other components:

0.1M HCl

Remarks

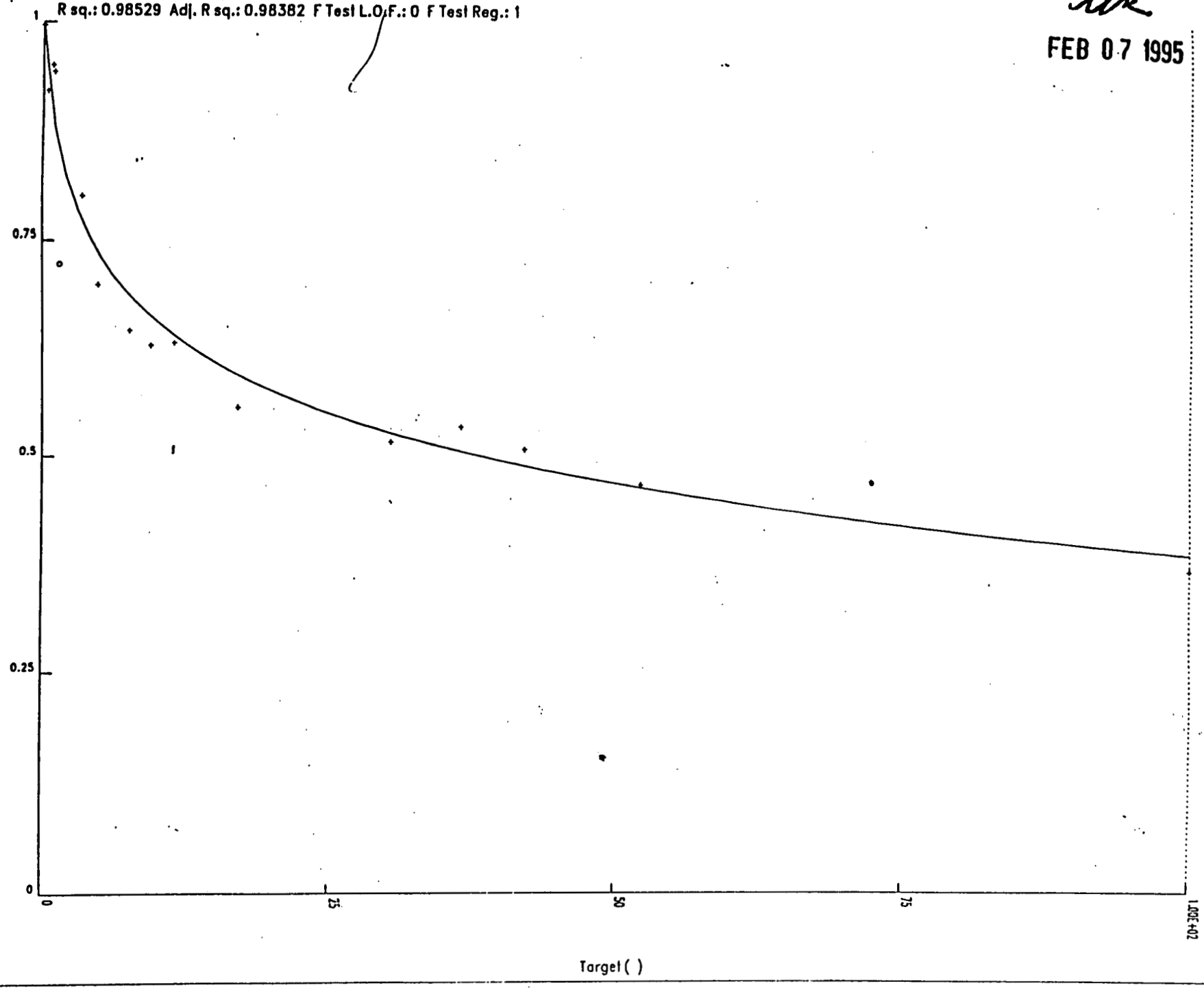
000207

Date Certificate Prepared September 6, 1990

Approval Signature Paul B. Hahn

Batch: 1993-2878 Analyte: Quartz
Model: a+b*log10(c+x) a: 0.947 b: -0.2795 c: 0.62652
R sq.: 0.98529 Adj. R sq.: 0.98382 F Test L.O.F.: 0 F Test Reg.: 1

FEB 07 1995



000208

8292

DataChem Laboratories - Data Analysis Summary

Batch ID: 1993-2878 Analyte: Quartz

Model Type: Nernst a+b*log10(c+x) Model is Weighted.

a: 0.947 b: -0.2795 c: 0.62652

r^2: 0.98529 adjusted r^2: 0.98382 F-Test L.o.F.: 0 F-Test R.: 1

Blank Correction: 0 Scaling: 1

FEB 07 1995

Standards		Target	Response	Calculated	Relative Error	Date acquired Y/M/D
PU-00-A	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-B	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-C	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-D	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-E	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-F	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-G	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-H	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-521-02	1	0.41000	0.92720	0.94264	0.01666	1858/11/17
PU-521-01	1	0.81000	0.95580	0.90303	-0.05521	1858/11/17
PU-521-03	1	0.97000	0.94830	0.89021	-0.06125	1858/11/17
PU-520-02	1	3.45000	0.80260	0.77643	-0.03261	1858/11/17
PU-520-03	1	4.85000	0.70270	0.74059	0.05392	1858/11/17
PU-520-04	1	7.65000	0.64910	0.69046	0.06373	1858/11/17
PU-520-05	1	9.51000	0.63200	0.66586	0.05357	1858/11/17
PU-520-06	1	11.53000	0.63500	0.64380	0.01386	1858/11/17
PU-520-07	1	17.15000	0.56000	0.59767	0.06727	1858/11/17
PU-520-08	1	30.37000	0.51940	0.53018	0.02076	1858/11/17
PU-520-09	1	36.50000	0.53720	0.50828	-0.05384	1858/11/17
PU-520-10	1	42.12000	0.51050	0.49117	-0.03787	1858/11/17
PU-520-11	1	52.27000	0.46860	0.46531	-0.00702	1858/11/17
PU-520-12	1	72.25000	0.47230	0.42641	-0.09715	1858/11/17
PU-520-13	1	99.86000	0.36880	0.38742	0.05049	1858/11/17

Tests	Referent	Response	Calculated	Recovery Percent	Date acquired Y/M/D

No Tests Found

Blanks	Response	Calculated	Dilution	Volume	Conversion	Corrected

No Blanks Found

QCs	Response	Calculated	Dilution	Volume	Conversion	Corrected	B.C.

No QCs Found

Samples	Response	Calculated	Dilution	Volume	Conversion	Corrected	B.C.

No Samples Found

000209

8292

DataChem Laboratories - Data Analysis Summary

Batch ID: 1993-2858 Analyte: ~~Quality~~ Beta

N = 16

Model Type: Nernst a+b*log10(c+x) Model is Weighted.

a: 0.95053 b: -4.25527E-02 c: 7.25157E-02

r^2: 0.83841 adjusted r^2: 0.82799 F-Test L.o.F.: 0 F-Test R.: 0

Blank Correction: 0 Scaling: 1

rlk

FEB 09 1995

Standards		Target	Response	Calculated	Relative Error	Date acquired Y/M/D
SR/Y-00-A	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-B	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-C	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-D	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-E	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-F	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-G	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-H	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-520-01	1	0.45000	0.89890	0.96253	0.07079	1858/11/17
SR/Y-520-02	1	2.51000	0.96620	0.93300	-0.03436	1858/11/17
SR/Y-520-03	1	4.30000	0.90410	0.92327	0.02120	1858/11/17
SR/Y-520-04	1	6.04000	0.92870	0.91708	-0.01251	1858/11/17
SR/Y-520-05	1	7.83000	0.93790	0.91233	-0.02726	1858/11/17
SR/Y-520-06	1	9.75000	0.89830	0.90831	0.01115	1858/11/17
SR/Y-520-08	1	13.43000	0.89000	0.90243	0.01397	1858/11/17
SR/Y-520-09	1	15.60000	0.87120	0.89968	0.03269	1858/11/17
SR/Y-520-10	1	16.87000	0.91730	0.89824	-0.02078	1858/11/17
SR/Y-520-11	1	19.23000	0.92100	0.89583	-0.02733	1858/11/17
SR/Y-512-03	1	19.61000	0.89060	0.89547	0.00547	1858/11/17
SR/Y-513-01	1	25.27000	0.87350	0.89080	0.01980	1858/11/17
SR/Y-512-04	1	27.52000	0.94770	0.88923	-0.06170	1858/11/17
SR/Y-513-02	1	37.63000	0.87700	0.88346	0.00736	1858/11/17
SR/Y-512-05	1	37.65000	0.92720	0.88345	-0.04719	1858/11/17
SR/Y-512-06	1	56.01000	0.85830	0.87612	0.02076	1858/11/17
SR/Y-512-07	1	60.96000	0.89050	0.87455	-0.01791	1858/11/17
SR/Y-512-08	1	66.55000	0.90700	0.87293	-0.03756	1858/11/17
SR/Y-512-09	1	82.52000	0.86990	0.86896	-0.00108	1858/11/17
SR/Y-513-04	1	94.16000	0.85900	0.86653	0.00876	1858/11/17
SR/Y-512-10	1	106.33000	0.86550	0.86428	-0.00141	1858/11/17
SR/Y-513-05	1	106.36000	0.84980	0.86428	0.01704	1858/11/17
SR/Y-512-13	1	164.63000	0.85350	0.85621	0.00317	1858/11/17
SR/Y-512-14	1	188.11000	0.84080	0.85375	0.01540	1858/11/17
SR/Y-512-15	1	202.89999	0.82720	0.85235	0.03040	1858/11/17
SR/Y-512-16	1	213.13000	0.81760	0.85144	0.04139	1858/11/17

Tests	Referent	Response	Calculated	Recovery Percent	Date acquired Y/M/D

No Tests Found

Blanks	Response	Calculated	Dilution	Volume	Conversion	Corrected

No Blanks Found

QCs	Response	Calculated	Dilution	Volume	Conversion	Corrected	B.C.

No QCs Found

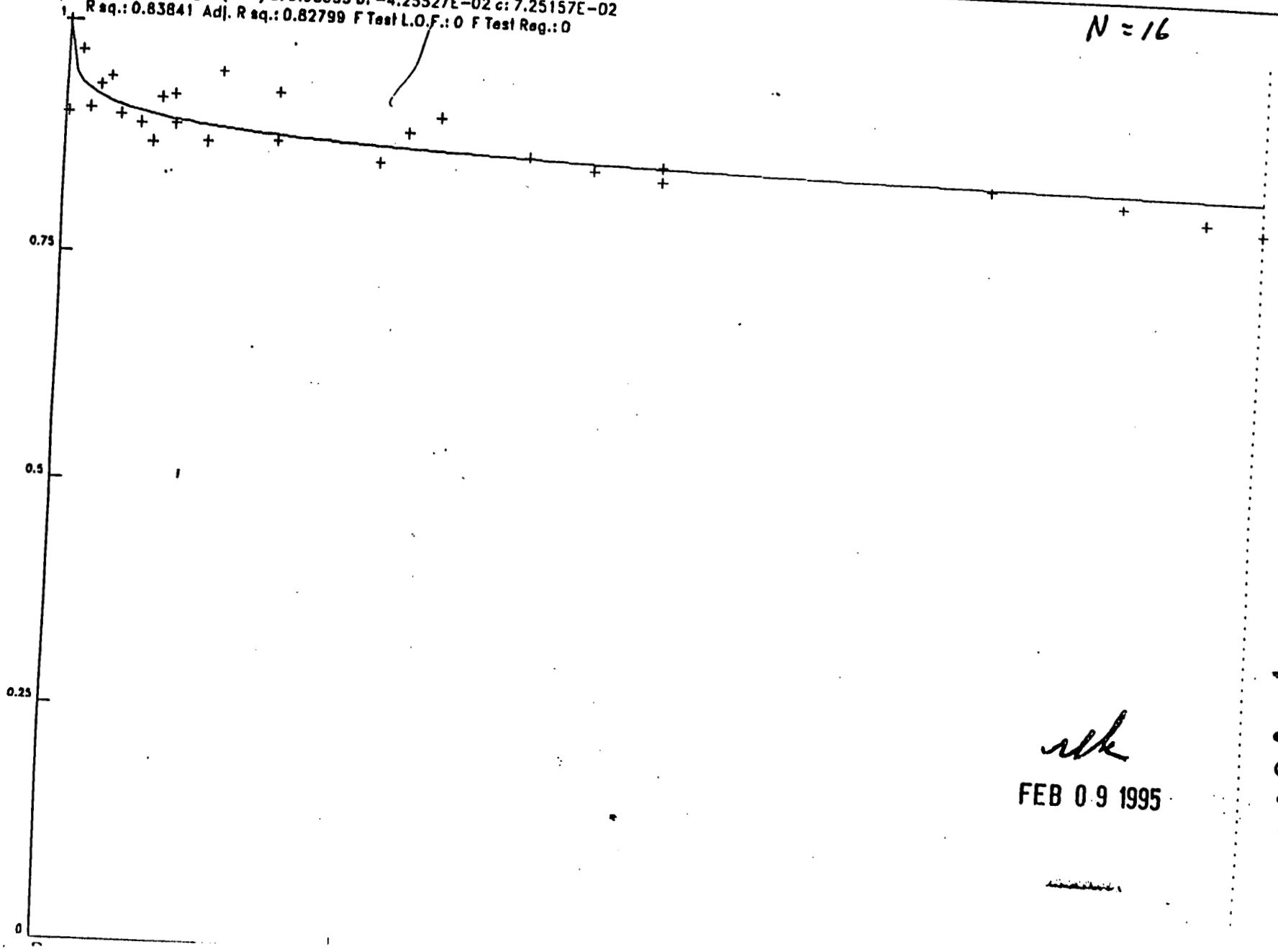
8292

000210

Page: 1 User: KERNS Date: 9-FEB-1995 16:13

Batch: 1993-2858 Analyte: ~~Gamma~~ Beta
Model: a+b*log10(c+x) a: 0.95053 b: -4.25527E-02 c: 7.25157E-02
R sq.: 0.83841 Adj. R sq.: 0.82799 F Test L.O.F.: 0 F Test Reg.: 0

N = 16



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2 of 8

APPENDIX C

CALCULATIONS

NOMENCLATURE

A_n = Area of sampling nozzle, ft^2

A_s = Cross-sectional area of stack at sampling site, ft^2

B_{ws} = Proportion water vapor in stack gas by volume

CO = Percent carbon monoxide in stack gas by volume,dry basis, %

CO_2 = Percent carbon dioxide in stack gas by volume, dry basis, %

C_p = Pitot tube coefficient

C_1 = Concentration of filterable particulate in stack gas, gr/dscf

C_2 = Concentration of filterable particulate in stack gas, lb/dscf

C_α = Concentration of alpha particles in stack gas, ρci/dscf

C_β = Concentration of beta particles in stack gas, ρci/dscf

C_{c1} = Concentration of condensible particulate in stack gas, gr/dscf

C_{c2} = Concentration of condensible particulate in stack gas, lb/dscf

C_{U1} = Concentration of uranium in stack gas, mg/m^3

C_{U2} = Concentration of uranium in stack gas, lb/dscf

dia = Diameter of stack, Inches

ER = Filterable particulate emission rate, lb/hr

ER_α = Gross alpha emission rate, ρci/hr

ER_β = Gross beta emission rate, ρci/hr

ER_c = Condensible particulate emission rate, lb/hr

ER_U = Total uranium emission rate, lb/hr

ΔH = Average pressure drop across orifice

%I = Percent isokinetic sampling rate, %

M_d = Molecular weight of stack gas, dry conditions, lb/lb-mole

M_s = Molecular weight of stack gas, stack conditions, lb/lb-mole

Mn = Filterable particulate catch, mg

Mn_α = Gross alpha catch, ρci

Mn_β = Gross beta catch, ρci

Mn_c = Condensible particulate catch, mg

Mn_U = Total Uranium catch, μg

N_2 = Percent nitrogen in stack gas by volume, dry basis, %

O_2 = Percent oxygen in stack gas by volume, dry basis, %

Δp = Average velocity head of stack gas, inches H_2O

$\sqrt{\Delta p}$ = Average square root of velocity head pressure, inches H_2O

P_b = Barometric pressure, inches Hg

P_g = Static pressure of stack gas, inches H_2O

P_s = Absolute stack gas pressure, inches Hg

Q_a = Volumetric stack gas flow rate, stack conditions, acfm

Q_{std} = Volumetric stack gas flow rate, dry standard conditions, dscfm

θ = Elapsed time of test, minutes

T_m = Average dry gas meter temperature, °F

T_s = Average stack gas temperature, °F

V_{lc} = Mass of water collected, g

V_m = Volume of gas measured by dry gas meter, ft^3

V_{mc} = Volume of dry gas meter corrected for leak rate, ft^3

V_{mstd} = Volume of dry gas meter corrected to standard conditions, ft^3

V_{wstd} = Volume of water collected, standard conditions, ft^3

Vs = Stack gas velocity, fps

γ = dry gas meter calibration factor, dimensionless

Note: Standard conditions = 68°F and 29.92 inches Hg.

EXAMPLE CALCULATION RUN # EO-1

1. Volume Metered, Standard Conditions (68°F, 29.92 In Hg)

$$V_{mstd} = (17.647) \times (V_m) \times (Y) \times \frac{(P_b) + \frac{(\Delta H)}{(13.6)}}{(T_m + 460)}$$

$$V_{mstd} = (17.647) \times (164.726) \times (0.999) \times \frac{(29.30) + \frac{(2.80)}{(13.6)}}{(91.2 + 460)} = 155.421$$

2. Molecular Weight of Stack Gas, Dry Conditions

$$M_d = (0.44 \times CO_2) + (0.32 \times O_2) + (0.28 \times (N_2 + CO))$$
$$M_d = (0.44 \times 0.0) + (0.32 \times 21.0) + (0.28 \times 79.0) = 28.84$$

3. Molecular Weight of Stack Gas, Stack Conditions

$$M_s = [M_d \times (1 - B_{ws})] + (18 \times B_{ws})$$
$$M_s = [28.84 \times (1 - 0.050)] + (18 \times 0.050) = 28.30$$

4. Static Pressure, inches H_20

$$Ps = (Pb) + \frac{(Pg)}{(13.6)}$$
$$Ps = (29.30) + \frac{(-0.05)}{(13.6)} = 29.30$$

5. Stack Gas Velocity, fps

$$V_s = (85.49) \times (c_p) \times (\sqrt{\Delta p}) \times \sqrt{\frac{(T_s + 460)}{(P_s) \times (M_s)}}$$

$$V_s = (85.49) \times (0.84) \times (0.212) \times \sqrt{\frac{(124.3 + 460)}{(29.30) \times (28.30)}} = 12.77$$

6. Stack Gas Flow Rate, acfm

$$Q_a = (60)\times(V_s)\times(5.454E{-}03)\times(Dia)^2$$
$$Q_a = (60)\times(12.77)\times(5.454E{-}03)\times(10)^2 = 417.9$$

7. Stack Gas Flow Rate, dscf

$$Q_{std} = (17.647)\times(Q_a)\times(1 - B_{ws})\times\frac{(P_s)}{(T_s + 460)}$$
$$Q_{std} = (17.647)\times(417.9)\times(1 - 0.050)\times\frac{(29.30)}{(124.3 + 460)} = 351.2$$

8. Isonkinetic Variation, %

$$\%I = 0.0944\times\frac{(T_s + 460)\times(V_{mstd})}{(P_s)\times(V_s)\times(A_n)\times(\theta)\times(1 - B_{ws})}$$
$$\%I = 0.0944\times\frac{(124.3 + 460)\times(155.421)}{(29.30)\times(12.77)\times(1.35E{-}03)\times(180)\times(1 - 0.050)} = 99.18$$

9. Filterable Particulate Concentration, gr/dscf

$$C_1 = \frac{(0.0154)\times(Mn)}{(V_{mstd})}$$
$$C_1 = \frac{(0.0154)\times(7.94)}{(155.421)} = 7.87E{-}04$$

10. Filterable Particulate Concentration, lb,dscf

$$C_2 = (1.429E{-}04)\times(C_1)$$
$$C_2 = (1.429E{-}04)\times(7.87E{-}04) = 1.12E{-}07$$

11. Filterable Particulate Emission Rate, lb/hr

$$ER = (C_2)\times(Q_{std})\times(60)$$
$$ER = (1.12E{-}07)\times(351.2)\times(60) = 2.37E{-}03$$

12. Condensible Particulate Concentration, gr/dscf

$$C_1 = \frac{(0.0154)\times(Mn)}{(V_{msd})}$$

$$C_1 = \frac{(0.0154)\times(8.80)}{(155.421)} = 8.72E-04$$

13. Condensible Particulate Concentration, lb,dscf

$$C_2 = (1.429E-04)\times(C_1)$$

$$C_2 = (1.429E-04)\times(8.72E-04) = 1.25E-07$$

14. Condensible Particulate Emission Rate, lb/hr

$$ER = (C_2)\times(Q_{std})\times(60)$$

$$ER = (1.25E-07)\times(351.2)\times(60) = 2.63E-03$$

15. Total Uranium Concentration, mg/m³

$$C_{U_1} = \frac{(Mn_U)}{(V_{msd})\times(28.316)}$$

$$C_{U_1} = \frac{(1500)}{(155.421)\times(28.316)} = 3.40E-01$$

16. Total Uranium Concentration, lb/dscf

$$C_{U_2} = \frac{(Mn_U)}{(V_{msd})\times(1.0E+06)\times(453.59)}$$

$$C_{U_2} = \frac{(1500)}{(155.421)\times(1.0E+06)\times(453.59)} = 2.12E-08$$

17. Total Uranium Emission Rate, lb/hr

$$ER_U = (C_{U_2})\times(Q_{std})\times(60)$$

$$ER_U = (2.12E-08)\times(351.2)\times(60) = 4.48E-04$$

18. Gross Alpha Concentration, pci/dscf

$$C_\alpha = \frac{(Mn_\alpha)}{(V_{mstd})}$$

$$C_\alpha = \frac{(4.20)}{(155.421)} = 2.70E-02$$

19. Gross Alpha Emission Rate, pci/hr

$$ER_\alpha = (C_\alpha)\times(Q_{std})\times(60)$$
$$ER_\alpha = (2.70E-02)\times(351.2)\times(60) = 569.5$$

20. Gross Beta Concentration, pci/dscf

$$C_\beta = \frac{(Mn_\beta)}{(V_{mstd})}$$

$$C_\beta = \frac{(2.00)}{(155.421)} = 1.29E-02$$

21. Gross Beta Emission Rate, pci/hr

$$ER_\beta = (C_\beta)\times(Q_{std})\times(60)$$
$$ER_\beta = (1.29E-02)\times(351.2)\times(60) = 271.2$$

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CLIENT/PROJECT #:	Fermco A95010
SAMPLE LOCATION:	East Oliver Vacuum Pump Exhaust
DATE/TIME:	5/10/95 0924-1433
RUN #:	EO-1 Filterable Particulate/Total Uranium

STATIC PRESSURE("H20):	-0.05	"HG	29.30
BAROMETRIC("HG):	29.30		
SAMPLE TIME(min):	180.00	Vm(corr)	164.726
ACTUAL METER VOLUME:	164.726	DSCF	155.421
SQ. ROOT /\P:	0.212		
AVG ORIFICE /\H:	2.80		
AVG STACK TEMP °F:	124.3	°R	584.3
AVG METER TEMP °F:	91.2		
Cp PITOT :	0.84		
NOZZLE DIA.(inches):	0.498	An(ft^2)	1.35E-03
METER GAMMA:	0.999		
LEAK RATE(IF>0.02):			
CIRC STACK? 1=Y,0=N:	1	As(ft^2)	0.55
DIA OR DIM (inches):	10.00		
% O2 :	21.00	DRY MOLE WT	28.84
% CO2 :	0.00	ST MOLE WT	28.30
VOL CONDENSATE(ml):		% H20	5.00
FILTER GAIN(mg):	-9.00		
RINSE GAIN(mg):	16.94	NET WT(mg)	7.94
ANALYTE #1 :	Uranium		
MOLE WEIGHT:	238.0		
µg/sample :	1500		
PPM :			

********** CALCULATED RESULTS **********

Gas Velocity (Vs):	12.77	FT/SEC
Stack Gas Flow (Qs):	417.9	ACFM
:	351.2	DSCFM
Stack Gas Temp :	124	Deg F
Moisture (H20):	5.00	%
Isokinetic :	99.18	%

FILTERABLE PARTICULATE SUMMARY

Concentration (Cs):	7.87E-04	Gr/DSCF
:	1.12E-07	lb/DSCF
Emission Rate (Er):	2.37E-03	lb/hr

EMISSION DATA FOR Uranium

Concentration (Cs):	2.12E-08	lb/DSCF
:	3.40E-01	mg/m3
Emission Rate (Er):	4.48E-04	lb/hr

COMMENTS:

HAYDEN
ENVIRONMENTAL GROUP, INC.

CLIENT/PROJECT #:	Fermco A95010
SAMPLE LOCATION:	East Oliver Vacuum Pump Exhaust
DATE/TIME:	5/10/95 0924-1433
RUN #:	EO-1 Condensable Particulate

STATIC PRESSURE("H2O):	-0.05	"HG	29.30
BAROMETRIC("HG):	29.30		
SAMPLE TIME(min):	180.00	Vm(corr)	164.726
ACTUAL METER VOLUME:	164.726	DSCF	155.421
SQ. ROOT /\P:	0.212		
AVG ORIFICE /\H:	2.80		
AVG STACK TEMP °F:	124.3	°R	584.3
AVG METER TEMP °F:	91.2		
Cp PITOT :	0.84		
NOZZLE DIA.(inches):	0.498	An(ft^2)	1.35E-03
METER GAMMA:	0.999		
LEAK RATE(IF>0.02):			
CIRC STACK? 1=Y,0=N:	1	As(ft^2)	0.55
DIA OR DIM (inches):	10.00		
% O2 :	21.00	DRY MOLE WT	28.84
% CO2 :	0.00	ST MOLE WT	28.30
VOL CONDENSATE(ml):		% H2O	5.00
FILTER GAIN(mg):			
RINSE GAIN(mg):	8.80	NET WT(mg)	8.80
ANALYTE #1 :			
MOLE WEIGHT:			
µg/sample :			
PPM :			

********** CALCULATED RESULTS **********

Gas Velocity (Vs):	12.77	FT/SEC
Stack Gas Flow (Qs):	417.9	ACFM
:	351.2	DSCFM
Stack Gas Temp :	124	Deg F
Moisture (H2O):	5.00	%
Isokinetic :	99.18	%

FILTERABLE PARTICULATE SUMMARY

Concentration (Cs):	8.72E-04	Gr/DSCF
:	1.25E-07	lb/DSCF
Emission Rate (Er):	2.63E-03	lb/hr

EMISSION DATA FOR	0	
Concentration (Cs):	NA	lb/DSCF
:	NA	mg/m3
Emission Rate (Er):	NA	lb/hr

COMMENTS:

HAYDEN
ENVIRONMENTAL GROUP, INC.

CLIENT/PROJECT #:	Fermco A95010		
SAMPLE LOCATION:	East Oliver Vacuum Pump Exhaust		
DATE/TIME:	5/10/95 0924-1433		
RUN #:	EO-1 Gross Alpha		

STATIC PRESSURE("H20):	-0.05	"HG	29.30
BAROMETRIC("HG):	29.30		
SAMPLE TIME(min):	180.00	Vm(corr)	164.726
ACTUAL METER VOLUME:	164.726	DSCF	155.421
SQ. ROOT /\P:	0.212		
AVG ORIFICE /\H:	2.80		
AVG STACK TEMP °F:	124.3	°R	584.3
AVG METER TEMP °F:	91.2		
Cp PITOT :	0.84		
NOZZLE DIA.(inches):	0.498	An(ft^2)	1.35E-03
METER GAMMA:	0.999		
LEAK RATE(IF>0.02):			
CIRC STACK? 1=Y,0=N:	1	As(ft^2)	0.55
DIA OR DIM (inches):	10.00		
% O2 :	21.00	DRY MOLE WT	28.84
% CO2 :	0.00	ST MOLE WT	28.30
VOL CONDENSATE(ml):		% H20	5.00
Gross Alpha (Pci)	4.20		
Gross Alpha Std Dev (pci	0.78	NET WT(mg)	4.98
Gross Beta (pci)	2.00		
Gross Beta std dev (pci)	0.74		

********** CALCULATED RESULTS **********

Gas Velocity (Vs):	12.77	FT/SEC
Stack Gas Flow (Qs):	417.9	ACFM
:	351.2	DSCFM
Stack Gas Temp :	124	Deg F
Moisture (H20):	5.00	%
Isokinetic :	99.18	%

Alpha Particle Summary

Alpha Concentration (Cs)	2.70E-02	pci/DSCF
Alpha Std Dev concentrat	5.02E-03	pci/DSCF
Alpha Emission Rate:	569.5	pci/hr
Alpha Std Dev Emission R	105.8	pci/hr

Beta Particle Summary

Beta Concentration (Cs):	1.29E-02	pci/DSCF
Beta Std Dev concentrati	4.76E-03	pci/DSCF
Beta Emission Rate:	271.2	pci/hr
Beta Std Dev Emission Ra	100.3	pci/hr

COMMENTS:

APPENDIX D

QUALITY ASSURANCE PROCEDURES AND RESULTS

QUALITY ASSURANCE PROCEDURES AND RESULTS

The sampling equipment used in this test series has been calibrated in accordance with procedures outlined in the USEPA Reference Methods for stationary source sampling and also in the Quality Assurance Handbook for Air Pollution Measurement Systems. All pertinent calibration data for the equipment used in this test series are included in this appendix. The following calibration procedures are employed.

a. **Probe-tips (Nozzles)**
Probe-tips are inspected before use to detect damage or irregularities. If the nozzle shows signs of damage, it is repaired and measured before use. The nozzle diameter is determined in the field by measuring three diameters with a precision micrometer. The average of the three measurements is the nozzle diameter.

b. **Pitot Tubes**
The S-type pitot tubes are built to the design specifications cited in Reference Method 2 and are calibrated annually in a wind tunnel. Standard pitot tubes are supplied from the manufacturer with a coefficient of 0.99. The pitot tubes, connecting lines, and manometers are leak-checked in the field before and after each test run.

c. **Thermocouples**
Thermocouples are calibrated upon receipt and annually thereafter. The thermocouples are calibrated at 32°F, ambient temperature, 212°F, and approximately 450°F.

d. **Fyrite Analyzers**
The fyrite analyzers are leak-checked on-site and the reagents are replenished as needed.

e. **Method 5 Control Consoles**
The dry gas meter and the orifice in the Method 5 control consoles are calibrated at six (6) points from 0 to 4 inches of mercury. The dry gas meter coefficient (y-factor) and the orifice constant (Delta H) are established from this calibration. The dry gas meter is calibrated after each test series to confirm the y-factors is used in all sample volume calculations. Hayden Environmental participates in the USEPA Method 5 Dry Gas Meter Inter-Laboratory Performance Audit.

f. **Barometers**
The aneroid field barometers are calibrated with a stationary mercury column barometer prior to each use. The reference barometer is permanently mounted in the Hayden Environmental Laboratory.

APEX INSTRUMENTS
REFERENCE METER CALIBRATION

Barometric Pressure 29.65
Meter Yw 1.00
K (deg R/inches Hg) 17.64

DGM Serial # 1334637
DATE 3/24/95

Filename A:\DGM_REF.15P\1334637.WK1

Time inutes)	Pressure (inches H20)	Dry Gas Meter (DGM) Meter Readings Initial	Final	Volume (cubic feet)	Temperature Initial (degrees F)	Final (degrees F	Wet Test Meter (WTM) Meter Readings Initial	Final	Volume (cubic feet)	Temp (degrees F)	DGM Avg. Temp (degrees R)	WTM Avg. Temp (degrees R)	DGM Coefficient Yd	Coefficient Variation Yd-(Avg.Y
14	-0.70	567.414	572.748	5.334	72	71	304.828	310.226	5.398	68	532	528	1.0208	0.003
15	-0.70	578.182	584.003	5.821	71	70	314.725	320.642	5.917	68	531	528	1.0234	0.006
35	-0.70	584.003	591.749	7.746	70	69	320.642	328.511	7.869	68	530	528	1.0208	0.003
12.5	-1.40	591.749	598.567	6.818	69	68	328.511	335.415	6.904	67	529	527	1.0193	0.002
11.5	-1.40	598.567	604.861	6.294	68	69	335.415	341.795	6.380	67	529	527	1.0204	0.003
10.5	-1.40	604.861	610.592	5.731	69	69	341.795	347.599	5.804	67	529	527	1.0204	0.003
10	-2.40	610.592	618.018	7.426	69	69	347.599	355.091	7.492	67	529	527	1.0191	0.001
9	-2.40	618.018	624.741	6.723	70	70	355.091	361.853	6.762	67	530	527	1.0179	0.000
8	-2.40	624.741	630.729	5.988	70	71	361.853	367.865	6.012	67	531	527	1.0170	-0.001
6.5	-3.70	630.729	636.921	6.192	71	71	367.865	374.058	6.193	67	531	527	1.0174	-0.000
5.5	-3.70	640.641	645.824	5.183	71	71	377.771	382.935	5.164	67	531	527	1.0135	-0.004
6	-3.70	645.824	651.498	5.674	71	71	382.935	388.601	5.666	67	531	527	1.0158	-0.002
5	-5.90	651.498	657.552	6.054	71	71	388.601	394.591	5.990	67	531	527	1.0120	-0.006
5	-5.90	657.552	663.611	6.059	71	72	394.591	400.681	6.090	67	532	527	1.0291	0.011
5	-5.90	663.611	669.650	6.039	72	72	400.681	406.561	5.880	67	532	527	0.9978	-0.020

Avg. Yd= 1.018

I certify that the above Dry Gas Meter was calibrated in accordance with E.P.A. Method 5 , paragraph 7.1 ;CFR 40 Part 60, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 3785, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature

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Meter Post Test Calibration

Client	FERMCO	P.N.	A95010	Date	6/26/95
Ref. Meter	1334637	Yr	1.018	Pb	29.30
Meter Box	N-3	Pre Test Y	0.9988	▲ H	2.07
Vacumn	2.5	Calib. Time	10		

Performed By: Matt Hayden

Run#	Vr(f-i)	Tr(avg)	Vd(f-i)	Td(avg)	Y
1	7.704	78.0	8.025	96.0	1.005
2	7.605	78.0	7.795	84.8	1.000
3	7.537	78.0	7.756	88.5	1.003
Averages					1.003

$$Y = Y_r * \frac{(V_r) * (T_d + 460) * (Pb)}{(V_d) * (T_r + 460) * (Pb + \frac{\Delta H}{13.6})}$$

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DGM/ORIFICE CALIBRATION

DATE 4/19/95

BAROMETRIC PRESSURE 29.20 in. Hg

CALIBRATOR MATHAYDEN

METER BOX NO. N-3

REFERENCE METER NO. 1334637

REFERENCE Y 1.018

ORIFICE SETTING in. H_2O	REFERENCE METER		DRY GAS METER			TIME θ min.	VACUUM
	GAS VOLUME V_R ft^3	TEMP. T_R °F	GAS VOLUME V_D ft^3	IN TEMP T_i °F	OUT TEMP T_o °F		
0.5	170.635	65°	332.340	68°	56°	12.4	5" HG
	175.449	66°	337.340	73°	72°		
	4.814	65.5	5.000	67.3			
1.0	047.937	66°	207.613	69°	67°	10	↓
	053.365	65°	213.175	72°	68°		
	5.426	65.5	5.562	69°			
1.5	162.012	65°	323.395	79°F	72°	10	↓
	168.453	65°	330.059	77°	72°		
	6.441	65°	6.664	57°			
2.0	070.561	65°	230.798	76°	69°	10	↓
	078.173	65°	238.563	77°	70°		
	7.612	65°	7.765	73°			
3.0	080.294	65°	240.722	77°	70°	10	↓
	089.633	65°	250.175	77°	71°		
	9.339	65°	9.453	73.75			
4.0	150.356	65°	311.418	74°	72°	10	↓
	160.999	65°	322.333	79°	72°		
	11.643	65°	10.915	73.5			

HAYDEN

Meter Box #	N-3	N-3	N-3
Date	4/19/95	4/19/95	4/19/95
Reference Meter #	1334637	1334637	1334637
Y Reference	1.018	1.018	1.018
Barometric Pressure	29.2	29.2	29.2
Orifice Setting ^ H (" H20)	0.5	1	1.5
Total Gas Volume Reference	4.814	5.428	6.44
Average Temperature Reference	65.5	65.5	69
Total Gas Volume Dry Gas Meter	5	5.562	6.664
Average Temperature Dry Gas Meter	67.3	69	75
Time (min)	12.4	10	10
Vacumn	5	5	5

******* Calculations **********

Meter Box Y	0.9823	0.9976	0.9912
Meter Box ^ H@	1.886	1.923	2.054

Meter Box #	N-3	N-3	N-3
Date	4/19/95	4/19/95	34808
Reference Meter #	1334637	1334637	1334637
Y Reference	1.018	1.018	1.018
Barometric Pressure	29.2	29.2	29.2
Orifice Setting ^ H (" H20)	2	3	4
Total Gas Volume Reference	7.612	9.339	10.643
Average Temperature Reference	65	65	65
Total Gas Volume Dry Gas Meter	7.765	9.453	10.915
Average Temperature Dry Gas Meter	73	73.75	73.5
Time (min)	10	10	10
Vacumn	5	5	5

******* Calculations **********

Meter Box Y	1.0081	1.0148	0.9986
Meter Box ^ H@	1.938	1.928	1.981

Average y	0.99876
Average delta H	1.95167

Meter Box Field Check

Meter Box #: N-3

Y: 1.019

delta H: 1.832

Date: 3/30/95

Calibrator: MH

Leak Check: O.K.

Barometric: 29.31 "MERC.

Run No.	Initial Volume	Final Volume	Net Volume	Initial Temp.	Final Temp.	Avg. Temp.	Y_c Comparison
1	995.505	002.680	7.175	55/52	66/61	58.5	0.988 < 1.046 < 1.049
2	003.259	010.594	7.335	66/61	64/58	62.25	0.988 < 1.0278 < 1.049
3	010.594	017.925	7.331	64/58	66/60	62.00	0.988 < 1.0280 < 1.049

$$y_c = \frac{10}{Vm} \times \sqrt{\frac{(0.0319) \times (Tm)}{(Pb)}}$$

Compare with Y_c

$0.97 * Y < Y_c < 1.03 * Y$

$0.97 * Y =$ 0.9886

$1.03 * Y =$ 1.0497

1 → 0.988 1.049 Yc 1.046

2 → " " Yc = 1.0278

.7512

1.046

0.7539

0.7537

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THERMOCOUPLE CALIBRATION

THERMOCOUPLE I.D.: SN LENGTH: _____ DATE: 4-19-95

CALIBRATED BY: JJ

REFERENCE THERMOMETER: Fisher Scientific 1498370

Source	Reference Thermometer Temperature °F	Test Thermocouple Temperature °F	Temperature Difference °F	Thermocouple Simulator *Display*	Thermocouple Simulator *Setting*
Ambient Air	61°	61°	0°	100°	100°
Boiling Oil	389°	389°	0°	501°	500°
Boiling H_2O	212°	212°	0°	301°	300°
ice H_2O	34°	36°	0°	1°	0°

F030164.94

THERMOCOUPLE CALIBRATION

THERMOCOUPLE I.D.: I-1 LENGTH: _____ DATE: 4-24-95

CALIBRATED BY: JA

REFERENCE THERMOMETER: Fisher Scientific 17938 7D

Source	Reference Thermometer Temperature °F	Test Thermocouple Temperature °F	Temperature Difference °F	Thermocouple Simulator *Display*	Thermocouple Simulator *Setting*
Ambient Air	60°	61°	1°	99°	100°
ice Bath H_2O	35°	36°	1°	1°	0°

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COMPLIANCE EMISSIONS TEST REPORT DETERMINATION OF PARTICULATE, RADIONUCLIDES, AND TOTAL URANIUM EMISSIONS FROM LAUNDRY CONTAMINATED CLOTHING DRYERS (EMISSION POINT # EP11-002) FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION CINCINNATI, OHIO

HAYDEN ENVIRONMENTAL GROUP, INC.

Health & Safety Division

561 Congress Park Drive, Dayton, Ohio 45459, USA•(513) 438-3010•(800) 282-8043•FAX (513) 438-3020

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COMPLIANCE EMISSIONS TEST REPORT DETERMINATION OF PARTICULATE, RADIONUCLIDES, AND TOTAL URANIUM EMISSIONS FROM LAUNDRY CONTAMINATED CLOTHING DRYERS (EMISSION POINT # EP11-002) FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION CINCINNATI, OHIO

prepared for

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Emissions Measurement Division

P.N. A95010
July 13, 1995

HAYDEN
ENVIRONMENTAL GROUP, INC.

Executive Summary

Hayden Environmental Group, Inc. was retained by Fernald Environmental Restoration Management Corporation to determine the particulate, radionuclide, and total uranium emission rates of the laundry contaminated clothing dryers at their Ross, Ohio facility. The evaluation was performed to demonstrate compliance with Ohio Environmental Protection Agency regulations restricting emissions from stationary sources. Emission samples were collected and analyzed using USEPA Reference Methods for stationary source sampling. The tests were conducted on May 9, 1995. The results of the tests are summarized below:

Summary of Laundry Dryer Emissions

Compound	Emission Rate (lb/hr)[a]
Total Particulate	0.026 lb/hr
Total Uranium (average)	BDL

Compound	Emission Rate (pci/hr)[b]
Gross Alpha	11,445 with 1,479 std. dev.
Gross Beta	5,106 with 1,461 std. dev.

BDL = Below Analytical Detection Limits
[a] pounds per hour
[b] picocuries per hour

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APPENDIX D Quality Assurance Procedures and Results

1.0 Introduction

Hayden Environmental Group, Inc. was retained by Fernald Environmental Restoration Management Corporation (FERMCO) to perform a compliance particulate, radionuclide, and total uranium emissions evaluation on the laundry contaminated clothing dryers at their Ross, Ohio facility. The evaluation was performed on May 9, 1995. A single test run was conducted using USEPA Reference Methods 1, 2, 3, 4, 5, and 114. Mr. Tim Miller of FERMCO coordinated the test schedule with plant operations. The emission tests were performed by the Hayden test team of Mr. Bruce Sarven and Mr. Bert Forsyth. The emission samples were analyzed by DataChem Laboratories located in Salt Lake City, Utah.

2.0 Process Description

Three Cissell clothes dryers are used in drying washed (potentially) contaminated clothing. Each clothing dryer has a maximum operating capacity of 150 pounds per cycle. Each drying cycle is 60 minutes in duration. Therefore the maximum capacity of the combined dryers is 450 pounds per hour. Each dryer typically operates at an average of 104 pounds per hour. The emissions from the dryers are vented through a lint filter, a pre-filter, and a HEPA filter.

3.0 Sampling Site Description

The emissions from the hepa filter are vented through a 22 inch diameter circular stack. Two sampling ports were located at 90° angles from each other. The sampling ports were located 94 inches or 1.7 stack diameters downstream from the last flow disturbance (fan) and 39 inches or 1.7 stack diameters upstream from the next flow disturbance (top of stack). A drawing of the sampling site is provided in Figure 3.1.

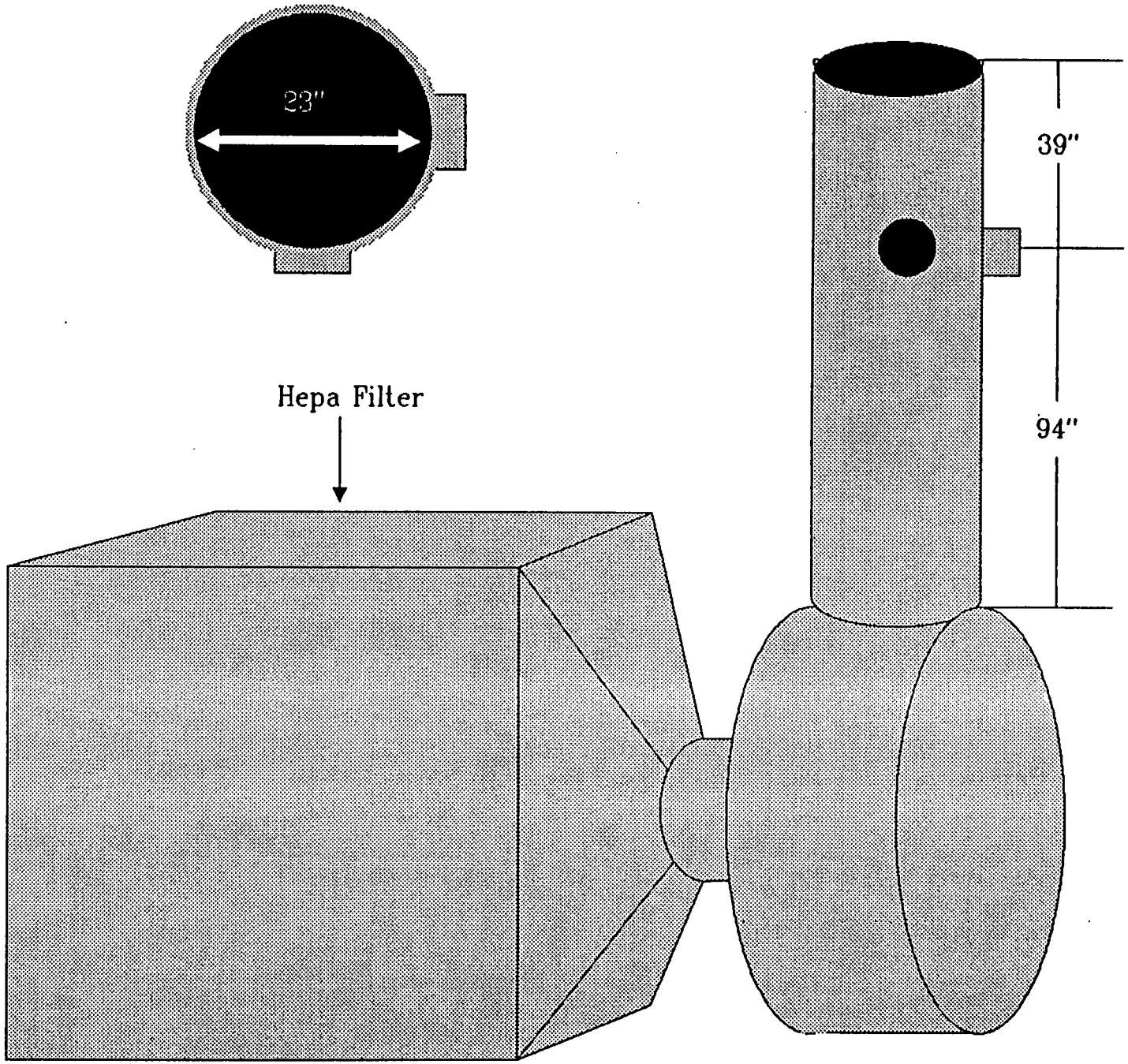

Figure 3.1 Sample Site Detail

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4.0 Sampling and Analytical Procedures

The sampling and analytical procedures conformed to the most recent revisions of USEPA Reference Methods for stationary sources. Specifically, USEPA Reference Methods 1, 2, 3, 4, 5, and 114 were used. A brief description of each procedure is included below:

4.1 Measurement Sites (USEPA Method 1)

The location of measurement sites and the number of traverse points were determined using USEPA Reference Method 1, "Sample and Velocity Traverses for Stationary Sources."

4.2 Velocities and Volumetric Flow Rates (USEPA Method 2)

The stack gas velocity and volumetric flow rates were determined using USEPA Reference Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate." The stack gas velocity was measured on a Dwyer oil filled manometer using a calibrated S-type pitot tube. The stack gas temperature was measured with a calibrated type "K" thermocouple and Omega digital temperature readout.

4.3 Dry Molecular Weight (USEPA Method 3)

The stack gas dry molecular weight was determined using USEPA Reference Method 3, "Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight." Several grab samples were collected and analyzed during each test with Fyrite combustion gas analyzers which directly measure concentrations of O_2 and CO_2.

4.4 Moisture (USEPA Method 4)

The stack gas moisture content was determined using USEPA Reference Method 4, "Determination of Moisture Content in Stack Gases." The samples were collected in a series of chilled impingers. The moisture collected within the impingers was analyzed by gravimetric analysis.

4.5 Particulate Matter (USEPA Method 5)

The particulate emissions were determined using USEPA Reference Method 5, "Determination of Particulate Emissions from Stationary Sources." The samples were collected isokinetically through a heated glass lined probe, a heated (248°+/-25°) tared glass fiber filter, and a series of cooled impingers (to condense the moisture). The nozzle, probe, and glassware before the filter was rinsed and brushed with acetone. The acetone rinse was placed in a tare-weighed beaker. The contents of the impingers were collected all of the glassware behind the filter were rinsed with deionized water. The DI rinse was collected in a separate tare-weighed beaker. The acetone and DI water were both evaporated at temperatures below their boiling points. The filter and acetone residue were analyzed by gravimetric analysis to determine the filterable particulate mass collected. The DI water residue was analyzed by gravimetric analysis to determine the condensible particulate mass collected. The total particulate was obtained by adding the filterable and condensible particulate emission rates. A drawing of the particulate sampling train is provided in Figure 4.1.

4.6 **Radionuclide and Total Uranium (USEPA M-114)**

The Radionuclide and total uranium emissions were determined using USEPA Reference Method 114, "Test Methods for Measuring Radionuclide Emissions from Stationary Sources." The radionuclide analysis was performed on the total particulate. The uranium was dissolved, oxidized to the hexavalent state, and extracted using a suitable solvent. The samples were analyzed for total uranium by colorimetry (Method A-5) and laser phosphoremetry. The total gross alpha activity was determined using an alpha counter (Method A-4). The total gross beta activity was determined using a beta counter (Method B-4). The total gamma isotopic activity was determined using a high resolution gamma detector (Method G-1).

The Hayden Environmental Group Inc. Air Sampling Quality Assurance Program includes procedures for equipment calibration that follow USEPA and manufacturers guidelines, use of and strict adherence to standard published procedures, and traceability protocols for the recording and calculation of data.

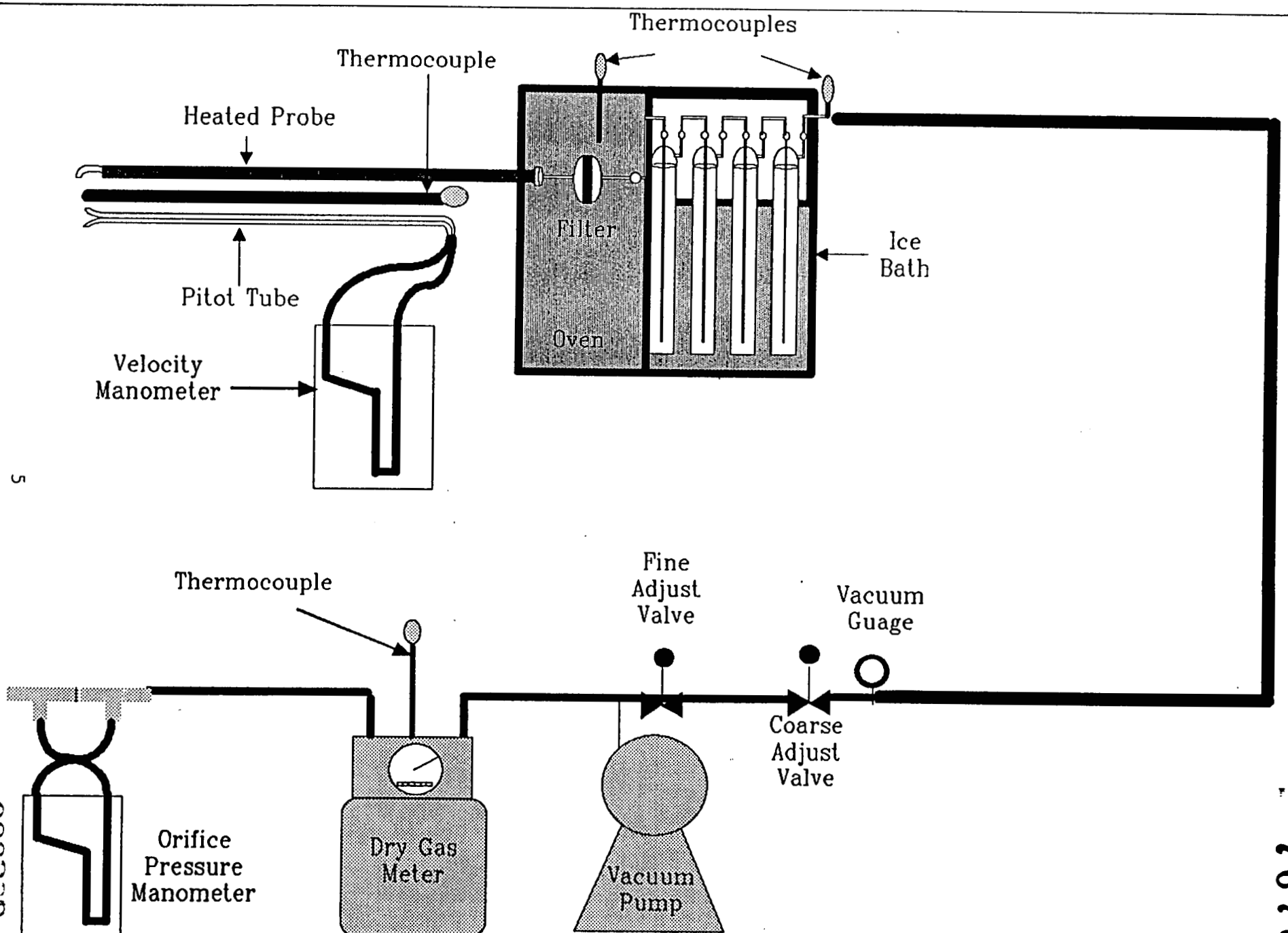

Figure 4.1 Particulate Sampling Train

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5.0 Test Results

Table 5.1 summarizes the laundry dryer HEPA filter exhaust stack gas conditions. The stack gas velocity averaged 35.1 feet per second (fps). The volumetric flow rate averaged 6,068 actual cubic feet per minute (acfm) or 5,181 dry standard cubic feet per minute (dscfm) at 132°F and 2.5% moisture. The stack gas concentration of oxygen and carbon dioxide were 21.0% and 0.0%, respectively.

Table 5.2 summarizes the laundry dryer HEPA filter exhaust particulate emissions. The average stack gas filterable particulate concentration was 5.76E-04 grains per dry standard cubic feet (gr/dscf) or 8.23E-08 pounds per dry standard cubic foot (lb/dscf). The filterable particulate emission rate averaged 0.026 pounds per hour (lb/hr). The condensible particulate was below the analytical detection limits. Therefore the total particulate emission rate averaged 0.026 lb/hr.

Table 5.3 summarizes the laundry dryer HEPA filter exhaust total uranium emissions. The total uranium catch was below the analytical detection limit.

Table 5.4 summarizes the laundry dryer HEPA filter exhaust gross alpha radionuclide emissions. The average stack gas gross alpha concentration was 3.68E-02 picocuries per dry standard cubic foot (ρci/dscf) with a standard deviation of 4.76E-03 ρci/dscf. The gross alpha emission rate averaged 11,445 picocurries per hour (ρci/hr) with a standard deviation of 1,479 ρci/hr.

Table 5.5 summarizes the laundry dryer HEPA filter exhaust gross beta radionuclide emissions. The average stack gas gross beta concentration was 1.64E-02 ρci/dscf with a standard deviation of 4.70E-03 ρci/dscf. The gross beta emission rate averaged 5,106 ρci/hr with a standard deviation of 1,461 ρci/hr.

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Table 5.1 Summary of Laundry Dryer HEPA Filter Exhaust Stack Gas Conditions

Run No.	Date Time	Velocity (fps)[a]	Air Flow (acfm)[b]	Air Flow (dscfm)[c]	Temp. (°F)[d]	Moisture (%)	Oxygen (%)	Carbon Dioxide (%)
LD-1	5/9/95 0927-1435	35.1	6,068	5,181	132	2.5	21.0	0.0

[a] feet per second
[b] actual cubic feet per minute
[c] dry standard cubic feet per minute
[d] degrees Fahrenheit

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Table 5.2 Summary of Laundry Dryer HEPA Filter Exhaust Particulate Emissions

Run No.	Date Time	Filterable Particulate			Condensable Particulate			Total Particulate Emission Rate (lb/hr)[c]
		Concentration		Emission Rate (lb/hr)[c]	Concentration		Emission Rate (lb/hr)[c]	
		(gr/dscf)[a]	(lb/dscf)[b]		(gr/dscf)[a]	(lb/dscf)[b]		
LD-1	5/9/95 0927-1435	5.76E-04	8.23E-08	0.026	0.00E-00	0.00E-00	0.000	0.026

[a] grains per dry standard cubic foot
[b] pounds per dry standard cubic foot
[c] pounds per hour

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Table 5.3 Summary of Laundry Dryer HEPA Filter Exhaust Total Uranium Emissions

Run No.	Date Time	Concentration		Emission Rate (lb/hr)[c]
		(mg/l)[a]	(lb/dscf)[b]	
LD-1	5/9/95 0927-1435	BDL	BDL	BDL

[a] grains per dry standard cubic foot
[b] pounds per dry standard cubic foot
[c] pounds per hour
BDL = The sample collected was below the analytical detection limits

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Table 5.4 Summary of Laundry Dryer HEPA Filter Exhaust Gross Alpha Emissions

Run No.	Date Time	Concentration			Emission Rate		
		Measured Concentration (ρci/dscf)[a]	Standard Deviation (ρci/dscf)[a]	Concentration Range (ρci/dscf)[a]	Measured Emission Rate (ρci/hr)[b]	Standard Deviation (ρci/hr)[b]	Emission Rate Range (ρci/hr)[b]
LD-1	5/9/95 0927-1435	3.68E-02	4.76E-03	3.20E-02 to 4.16E-02	11,445	1,479	9,966 to 12,924

[a] picocuries per dry standard cubic foot
[c] picocuries per hour

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Table 5.5 Summary of Laundry Dryer HEPA Filter Exhaust Gross Beta Emissions

Run No.	Date Time	Concentration			Emission Rate		
		Measured Concentration (ρci/dscf)[a]	Standard Deviation (ρci/dscf)[a]	Concentration Range (ρci/dscf)[a]	Measured Emission Rate (ρci/hr)[b]	Standard Deviation (ρci/hr)[b]	Emission Rate Range (ρci/hr)[b]
LD-1	5/9/95 0927-1435	1.64E-02	4.70E-03	1.17E-02 to 2.11E-02	5,106	1,461	3,645 to 6,567

[a] picocuries per dry standard cubic foot
[c] picocuries per hour

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6.0 Discussion and Interpretation

The negative weight was recorded for the filter catch. It is not uncommon for the net weight change of the particulate filter to be negative on sources with very low particulate loadings. The filter edge is typically partially damaged by normal use in a Method 5 sampling train. When the filter is recovered, the loose filter material from the edge of the filter holder and frit are also recovered with the filter to the extent possible. Following recovery of the filter, the filter holder and frit are brushed and rinsed with acetone to recover any particulate and filter residue that could not be recovered by physical means. This portion of the particulate is included in the acetone rinse fraction. The portion of filter material not recovered with the filter fraction is reflected in the weight gain of the acetone rinse. The sample from this test run showed a positive total particulate weight gain.

APPENDIX A

FIELD DATA

METHOD 1 TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Client: FEAMCO PN: A95010 Date: 5/9/95
Source: LAUNDRY DRYER Site: HEPA FILTER EXHAUST

INSIDE OF FAR WALL TO OUTSIDE OF NIPPLE: 25"

INSIDE OF NEAR WALL TO OUTSIDE OF NIPPLE: 2"

STACK I.D.: 23"

NEAREST UPSTREAM DISTURBANCE: 39" (1.7 DIA)

NEAREST DOWNSTREAM DISTURBANCE: 94" (4 DIA)

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D. (Y)	STACK DIAMETER (D)	(Y) x (D)	NIPPLE DEPTH	TRAVERSE POINT LOCATION
1	0.021	23"	0.483	NA	1/2
2	0.067		1.541		1 9/16
3	0.118		2.714		2 11/16
4	0.177		4.071		4 1/16
5	0.250		5.750		5 3/4
6	0.356		8.188		8 3/16
7	0.644		14.812		14 13/16
8	0.750		17.250		17 1/4
9	0.823		18.929		18 15/16
10	0.882		20.286		20 5/16
11	0.933		21.459		21 7/16
12	0.979		22.517		22 1/2

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EMISSION TESTING FIELD DATA

Client: FEMCO
PN: A95010
Date: 5/9/95
Source: LAUNDRY DRYER
Site: HEPA FILTER EXHAUST
Sample Type: M-5, + 114
Run: LD-7
Operators: BJ, BF
Barometric Pressure (Pb): 29.40
Static Pressure (Pg): -0.15

Meter Box #: N-3
Sample Box #: 4
Filter #: 0447
Probe Length/Type: 3' GLASS
Stack Thermocouple #: 5N
Oven Thermocouple #: OV-4
Impinger Thermocouple #: I-1
Pitot Tube #: 3A
Stack I.D.: 23"
Record Data Every 15 Minutes

Meter ΔH@: 1.951
Meter Y Factor: 0.9988
C Factor: 1.1
Reference ΔP: 0.44 VARIABLE
Nozzle I.D.: _ _ _ Avg. 0.247
Pre-Test Leak Rate: 0.010 cfm@ 10 "Hg
Post-Test Leak Rate: 0.003 cfm@ 3 "Hg
Pitot Tube Leak Check: Pre: ✓ Post: ✓
Orsat Train Leak Check: Pre: _ Post: _
Page 1 of 3

Traverse Point Number	Sampling Time (min)	Clock Time (hr)	Meter Reading (cu ft.)	Velocity Pressure ΔP ("H2O)	Orifice Pressure ΔH@ ("H2O) Desired	Orifice Pressure ΔH@ ("H2O) Actual	Train Vacuum ("Hg)	Temperatures (°F) Stack	Filter	Probe	IMP	Meter	
	0	0927	096.557										
PART A 1	7.5		101.995	0.45	1.90	1.90	2.0	102	265	70%	62	68	66
	15.0		107.335	0.43	1.80	1.80	2.0	118	247		60	70	67
2	22.5		112.760	0.44	1.85	1.85	2.0	134	245		58	75	68
	30.0		117.880	0.44	1.70	1.70	2.0	136	246		55	77	68
3	37.5		122.680	0.37	1.45	1.45	2.0	132	243		52	78	70
	45.0		128.010	0.47	1.75	1.75	2.0	136	245		53	79	71
4	52.5		133.370	0.46	1.75	1.75	2.0	137	281		53	81	73
	60.0		136.920	0.19	0.72	0.72	2.0	136	265		53	82	74
5	67.5		141.885	0.42	1.60	1.60	2.0	144	255		55	80	74
	75.0		146.850	0.44	1.65	1.65	2.0	132	241		55	81	74
6	82.5		151.920	0.41	1.60	1.60	2.0	150	250		56	82	75
	90.0		157.035	0.44	1.65	1.65	2.0	141	244		56	82	75
7	97.5		162.305	0.39	1.50	1.50	2.0	147	246		56	87	77
	105.0		166.995	0.39	1.50	1.50	2.0	139	246		55	91	80

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EMISSION TESTING FIELD DATA

Client: Fenco Run #: 10-1 Date: 5/9/95 Page 2 of 3

Traverse Point Number	Sampling Time (min)	Clock Time (hr)	Meter Reading (cu ft.)	Velocity Pressure ΔP ("H2O)	Orifice Pressure ΔH@ ("H2O) Desired	Orifice Pressure ΔH@ ("H2O) Actual	Train Vacuum ("Hg)	Temperatures (°F) Stack	Filter	Probe	IMP	Meter	
	105.0		166.995										
8	112.5		171.825	0.38	1.50	1.50	2.0	149	244	70%	55	93	82
	120.0		176.795	0.39	1.50	1.50	2.0	150	246		57	96	84
9	127.5		180.420	0.18	0.68	0.68	2.0	128	240		56	97	87
	135.0		185.050	0.36	1.40	1.40	2.0	145	243		56	96	88
10	142.5		189.960	0.36	1.40	1.40	2.0	142	243		56	100	90
	150.0		194.850	0.30	1.15	1.15	2.0	137	241		56	97	91
11	157.5		198.040	0.29	1.10	1.10	2.0	141	241		55	94	90
	165.0		201.130	0.06	0.24	0.24	2.0	112	249		57	93	89
12	172.5		203.320	0.06	0.24	0.24	2.0	102	237		58	90	90
	180.0	1229	205.042	0.04	0.15	0.15	2.0	118	241		59	88	88
1	187.5	1237	209.880	0.35	1.35	1.35	2.0	141	232		62	85	86
	195.0		214.415	0.35	1.35	1.35	2.0	132	251		63	88	86
2	202.5		219.205	0.34	1.30	1.30	2.0	118	242		65	91	86
	210.0		223.895	0.35	1.35	1.35	2.0	135	246		66	91	85
3	217.5		228.065	0.29	1.10	1.10	2.0	121	238		65	92	86
	225.0		232.830	0.37	1.40	1.40	2.0	120	240		65	92	87
4	232.5		237.660	0.37	1.40	1.40	2.0	130	240		65	93	87
	240.0		242.455	0.37	1.40	1.40	2.0	133	239		66	92	87
5	247.5		247.235	0.38	1.40	1.40	2.0	135	245		66	93	87
	255.0		252.070	0.38	1.40	1.40	2.0	134	243		66	90	86
6	262.5		256.540	0.37	1.40	1.40	2.0	137	242		65	89	85
	270.0		261.665	0.37	1.40	1.40	2.0	122	240		66	86	82

HAYDEN ENVIRONMENTAL GROUP, INC.

000250

8292

EMISSION TESTING FIELD DATA

Client: EFAMCO Run #: LO-2 Date: 5/9/95 Page 3 of 3

Traverse Point Number	Sampling Time (min)	Clock Time (hr)	Meter Reading (cu ft.)	Velocity Pressure ΔP ("H2O)	Orifice Pressure ΔH@ ("H2O) Desired	Orifice Pressure ΔH@ ("H2O) Actual	Train Vacuum ("Hg)	Temperatures (°F) Stack	Filter	Probe	IMP	Meter	
	270.0		261.665										
7	277.5		266.425	0.38	1.40	1.40	2.0	134	235	70%	66	84	81
	285.0		271.500	0.41	1.55	1.55	2.0	134	232		67	85	80
8	292.5		276.210	0.36	1.40	1.40	2.0	128	235		65	85	80
	300.0	1435	281.289	0.42	1.60	1.60	2.0	133	252		66	84	79
9	307.5												
	315.0		END OF PRODUCTION										
10	322.5												
	330.0		184.732	0.5811		~~1.260~~		132.4				84.0	
11	337.5					1.350							
	345.0		VB1	VB1		VB1		VB1				VB1	
12	352.5												
	360.0												

HAYDEN ENVIRONMENTAL GROUP, INC.

000251

8292

SAMPLE RECOVERY DATA

Client: Fermco PN: A95010 Date: 5/4/95
Source: Laundry Dryer Site: HEPA Filter Exhaust Run#: LD-1
Sample Date: 5/2/95 Recovery Date: 5/2/95

Filter No: 0447 Glassware Set No: _____ Sample Box No: 4

IMPINGER DATA

Gravimetric: ✓ Volumetric: _____

	#1	#2	#3	#4	#5	Total
Contents	100 ml DI H_2O	100 ml DI H_2O	Empty	5.1 Gel		
Final	585.5	601.6	453.4	774.8		
Initial	554.7g	587.2g	443.2g	735.7g		
Net	30.80	14.4	10.2	39.1		94.5g

VB

RECOVERED SAMPLE

Description of Particulate on Filter: White none visable

Color of Silica Gel: 20% Blue

Recovered By: BJ

HAYDEN ENVIRONMENTAL GROUP, INC.

APPENDIX B

LABORATORY DATA

DATA CHEM
LABORATORIES
A SORENSON COMPANY

Case Narrative

Method: EPA Method 5, 40 CFR
Analysis: Particulates
DCL Set ID: S95-0498-BE

Client: Hayden Environmental Group, Inc.
Account: 3025
Matrix: Water/Acetone

General Set Information: There were eight field samples in this set.

Method Summary: The beakers were uniquely marked and rinsed with ASTM type II water, and then placed in a 180°C oven for at least one hour. The beakers were then placed in a desiccator for at least three hours before obtaining a tare weight. The corresponding entire sample was poured into each beaker, then rinsed well with ASTM type II water or acetone (as appropriate for each sample) to remove all dissolved solids. The water samples were placed in the 97°C oven to evaporate. The acetone samples were allowed to evaporate in a hood before being placed in the 97°C oven.. The evaporated samples were dried at 103°C for at least an hour and transferred to a desiccator. After being in the desiccator for at least three hours, they were weighed again. The difference in weight is the result. Samples were weighed until two consecutive results showed a difference in weight of no more than 0.0004 gram.

Method and Sample QC data: LCS recovery was 97.4%. The method blank was below the CRDL.

MD Analysis: A matrix duplicate was not performed because all sample was consumed in the analysis.

Sample Calculation: The final results are calculated in mg/L. Example for sample EO 3872:

$$\frac{(81.6798\,g - 81.6629\,g) \times (1000\,mg/g)}{(0.154\,L)} = 109.7\,mg/L$$

Cynthia Adams 06/16/95
Cynthia Adams Date

This report is 16 total pages.

\\owl\wl_current\casenarr\mdf\g954q002.tss

7678

DATA CHEM LABORATORIES
A Sorenson Company

COVER FORM (TYPE I)
SINGLE METHOD ANALYSES

SUMMARY INFORMATION

Form RLIMS63M-V1.0
06159521345631
Page 1

G954P022

Date Reported.....:

Date Printed.....: 15-JUN-95 21:34
DCL Client Group..: S95-0498-BE

Client Ref Number.: Not Provided
Release Number....: Not Provided

Analysis Method...: EPA 5

Hayden Environmental Group, Inc.
Attention: David Robinson
561 Congress Park Drive
Dayton, OH 45459

Client Sample ID	Lab Sample ID
BL-57150-1	BL-57150-1
QC-57150-1	QC-57150-1
REAG BLK	EO 3869
REAG BLK	EO 3870
EO-1	EO 3872
EO-1	EO 3873
LO-1	EO 3875
LO-1	EO 3876
FLD BLK	EO 3879
FLD BLK	EO 3880

000255

Cynthia Adams
Analyst: Cynthia Adams

Suzanne W. Bowe
Reviewed: Suzanne W. Bowe

Tim S. Mikesell
Laboratory Supervisor: Tim S. Mikesell

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002

DATA CHEM LABORATORIES
A Sorenson Company

FORM H (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE GROUP COMMENTS

G954P022

Date Printed.....: 15-JUN-95 01:24
DCL Client Group..: S95-0498-BE

Client Name.....: Hayden Environmental Group, Inc.

Release Number....: Not Provided

General Information

The DCL QC Database maintains all numerical figures which are input from the pertinent data source. These data have not been rounded to significant figures nor have they been moisture corrected. Reports generated from the system, however, list data which have been rounded to the number of significant figures requested by the client or deemed appropriate for the method. This may create minor discrepancies between data which appear on the QC Summary Forms (Forms B-G) and those that would be calculated from rounded analytical results. Additionally, if a moisture correction is performed, differences will be observed between the QC data and the surrogate data reported on Form A (or other report forms) and corresponding data reported on QC Summary Forms. In these cases, the Form A will indicate the "Report Basis" as well as the moisture value used for making the correction.

Symbol Definitions

ND - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry).
B - For organic analysis the qualifier indicates that this analyte was found in the method blank. For inorganic analysis the qualifier signifies the value is between the IDL and PQL.
J - The qualifier indicates that the value is between the MDL and the PQL. It is also used for indicating an estimated value for tentatively identified compounds in mass spectrometry where a 1:1 response is assumed.

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

7678

Form RLIMS63A-V1.0
06159501245655
Page 3

S95550VJ

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: BL-57150-1
DCL Sample Name...: BL-57150-1

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: mg/L
☐ As Received ☐ Dried

Date Received.....: Not Applicable
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 100 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	ND			10

000257

004

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06159501245655
Page 4

S95550VK

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: QC-57150-1
DCL Sample Name...: QC-57150-1

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: mg/L
☐ As Received ☐ Dried

Date Received.....: Not Applicable
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 100 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	730			10

000258

005

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954P06R

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: REAG BLK |200153662
DCL Sample Name...: EO 3869

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: ACETNE
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 216 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	ND			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: REAG BLK |200153666
DCL Sample Name...: EO 3870

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: WATER
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 370 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	ND			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954P06T

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: EO-1 |200153663
DCL Sample Name...: EO 3872

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: ACETNE
Date Sampled.....: 10-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 154 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	110			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954P06V

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: EO-1 |200153667
DCL Sample Name...: EO 3873

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: WATER
Date Sampled.....: 10-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 440 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	20			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

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06159501245655
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S954P06W

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: LO-1 |200153664
DCL Sample Name...: EO 3875

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: ACETNE
Date Sampled.....: 09-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 240 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	30			10

000263

010

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954P06X

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: LO-1 |200153668
DCL Sample Name...: EO 3876

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: WATER
Date Sampled.....: 09-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 349 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	ND			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954P06Y

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 230 mL
Net Weight/Volume....: Not Required

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: FLD BLK |200153665
DCL Sample Name...: EO 3879

Matrix.....: ACETNE
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	ND			10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

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Form RLIMS63A-V1.0
06159501245655
Page 12

S954P06Z

Date Printed.....: 15-JUN-95 01:24
Client Sample Name: FLD BLK |200153669
DCL Sample Name...: EO 3880

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: WATER
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: mg/L
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-BE

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
Aliquot Weight/Volume: 430 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Particulates	25-MAY-95 00:00	10	ND			10

000266

013

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DATA CHEM LABORATORIES
A Sorenson Company

FORM B (TYPE I)
SINGLE METHOD ANALYSES

S95550VK

QUALITY CONTROL DATA SHEET
LABORATORY CONTROL SAMPLE (LCS)

Date Printed.....: 15-JUN-95 01:24
Client Name.....: Hayden Environmental Group, Inc.
DCL Sample Name...: QC-57150-1
Release Number.....: Not Provided

DCL Analysis Group: G9555063
Matrix.....: WATER
Analysis Method...: 160.3
Reporting Units.....: mg/L
Instrument Type...: GRAV
Instrument ID.....: Balance
LCS Source.....:
Column Type.....: Not Applicable

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable
QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Target	Result	Percent Recovery	QC Limits	QC Flag
TS	25-MAY-95 00:00	746.	726.	97.4	80.0/120.	

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DATA CHEM LABORATORIES
A Sorenson Company

FORM C (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
BLANK SAMPLE

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: WATER
Reporting Units.....: mg/L

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: Not Applicable

Date Printed.....: 15-JUN-95 01:24
DCL Sample Name...: BL-57150-1

DCL Analysis Group: G9555063
Analysis Method...: 160.3
Instrument Type...: GRAV
Instrument ID.....: Balance
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Result	CRDL
TS	25-MAY-95 00:00	-8.00	10.0

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DATA CHEM LABORATORIES
A Sorenson Company

QUALITY CONTROL REPORT

Form RLIMS65-V1.0
06069522533261
Page 1

G9555063

Method....: 160.3, EPA 5
Analyte...: TS OR PARTICULATE
Matrix....: WATER

Date Printed....: 06-JUN-1995 22:53
Group Name.....: G9555063
Analyst.....: CA
Units.....: mg/L

Blank Results

Sample ID	Sample Name	QC Date	Blank Result	Lower Limit	Upper Limit	Flags
S95550VJ	BL-57150-1	25-MAY-1995	-8.00	-10.0	10.0	Mp

LCS Results

Sample ID	Sample Name	QC Date	LCS Result	Amount Spiked	Percent Recovery	Lower Limit	Upper Limit	Flags
S95550VK	QC-57150-1	25-MAY-1995	726.	746.	97.4	80.0	120.	Mp

checked by: Suzanne W. Bowe 06/16/95

000269

016

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DATA CHEM LABORATORIES
A SONESSON COMPANY

7678

Datapackage Table of Contents

Information pertaining to this datapackage is divided into the four categories listed below (see colored divider sheets for an inventory list of each category). If an item on the inventory is not applicable, an "NA" is placed in the corresponding check box. A Case Narrative immediately precedes this Table of Contents and contains pertinent information about this datapackage.

Analytical Forms ..... Yellow
Sample Tracking Documentation ..... Pink
Analytical Documentation ..... Blue
Raw Data ..... Green

♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦

Analytical Forms
Inventory Checklist

[X] Case Narrative

[NA] IRDMS	[X] Commercial Forms
[ ] Data Review and Approval Form	[NA] Analytical or Environmental Report Form
[ ] IRDMS Reports	[NA] Set Comments
[ ] GC/MS TICs	[X] Applicable QC Sheets

[X] RLIMS Forms	
[X] Cover Form	[NA] Matrix Spike/Matrix Spike Duplicate Sample (Form F)
[X] Sample Group Comments (Form H)	[NA] Surrogate Summary (Form G)
[X] Sample Analysis Data Sheet (Form A)	[NA] Initial Calibration Form
[X] Laboratory Control Sample (Form B)	[NA] Continuing Calibration Form
[X] Blank Sample (Form C)	[NA] Serial Dilution Form
[NA] Matrix Spike Sample (Form D)	[NA] Endrin Breakdown or BFB/DFTPP GC/MS Tuning Form
[NA] Matrix Duplicate Sample (Form E)	[NA] Internal Standard Form

Analytical Forms
Reviewer Checklist

X The Analytical Forms Inventory Checklist above is complete.

X The Case Narrative was completed in accordance with procedures in DCL SOP XX-DC-020, "Datapackage Preparation and Validation."

X Only the correct report forms are used (IRDMS or Commercial Forms or RLIMS Forms).

X All fields on the report forms are complete with the correct information, including signatures.

X Results for all samples are reported per client request.

X Units, methods, and dates are correct.

X Sample and/or set comments are complete.

000270

Assembled by: Cynthia Adams 06/06/95 (Signature, Date) Reviewed by: Suzanne W. Bowe 06/16/95 (Signature, Date)

V95

DATA CHEM LABORATORIES
A SORENSON COMPANY

7678

Sample Tracking Documentation
Inventory Checklist

- [X] LIMS Grouping Reports
- [X] DataChem Laboratories (DCL) Chain-of-Custody Record
- [X] DCL Sample Work Order
- [NA] Copy of numbered Nonconformance/Corrective Action Report (NC/CAR)
- [NA] Copy of Client-Related Problem Report (CPR)

Sample Tracking Documentation
Reviewer Checklist

X The Sample Tracking Documentation Inventory Checklist above is complete.

X DCL Chain-of-Custody Record provides signatures for the sample portion reported in this data package.

X DCL Chain-of-Custody Record was completed in accordance with procedures in DCL SOP XX-DC-006 "Chain-of-Custody and Laboratory Tracking."

X Methods specified on the Sample Work Order were performed or an explanation for deviations is provided.

X Special instructions on the Sample Work Order were followed.

X Project Management instructions on the Project Protocol Worksheet were followed.

X Client's requests were met or an explanation is provided in the Case Narrative.

NA NC/CAR and/or CPR were completed in accordance with procedures in DCL SOP QC-DC-006 "Nonconformance/Corrective Action Report (NC/CAR) Procedures."

000271

Assembled by: Cynthia Adams (Signature) 06/06/95 (Date) Reviewed by: Suzanne W. Bowe (Signature) 06/16/95 (Date)

1/95

DataChem Laboratories
LIMS - Sample Master System
Analysis Group Report

Date: 6-JUN-1995 22:21
User: ADAMS

RLIMS15-V1.1

Analysis Run Name: G9555063

Group ID: G9555063

Samples: 10

Pos	Laboratory Sample Name	Field Sample Name	Laboratory Sample ID	Laboratory Group Name	Accnt. Number
1	BL-57150-1	BL-57150-1	S95550VJ	S95-0498-BE	03025
2	QC-57150-1	QC-57150-1	S95550VK	S95-0498-BE	03025
3	EO 3869	REAG BLK	S954P06R	S95-0498-BE	03025
4	EO 3870	REAG BLK	S954P06S	S95-0498-BE	03025
5	EO 3872	EO-1	S954P06T	S95-0498-BE	03025
6	EO 3873	EO-1	S954P06V	S95-0498-BE	03025
7	EO 3875	LO-1	S954P06W	S95-0498-BE	03025
8	EO 3876	LO-1	S954P06X	S95-0498-BE	03025
9	EO 3879	FLD BLK	S954P06Y	S95-0498-BE	03025
10	EO 3880	FLD BLK	S954P06Z	S95-0498-BE	03025

----- END OF LISTING -----

Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498 * | Reporting Group | BE

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AM 5-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Analysis	Particulates	# Bottles
11-May-1995	REAG BLK	EO 3869			ACETNE		X	1
11-May-1995	REAG BLK	EO 3870			WATER		X	1
10-May-1995	EO-1	EO 3872			ACETNE		X	1
10-May-1995	EO-1	EO 3873			WATER		X	1
9-May-1995	LO-1	EO 3875			ACETNE		X	1
9-May-1995	LO-1	EO 3876			WATER		X	1
11-May-1995	FLD BLK	EO 3879			ACETNE		X	1
11-May-1995	FLD BLK	EO 3880			WATER		X	1

Received: Date/Time/Signature 5-18-95 / 1000 / Amaylia McKewer

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Amaylia McKewer	5-18-95 1100	WAHIN R-23-1 AM	STORAGE R-23-1
R-23-1 CA	05/25/95 17:00	Cynthia Adams	TS analysis / R-403-1 ~~R-408~~

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: TS | Lab Notebook No.: A21

Prepared/Analyzed by: CA | Date/Time: 05/25/95 20:00

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 5/23/1995 16:41

Form: COFC1.01-SWV2.30

000223

7678

Sample Work Order

► 7678

QC Clearance: _____

Project Manager: Keith R. Nicholson

Client: Hayden Environmental Group, Inc.

Account: 03025

Project/Task: COMM-ENV

Date Received: 18-May-1995

Date for Mailing Report: 7-Jun-1995

DCL Root Set ID: S95-0498 *

DCL Lab. Name: EO 3869–EO 3880

Total # Samples: 8

Sample Medium: ACETNE

Earliest Sampling Date: 9-May-1995

Preparation Type:

Rep. Group	Physical Properties - Wet Chemistry Analytes Requested	Latest Prep. Date	Latest Anal. Date	No. of Samp.	Split ID	Storage Location	Analysis/Prep. Method	Inst.	
BE	Particulates			8		Kalo Lab	40CFR method	Grav	

Special Instructions: Take the entire sample and evaporate in a Tared Beaker below Boiling point ~~at ambient~~ (Temp) for Acetone & Water. Rinse Container w/Acetone to Remove additional sample. After sample comes to dryness desicate to constant weight Then the beaker w/Residue goes to Rad chem for additional analysis Contact ~~Charlie Walker~~ Bill Hauer to hand off samples. (Do a direct handoff please).

Section Manager Approval: Tim S. Mikesell 5/24/95
Tim S. Mikesell — Date

000274

Other Sections Receiving Sample Portions: IM, WA

DataChem Laboratories/ 960 West LeVoy Drive / Salt Lake City, Utah 84123

Form: WO1.04-SWV2.12

PRINTED 5/23/1995 16:49

Fernald Environmental Restoration Management Corporation
RSO - ANALYTICAL LABORATORY SERVICES

REFERENCE DOCUMENT NO:
SAR/CR: SPL-95-1376

Page 1 of 2

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

PURCHASE ORDER NO.: 95-H053
RELEASE NO.: 1000006737
SAMPLE SHIPMENT DATE: 5-17-95
SAMPLE SHIPPER: M. CORNELL

OFF-SITE LAB CONTACT: KEITH NICHOLSON
FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157
REQUIRED REPORT DATE: PER CONTRACT (NORMAL)
SAMPLE TEAM: EFFL. MON. & CNTL

REPORT TO:
FERMCO
P.O. BOX 398704
CINCINNATI, OH 45239-8704

RECEIVING LAB NAME: DATACHEM
RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT 84123

	SAMPLE NUMBER		SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153657	REAG. BLK.	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* PARTICULATES ED 3868	~~ASBESTOS~~ ED 3881
2	200153662	REAG. BLK.	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3869	
3	200153666	REAG. BLK.	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3870	
4	200153658	EO-1	G.F. FILTER	5/10/95 0930	PETRI DISH	1 x FLTR	NONE	* 3871	3882
5	200153663	EO-1	ACETONE	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3872	
6	200153667	EO-1	D.I. WATER	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3873	
7	200153659	LO-1	G.F. FILTER	5/9/95 1450	PETRI DISH	1 x FLTR	NONE	* 3874	3883
8	200153664	LO-1	ACETONE	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3875	
9	200153668	LO-1	D.I. WATER	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3876	
10	200153660	FLD BLK	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* 3877	3884
11	200153665	FLD BLK	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3879	

CAN SEAL NO. 2470

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOWOMETRY (AS LISTED IN METHOD 114)

* = TOTAL U (CE); GROSS A/B (DE); PARTICULATES (AE); GAMMA SCAN (EE)

CHARGE NUMBER: 7 ECB 2

SAMPLE PLAN NUMBER: N/A

PROJECT NAME: PERIODIC CONFIRMATORY MSMTS.

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN 5-17-95 COOLER SEALED		w/ C-o-C TAPE			

RELINQUISHED BY	DATE	TIME	RECEIVED DATE	RECEIVED TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaryllis McGuire
3.			3.		

NO.		DISTRIBUTION OF COPIES
1	WHITE	REMAIN WITH SAMPLES
2	YELLOW	OFF-SITE LAB
3	PINK	FERMCO DATA REVIEW AND REPORTING
4	BLUE	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

FS-F-2388 (REV. 12/31/92)

000225

00

RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFF. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT. 84123

	SAMPLE NUMBER	SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153669 FLD BLK	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	*EO 3880	EO 3884
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

CAN SEAL NO: 2470

LAST ENTRY MM 5-17-95

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOUOMETRY (AS LISTED IN METHOD 114)

*= TOTAL U; GROSS A/B; PARTICULATES; GAMMA SCAN

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN COOLER	SEALED w/C-O-C TAPE						

MM 5-17-95

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. M. Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amelia Mc Elwee
3.			3.		

NO.		DISTRIBUTION OF COPIES
1	WHITE	REMAIN WITH SAMPLES
2	YELLOW	OFF-SITE LAB
3	PINK	FERMCO DATA REVIEW AND REPORTING
4	BLUE	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

FS-F-3368 (REV. 12/31/92)

00026

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HAYDEN

DEN
MENTAL GROUP, INC.

Post-it® Fax Note 7671	Date 11-21-94	# of pages ▶ 8
To Customer Service	From D. Robinson	
Co./Dept.	Co.	
Phone #	Phone #	
Fax # 801-268-9992	Fax #	

November 21, 1994

Customer Service
DataChem Laboratories
960 West Levoy Drive
Salt Lake City, UT 84123

Subject: Laboratory Services / Subcontracting
FERMCO RFP # PES-80706

Dear Sir or Madam:

We are submitting a proposal in response to the above request and would like to receive a quotation from your firm for laboratory services. Your firm's name was given to us by FERMCO as a qualified subcontract laboratory.

We request a firm, fixed cost proposal to provide analytical support for the scope of work included with this letter. To summarize the analytical scope of work:

1. Provide analysis by USEPA Method 5 (40CFR Part 61) for three field samples from Source EP8-013 and one field sample from EP11-002. Filter, probe rinse (Acetone), and backhalf (H_2O) samples will be included as well as quality control samples (see below). Samples are to be analyzed for total particulate.

2. Following particulate analysis, the fractions for each field sample shall be composited and analyzed to total activity and uranium per EPA Method 114, and according to the protocol shown in Table 2 of the scope of work.

3. Proposed cost shall include cost to analyze and report results for all field samples and quality control samples. Quality control samples to be included in the sample sets:

   - Performance evaluation sample, to be supplied by FERMCO, and analyzed for total Uranium in the same manner as the composites (Item 6, scope of work).

   - Two field blank acetone rinse samples, two field blank filters, two laboratory filter blanks (supplied by Hayden), laboratory matrix spike/spike duplicate, and two container blanks.

000277

F010331.94

TALLY SHEET

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RELEASE #: 1000006737 (Can 1 of 1)
PO #: 95-H053 (DCL-SLC)
DATE SHIPPED: 17-May-95
MATERIAL: Periodic Confirmatory Measurements – Filters, Acetone, Water

ANALYSIS: Total U; Gross A/B; Particulates; Gamma Scan

Composite Sample Number	Lot Number	Sample Container Size	AnaLis/ FACTS Number	Gross Weight lbs.	Tare Weight lbs.	Net Weight lbs.
REAG. BLK.	W050-725-P047-6737	PETRI DISH	200153657	0.106	0.088	0.018
REAG. BLK.	W050-725-P047-6737	1L PLST	200153662	0.511	0.141	0.370
REAG. BLK.	W050-725-P047-6737	1L PLST	200153666	0.943	0.141	0.802
EO-1	W050-725-P047-6737	PETRI DISH	200153658	0.106	0.088	0.018
EO-1	W050-725-P047-6737	1L PLST	200153663	0.423	0.141	0.282
EO-1	W050-725-P047-6737	1L PLST	200153667	1.128	0.141	0.987
LO-1	W050-725-P047-6737	PETRI DISH	200153659	0.101	0.088	0.013
LO-1	W050-725-P047-6737	1L PLST	200153664	0.542	0.141	0.401
LO-1	W050-725-P047-6737	1L PLST	200153668	0.934	0.141	0.793
FLD. BLK.	W050-725-P047-6737	PETRI DISH	200153660	0.106	0.088	0.018
FLD. BLK.	W050-725-P047-6737	1L PLST	200153665	0.476	0.141	0.335
FLD. BLK.	W050-725-P047-6737	1L PLST	200153669	1.163	0.141	1.022
				6.537	1.480	5.057

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FEMP	RADIOLOGICAL SURVEY REPORT COVER SHEET		SURVEY NUMBER: 95-05-G1-194	
DATE: 5-17-95	LOCATION: Lab	RCT: BV Dunlap / D. Wessel	BADGE: 10148	PAGE: 1 OF 4
TIME: 0700	LEVEL: 580-	SIGNATURE: BV Dunlap / D. Wessel		
WORK PERMIT NUMBER: N/A		REVIEWER:	BADGE:	
IWP NUMBER:		SIGNATURE:	DATE:	

ATTACHMENTS:		
3	Pg 2 MURF	
	Pg 3 & 4 Teunelco Printout	

REASON FOR SURVEY	
	Sample surveyed for release to go offsite. Gross area smears taken. Direct frisk inside drum
	Release # ~~[illegible]~~ 6737 N/A

SUMMARY:

N/A

No.	Distribution of Copies
1	Radiological Records
2	Files

Supervisor Notified	Time	Date	Notified by:
			000279

FS-F-1993-0 (REV. 04/18/95)

MATERIAL UNRESTRICTED RELEASE FORM

SURVEY 95-05-G11-194

DATE:	LOCATION:	RCT:	SIGNATURE:	BADGE #:
5-17-95	Lab	B.V. Dunlap / D. Wessel	B.V. Dunlap / D. Wessel	10148 / 721

MODEL	SERIAL NUMBER	TYPE ALPHA or BETA/GAMMA	CAL DUE DATE	BKGD. (CPM)	CF	MDA (DPM)	INST. PERFORMANCE TEST YES	INST. PERFORMANCE TEST NO
LB5100	7	α, β, γ	6-95	.2 / 1.72	.289 / 9.18	18.2 / 19.8	X	
M-3	77101	β, γ	10-95	60	30	3K	X	
			N					
				A				

TIME	RCT INIT	MATERIAL DESCRIPTION	RELEASE CRITERIA SURF or VOL	RESULTS ALPHA REMOVABLE	RESULTS ALPHA FIXED + REM	RESULTS BETA/GAMMA REMOVABLE	RESULTS BETA/GAMMA FIXED + REM	RELEASE JUSTIFICATION	RECIPIENT	MATERIAL RELEASE EVALUATOR BADGE # and SIGNATURE (1)
0700	bo/DC	2001536667	SURF	-0 *	N/A	0 *	<MDCP		Doug Stack	
		2001536668		2 *		4 *	<MDCP			
		2001536669		2 *		4 *	<MDCP			
		2001536666		-0 *		4 *	<MDCP			
		2001536662		-0 *		0 *	<MDCP			
		2001536665		-0 *		-1 *	<MDCP			
		2001536664		2 *		-1 *	<MDCP			
		2001536663		2 *		8 *	<MDCP			N/A
		2001536658 (AF)		-0 *		0 *	<MDCP	*		
		2001536659 (AF)		5 *		-1 *	<MDCP	*		
		2001536660 (AF)		-0 *		0 *	<MDCP	*		
		2001536657 (AF)		2 *		0 *	<MDCP	*		
		10 gal Can		-0 *		0 *	<MDCP			
					N					
						A				

* M:ESH:BCRC: 93 613

Comments: Release # 6737
(AF) = Air Filter

REVIEW: INITIAL ____ DATE ____

(1) Material Release Evaluator approval required in accordance with RC-DPT-019, (Release of Materials from the Fernald Environmental Management Project), if any of the following conditions exist:
- a. Material has areas which are inaccessible for proper survey.
- b. Process knowledge is used to support the release decision.
- c. Material must be evaluated for the potential of contamination beneath any coating applied while the material was in the Controlled Area.
- d. Material must be evaluated for the potential for any volume or in-depth radioactivity within the material matrix.
- e. Special case items are being released, such as radioactive consumer products, industrial sources, etc.
- f. Material has detectable activity present and the activity is below the contamination limits listed in Attachment A of RC-DPT-019.

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P3-P-3915 (06/22/94) equil.

WED MAY 17, 1995 08:57:36
GROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1 MIN)

7678

SAMPLE NUMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	08:58:45
2	1	4	2	4	09:00:06
3	1	4	2	4	09:01:27
4	0	4	-0	4	09:02:48
5	0	2	-0	0	09:04:10
6	0	1	-0	-1	09:05:30
7	1	1	2	-1	09:06:51
8	1	6	2	8	09:08:13
9	0	2	-0	0	09:09:34
10	2	1	5	-1	09:10:55
11	0	2	-0	0	09:12:16
12	1	2	2	0	09:13:37
~~12~~	~~0~~	~~5~~	~~0~~	~~6~~	~~09:14:58~~ bad 5-17-95

OPERATION COMPLETE

FEMP RADIOLOGICAL SURVEY # 9505-G1-194 REPORT pg 3 of 4 5-17-95

BV Dunlap/D. Weser/ BUR L. / D. Wenal

000281

GROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1 MIN)

SAMPLE NUMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	10:05:55

OPERATION COMPLETE

000282

FEMP RADIOLOGICAL SURVEY REPORT pg 4 of 4

SURVEY # 95-05-G11-194 DATED 5-17-95

	(name)	(signature)
RCT:	[illegible]	[illegible]
REVIEWER:		

8292

ACETONE, 3, UN 1090, II

POTENTIAL HAZARDS

IRE OR EXPLOSION

Flammable/combustible material; may be ignited by heat, sparks or flames.
Vapors may travel to a source of ignition and flash back.
Container may explode in heat of fire.
Vapor explosion hazard indoors, outdoors or in sewers.
Runoff to sewer may create fire or explosion hazard.

ALTH HAZARDS

May be poisonous if inhaled or absorbed through skin.
Vapors may cause dizziness or suffocation.
Contact may irritate or burn skin and eyes.
Fire may produce irritating or poisonous gases.
Runoff from fire control or dilution water may cause pollution.

EMERGENCY ACTION

Keep unnecessary people away; isolate hazard area and deny entry.
Stay upwind; keep out of low areas.
Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.
Isolate for 1/2 mile in all directions if tank, rail car or tank truck is involved in fire.
CALL Emergency Response Telephone Number on Shipping Paper first.
If Shipping Paper not available or no answer, CALL CHEMTREC AT 1-800-424-9300.
If water pollution occurs, notify the appropriate authorities.

RE

Small Fires: Dry chemical, CO2, water spray or alcohol-resistant foam.
Do not use dry chemical extinguishers to control fires involving nitromethane or nitroethane.
Large Fires: Water spray, fog or alcohol-resistant foam.
Move container from fire area if you can do it without risk.
Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.
For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

LL OR LEAK

Cut off ignition sources; no flares, smoking or flames in hazard area.
Stop leak if you can do it without risk.
Water spray may reduce vapor; but it may not prevent ignition in closed spaces.

Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal.
Large Spills: Dike far ahead of liquid spill for later disposal.

IRST AID

Move victim to fresh air and call emergency medical care; if not breathing, give artificial respiration; if breathing is difficult, give oxygen.
In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water.
Remove and isolate contaminated clothing and shoes at the site.

SURVEY RECORD

Date: 5-18-95

By: MM

Survey Type: Meter: ✓ Smear: ✓ Leak Test:

Approved: RSO

Date:

Survey Instrument:

Manufacturer: LUDLUM
Model Number 19
Serial Number: ~~159~~ 102872
Calib. Date: 9-30-94

FERMCO ~~MX-0199~~ IH. 5-18-95

BACKGROUND <0.011 mR/hr

Scintillation Counter:

Manufacturer: Ludlum
Model Number: 2929
Lab Instrument No.: 108227

Sample Count Time - 1 min.

	ALPHA	BETA
BLANK (CPM)	0.08	65.03
COUNTER EFFICIENCY (%)	0.3517	0.4083

Mixed Waste Lab Survey Location or Sealed Source Number	Instrument Reading	Disc Smears/Leak Test Swipes						Remarks
		Alpha			Beta			
		CPM	DPM	pCi	CPM	DPM	pCi	
M095 0241 OUTSIDE	<0.012 mR/hr	0			68			<0.011 mR/hr @ 1 METER
INSIDE	<0.012	0			63			
SAMPLE	<0.012	0			71			

DATACHEM LABORATORIES COOLER RECEIPT CHECKLIST 7678

1. Client Name: FERMCO
2. Project/Task/Site: REL. #: 6737
3. Time/Date of Receipt: 1000 5-18-95
4. # Coolers Received: 1
5. Custody Seals?: (Circle) Present/Absent* Intact/Broken*
   Tamper Evident: Yes/No
6. Condition of Coolers: Acceptable/Unacceptable
7. Comments on Cooler Condition (#6): 1 DRUM
8. Ice Present: Yes/No* Frozen/Melted
   Comments: RAD CHEM ONLY
9. Temp Control: Present/Not Included
10. Location Temp Taken: Control/Between Samples
11. Taken by: (Signature) 5-18-95 MARK MENDENHALL (Printed Name) 5-18-95 1130 (Date/Time)
12. Are all temperatures within project specific guidelines? Yes/No*

*CONTACT PROJECT MANAGER. COMPLETE INCIDENT REPORT.

Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp
1	MC95 0341	20 °C	6	MC95	°C	11	MC95	°C
2	MC95	°C	7	MC95	°C	12	MC95	°C
3	MC95	°C	8	MC95	°C	13	MC95	°C
4	MC95	°C	9	MC95	°C	14	MC95	°C
5	MC95	°C	10	MC95	°C	15	MC95	°C

SAMPLE RECEIVING INCIDENT REPORT

Client Sample #'s Affected: _____ DCL Set I.D: _____

DCL Sample #'s Affected: _____

- ☐ Cooler Temps out of Range
- ☐ Missing Cooler
- ☐ Broken/Leaking Samples
- ☐ Missing Samples/Bottles
- ☐ Missing Paperwork
- ☐ Incorrect Preservation
- ☐ Low Sample Volume
- ☐ Incorrect Bottle Type
- ☐ Missing/Incorrect Bottle Labels
- ☐ Other

BRIEFLY DESCRIBE PROBLEM:

Delivered to: _____ Project Manager

Delivered by: _____ Signature/Date/Time

RESPONSE REQUIRED WITHIN 24 HOURS

PROJECT MANAGER'S COMMENTS:

Returned to Sample Receipt by: _____ (Date/Time/Signature)

Accepted for Sample Receipt by: _____ (Date/Time/Signature)

8/95

Project Protocol Worksheet

Client	Hayden Environmental
Project	FERMCO Emissions Tests
Project Manager	Keith Nicholson
Account Number	3025
Project Duration	1 Month

Date 5/17/95

Mailby Days 20 days

Sample Stream	Project/ Method Type
S95	EPA Clean Air

QC Requirements

Inorganic		
Blank		
LCS		
MS		
MSD		
MD		
USAEC		
MSA		
Tracer		
Other		

Radiochemistry		
Blank	X	
LCS	X	
MS	X	U only
MSD	X	U only
Tracer		
Other	X	MD

Organic		
Blank		
LCS		
MS/MSD		
USAEC		
Surrogate		
Other		

Preparation Requirements

Inorganic		
CLP SOW		
SW-846 Rev.		
USAEC 1990		
USAEC 1993		
Microwave		
Hotplate		
DCL SOP		
Other		

Radiochemistry		
Hotplate leach		
Muffle furnace		
Total dissolution		
Microwave		
DCL SOP		
Other	X	Mthd. 114

Organic		
CLP SOW		
SW-846 Rev.		
USAEC 1990		
USAEC 1993		
Sonication		
Soxhlet		
Continuous		
Separatory funnel		
DCL SOP		
Other		

Reporting Requirements

Full CLP SOW	
CLP Forms Only	
CLP Disk	
RLIMS	X
Raw Data	
Custom Disk	
ARF	
QC Forms (specify below)	X
Case Narrative	X
Calibration data	X
Continuing Cal. data	
Reporting Basis	
IRDMIS	
# of TICs	
Counting Error (1 or 2 sigma)	
TPU	
RPD	
RER	
Send raw data	X
Store raw data	
Other	

LOD/MDL/IDL Requirements

CLP SOW		
SW-846 Rev.		
EPA Clean H2O		
USAEC 1990		
USAEC 1993		
NIOSH		
DCL SOP		
Client specified		
Other	X	Method

QC Limits		
Method	X	
Statistical		
Client specified		

David Robinson

Batch samples with other sets?	(●) yes	( ) no
MS/MD/MSD sample identified?	( ) yes	(●) no
Specific spiking levels identified?	(●) Method	
	( ) DCL SOP	
	( ) other (see comments)	

Comments: Analyze for U by EPA method 114 A-5, and by laser phosphoremetry - report results separately. Desired detection limits are 50 ug/sample for colorimetric U, and 1 ug/sample for phosphoremetry. Analyze for gamma, alpha, and beta for method 114 G-1, A-4 and B-4. Desired detection limits are 10 pCi for alpha and beta, a 20 pCi/sample as Cs-137 for gamma. Liquid samples and filters are to be analyzed for total particulates prior to other analyses. The client will specify how any compositing of liquid samples is to be conducted.

000287

8292

DATA CHEM LABORATORIES
A SONESCON COMPANY

7678

Analytical Documentation
Inventory Checklist

- [NA] Copy of TCLP Preparation Logbook Pages
- [NA] Copy of Sample Preparation Notebook/Logbook Pages
- [X] Copy of Analyst's Notebook/Method Logbook Pages
- [NA] Copy of Instrument Injection Logbook/Instrument Logbook/Run Log Pages
- [NA] Percent Solids/Percent Moisture Results
- [NA] Copy of Reagent Logbook Pages
- [NA] Copy of Working Standard Preparation Logbook Pages
- [NA] Copy of Secondary or Intermediate Standard Preparation Logbook Pages
- [NA] Copy of Primary Standard or Concentrated Stock Standard Preparation Logbook Pages
- [NA] Certificates of Analysis for Standards
- [NA] Copy of Standard Verification Logbook Pages (including documentation for spiking solutions and calibration standards)
- [NA] Copy of Preparation Logbooks for solutions prepared by QC

All other miscellaneous documentation associated with this set (describe)

- [X] Copy of Conductivity Method page with QC target

Analytical Documentation
Reviewer Checklist

- X The Analytical Documentation Inventory Checklist above is complete.
- X Basic documentation procedures were followed in accordance with DCL SOP XX-DC-004 "Analytical Data Record Keeping."
- X All notebook and logbook pages contain page number, book number, title, and available space for pagination (if required).
- X All notebook and logbook pages were signed and dated by the analyst and reviewer before copying.
- X All copies are legible.
- NA Standard preparation is documented in accordance with DCL SOP XX-DC-019 "Standards Purity, Preparation, Traceability and Verification" or by WR-DC-001 "The Acquisition, Preparation, and use of Radioactive Standard Reference Materials."
- NA Documentation is provided to verify that standard calibration solutions and spiking solutions are traceable to a vendor certificate.

Assembled by: Cynthia Adams 06/06/95 (Signature, Date) Reviewed by: Suzanne W. Bowe 06/16/95 (Signature, Date)

3/95

DataChem Laboratories

Particulates
~~Total Residue~~ CA 06/15/95

Page 107 Book A 021

DCL Set ID	S95-0498-BE
DCL Sample #	EO 3869-70, 72-73, 75-76, 79-80
DCL Acct #	3025
Date Analysis Started	05/25/95
Balance #'s	105930 (Mettler AT 261) For 400mL beakers & 102839 (Sartorius)
LOD	10 mg/L
Method	~~EPA 160.3~~ CA 06/15/95 EPA METHOD 5 from CFR

Sample preparation: Clean beakers were rinsed with Type II water and placed in a 180°C oven for one hour. Beakers were removed and placed in desiccators to cool for 4 ½ hours. Beakers were weighed in grams (the tare weight) and stored in desiccators CA 06/06/95 until ready for use. The water samples EO 3870, 73, 76, 80 were placed in the 400 mL beakers, ~~also~~ CA 06/06/95 placed in a 103°C CA 06/15/95 oven and allowed to evaporated overnight. The rest of the sample and rinsings were added the next day for EO 3873 and EO 3880. ~~All~~ CA 06/06/95 The entire sample was used and each sample container was rinsed CA 06/06/95 three times with the appropriate matrix. The acetone samples EO 3869, 3872, 75, and 79 were poured into the 150 mL beakers and placed in a hood to evaporate. By the end of night shift all the sample and rinsings had been added. The samples were left in the hood till dryness and placed in 103-105°C oven early the next morning by SKP. The blank consists of 100 mL Type II water. The QC/LCS was 100 mL of PS-44K conductivity solution (443 umhos/cm. RICCA LOT E219 EXP 07/95). No acetone blank prepared.

Beaker #	Tare wt.	Sample #'s	wt. #1 (g)	wt. #2 (g)	wt #3 (g)	wt #4 (g)	wt #5 (g)	wt #6 (g)
1	175.0451	EO 3870	175.0426	175.0432	175.0442	175.0431	175.0443	175.0446
2	160.6076 80 CA 06/06/95	EO 3873	160.6144	160.6157	160.6153	NA	NA	NA
3	150.1550	EO 3876	150.1547	150.1550	NA	NA	NA	NA
4	157.6280	EO 3880	157.6270	157.6273	NA	NA	NA	NA
5	83.8590	BLK	83.8592 CA 06/06/95	83.8583	83.8595	83.8607	83.8580	83.8598
6	81.3255	QC/LCS	81.4003	81.4399 CA 06/30/95	81.4003	81.4009	81.3988	81.4007
7	81.6629 CA 06/06/95	EO 3872	81.6798	81.6778	81.6795	81.6798	NA	NA
8	79.8689	EO 3875	79.8778	79.8759	79.8770	79.8772	NA	NA
9	85.6009	EO 3879	85.6040	85.6026	85.6036	85.6046	85.6030	85.6045
10	87.3759	EO 3881 87 CA 06/06/95	87.3777	87.3766	87.3775	87.3779	NA	NA

Recorded by: Cynthia Adams 06/05/95 Date

Reviewed by: Suzanne W. Bowe 06/16/95 Date

DataChem Laboratories

Particulates ~~Total Residue~~ CA 06/15/95 Continued.

Page 108 Book A 021

Beaker #	Tare wt(g)	Sample #'s	wt # 7(g)	wt # 8(g)
5	83.8590	BLK	83.8578	83.8582
6	81.3255	QC/LCS	81.3985	81.3981
9	85.6009	EO 3879	85.6031	85.6028

Since the LCS was in water, the blank was also done in water.
The 400mL beakers were too heavy for the Sartorius balance; this is why two different balances were used. Samples were dryed, cooled, desiccated and weighed until a constant weight is obtained (Two consecutive weighings agree within < 0.5mg of each other). No duplicates were analyzed since all sample was consumed.

Sample Calculations:

Total Residue, mg/L = $\frac{(A-B) \times 1000}{C}$ where A = weight of sample + dish in g
B = weight of dish in g
C = volume of sample in L

Sample volumes obtained by ~~measuring~~ CA 06/06/95 filling sample bottles to customer marked levels and then measuring that volume with a graduated cylinder.

EO 3869	216mL = 0.216L		EO 3875	240 mL = 0.240L	
EO 3870	370mL = 0.370L		EO 3876	349 mL = 0.349L	
EO 3872	154mL = 0.154L		EO 3879	230 mL = 0.230L	
EO 3873	440mL = 0.440L		EO 3880	430 mL = 0.430L	

		calculated	reported
Blank	[(83.8582g ~~85.6028g~~ CA 06/06/95 − 83.8590g) X 1000] ÷ 0.1 L	= −8 mg/L	= ND
QC/LCS	[(81.3981g − 81.3255g) X 1000] ÷ 0.1L	= 726 mg/L	= 730
EO 3869	[(87.3778g − 87.3759g) X 1000] ÷ 0.216L	= 9.3 mg/L	= ND
EO 3870	[(175.0446g − 175.0451g) X 1000] ÷ 0.370L	= −1.4 mg/L	= ND
EO 3872	[(81.6798g − 81.6629g) X 1000] ÷ 0.154L	= 109.7 mg/L	= 110
EO 3873	[(160.6153g − 160.6080g) X 1000] ÷ 0.440L	= 16.6 mg/L	= 20
EO 3875	[(79.8772g − 79.8689g) X 1000] ÷ 0.240L	= 34.6 mg/L	= 30
EO 3876	[(150.1550g − 150.1550g) X 1000] ÷ 0.349L	= 0 mg/L	= ~~NO~~ CA 06/06/95 ND
EO 3879	[(85.6028g − 85.6009g) X 1000] ÷ 0.230L	= 8.3 mg/L	= ND
EO 3880	[(157.6273g − 157.6280g) X 1000] ÷ 0.430L	= −1.63 mg/L	= ND

QC/LCS Recovery = 726/745.6 X 100 = 97.4 %

For QC target see page 6 of Book 2084

000290

Recorded by: Cynthia Alamo 06/05/95 Date

Reviewed by: Suzanne W. Bowe 06/15/95 Date

Project No. 2 DATACHEM
TITLE CONDUCTIVITY, OR SPECIFIC CONDUCTANCE Book No. 2084 LABORATORIES 6

From Page No. NA

METHODS: EPA 120.1, EPA 9050, SOP-PNL-ASTM D1125 (12/91), MODIFIED AS DESCRIBED BELOW.

INSTRUMENT: ORION MODEL 160 CONDUCTIVITY METER. THIS INSTRUMENT CORRECTS FOR CELL CONSTANT AND TEMPERATURE, USING THE FOLLOWING SETTINGS: CELL CONSTANT: 0.609 cm^{-1} USING THE 016010 CELL.
TEMPERATURE: nLF (CORRECTS READING TO 25°C).

PROCEDURE: THE CELL AND TEST TUBE ARE RINSED THREE TIMES WITH EACH SAMPLE OR STANDARD BEFORE READING. FOR ANALYSIS, THE TUBE IS FILLED WITH ENOUGH SAMPLE TO COVER THE ELECTRODE.

QUALITY CONTROL REQUIREMENTS:
EPA 120.1: NONE SPECIFIED.
EPA 9050: CHECK STANDARD/15 SAMPLES, DUPLICATE/10 SAMPLES.
SOP-PNL-ASTM D1125: DUPLICATE/10 SAMPLES.
WHEN NOT OTHERWISE SPECIFIED, BLANKS, DUPLICATES, AND CHECK STANDARDS WILL BE ANALYZED ONCE PER 20 SAMPLES OR ANALYTICAL BATCH, WHICHEVER IS MORE FREQUENT.

STANDARDS: ALL THREE METHODS REQUIRE STANDARDS OF KCL IN WATER. PREPARATION REQUIREMENTS DIFFER SLIGHTLY, BUT THESE DIFFERENCES ARE NEGLIGIBLE CONSIDERING THE REPORTING LIMITS USED. THEREFORE, STANDARDS MADE FOLLOWING ONE METHOD ARE USED FOR ANY OF THE METHODS. ASTM D1125 DESCRIBES A SERIES OF STANDARDS; HOWEVER, THEY ARE USED TO DETERMINE THE CELL CONSTANT, WHICH IS ALREADY KNOWN FOR THIS INSTRUMENT. IN PRACTICE, AT LEAST ONE STANDARD PER RUN IS USED TO CHECK THE SYSTEM. STANDARDS MAY BE MADE AS FOLLOWS:

WATER TEMP.	g KCL*/L SOL'N	µmhos/cm AT 25°C FROM KCL (ADD WATER READING)	METHOD REFERENCE
25°C	0.7456	1413	EPA 120.1, 9050
20±2°C	7.4365	12,856	SOP-PNL-ASTM D1125
20±2°C	0.7440	1408.8	↓
20±2°C	100 mL OF THIS SOL'N. *(DRIED 2 HR. AT 105°C)	146.93	

HOLD TIME AND PRESERVATION: EPA 120.1 AND 9050 RECOMMEND 24 HOURS. HOWEVER, 28 DAYS IS USED AS THE MAXIMUM HOLD TIME, AS SPECIFIED BY THE EPA (SW-846, 3RD ED., REV. 0). WHEN POSSIBLE, SAMPLES ARE ANALYZED WITHIN 7 DAYS. SAMPLES SHOULD BE REFRIGERATED AND PROTECTED FROM GAIN OR LOSS OF DISSOLVED GASES.

To Page No. NA

Witnessed & Understood by me,	Date	Invented by	Date	
Christine R Lui	09/08/92	Recorded by J. I. Rowe	09/03/92	000291

DATA CHEM LABORATORIES
A SORENSON COMPANY

7678

Raw Data
Inorganic Department
Inventory Checklist

- [NA] Analytical protocol sheets
- [NA] Analysis summary sheets
- [NA] Instrument print-outs of the calibration standards and appropriate QC
- [NA] Instrument print-outs of each exposure or instrumental reading of the initial analysis
- [NA] Instrument print-outs of each exposure or instrumental reading of subsequent analyses
- [NA] Chromatograms and/or strip charts
- [NA] Analysis worksheets
- [NA] Muddle sheets or other calculation sheets

Raw Data
Inorganic Department
Reviewer Checklist

- X The Raw Data Inventory Checklist above is complete.
- NA Specific analytical protocols are followed for particular contract requirements.
- NA Print-outs of raw data are legible.
- NA Print-outs are dated and signed as required.
- NA Instrument ID# is recorded on raw data.
- NA Conditions of instrument setup are noted.
- NA Standard and reporting units are listed.
- NA Chromatograms and/or strip charts are labeled correctly.
- NA Cross-outs are performed as required (initialed and dated with an explanation if needed). No correction fluid or correction tape has been used on any raw data.
- NA Dilutions are clearly noted.
- NA All weights, dilution, and volumes used to obtain the reported values are recorded.
- NA Data not used are crossed off and the reason for non-use is explained sufficiently.

000292

Assembled by: Cynthia Adams (Signature) 06/06/95 (Date) Reviewed by: Suzanne W. Bowe (Signature) 06/16/95 (Date)

3/95

Filter # 0445 HEG Task # _____

Date/Time Dessicated 10/25/94 1500 Project # _____

Date/Time/Analyst 10/26/94 1500 Tare Wt. 405.8 mg.
Date/Time/Analyst 10/26/94 1130 Tare Wt. 405.8 mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.

Avg = 405.8

Filter # 0446 HEG Task # _____

Date/Time Dessicated 10/25/94 1500 Project # _____

Date/Time/Analyst 10/26/94 1500 Tare Wt. 406.3 mg.
Date/Time/Analyst 10/27/94 1130 Tare Wt. 406.3 mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.

Avg = 406.3

Filter # 0447 HEG Task # _____

Date/Time Dessicated 10/25/94 1500 Project # _____

Date/Time/Analyst 10/26/94 1500 Tare Wt. 405.6 mg.
Date/Time/Analyst 10/27/94 1130 Tare Wt. 405.7 mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.

Avg = 405.6

Filter # 0448 HEG Task # _____

Date/Time Dessicated 10/25/94 1500 Project # _____

Date/Time/Analyst 10/26/94 1500 Tare Wt. 403.6 mg.
Date/Time/Analyst 10/27/94 1130 Tare Wt. 403.8 mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.

Avg = 403.7

HAYDEN ENVIRONMENTAL GROUP INC.

7678

Filter # 000227 HEG Task # _____

Date/Time Dessicated 3-1-95 1530 Project # _____

Date/Time/Analyst 3/2/95 1545 Tare Wt. 404.8 mg.
Date/Time/Analyst 3/10/95 1000 Tare Wt. 404.9 mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.

Avg = 404.8

Filter # 000228 HEG Task # _____

Date/Time Dessicated 3-1-95 1530 Project # _____

Date/Time/Analyst 3/2/95 1545 Tare Wt. 414.1 mg.
Date/Time/Analyst 3/10/95 1000 Tare Wt. 414.1 mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.

Avg = 414.1

Filter # 000229 HEG Task # _____

Date/Time Dessicated 3-1-95 1530 Project # _____

Date/Time/Analyst 3/2/95 1545 Tare Wt. 409.3 mg.
Date/Time/Analyst 3/10-/95 1000 Tare Wt. 409.4 mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.

Avg = 409.4

Filter # 000230 HEG Task # _____

Date/Time Dessicated 3-1-95 1530 Project # _____

Date/Time/Analyst 3/2/95 1545 Tare Wt. 418.5 mg.
Date/Time/Analyst 3/10/95 1000 Tare Wt. 418.5 mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.
Date/Time/Analyst _____ Tare Wt. _____ mg.

Avg = 418.5

HAYDEN ENVIRONMENTAL GROUP, INC.

7678

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 1 of 2
Part 1 of 1

Date JUN 6 1995
Agency Identification Number S95-0498-AE
Account No. 03025

Hayden Environmental Group, Inc.
561 Congress Park Drive
Dayton, OH 45459
Attention: David Robinson

FAX (513) 438-3000
Telephone (513) 438-3010

Sampling Collection and Shipment

Sampling Site Rel# 1000006737 Date of Collection May 09, 1995

Date Samples Received at Laboratory May 18, 1995

Analysis

Method of Analysis Gravimetric

Date(s) of Analysis June 05, 1995

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Gross Weight grams								
REAG BLK	EO 3868	FILTER	0.407								†
EO-1	EO 3871	FILTER	0.400								†
LO-1	EO 3874	FILTER	0.405								†
FLD BLK	EO 3877	FILTER	0.420								†
Limit of Detection			NA								

† See comment on last page.
ND Parameter not detected.
NR Parameter not requested.
** See comment on last page.
( ) Parameter between LOD and LOQ.

Analyst: Jim L. Gale

Reviewer: Robert L. Quigley

Laboratory Supervisor: Patricia A. Klinger

000295

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

JUN 6 1995

Date _____

Agency Identification Number S95-0498-AE

General Set Comments

The samples in this set were collected on 70 mm glass fiber filters that have no tare weights. The samples were analyzed for gross weight and reported in grams. Note: Glass fiber filters are not recommended for total weight analysis.

Sample Comments

Laboratory Number	-- Comment --
EO 3868	See set comment.
EO 3871	See set comment.
EO 3874	See set comment.
EO 3877	See set comment.

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547 / (801) 266-7700
A Sorenson Company

CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498 * | Reporting Group

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AM 5-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Analysis: AE	Analysis: Particulates	# Bottles
11-May-1995	REAG BLK	EO 3868			FILTER	X		1
10-May-1995	EO-1	EO 3871			FILTER	X		1
9-May-1995	LO-1	EO 3874			FILTER	X		1
11-May-1995	FLD BLK	EO 3877			FILTER	X		1

Received: Date/Time/Signature 5-18-95/1000 Amarylis McGuire

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Amarylis McGuire	5-23-95 1700	WALKIN R-23-1	STORAGE R-23-1
R-23-1 CA	05/25/95 17:00	Cynthia Adams	analysis R-403-1
Cynthia Adams	05/30/95	JR Cole	analysis
JR Cole	5/31/95 1730	RCL Rm 3H DR	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Printed 5/23/1995 16:41

000202

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Sample Work Order

QC Clearance: _____
Project Manager: Keith R. Nicholson
Client: Hayden Environmental Group, Inc.
Account: 03025
Project/Task: COMM-ENV
Date Received: 18-May-1995
Date for Mailing Report: 7-Jun-1995

DCL Root Set ID: S95-0498 *
DCL Lab. Name: EO 3868–EO 3877
Total # Samples: 4
Sample Medium: FILTER

Earliest Sampling Date: 9-May-1995
Preparation Type:

Rep. Group	Minerals Analysis Analytes Requested	Latest Prep. Date	Latest Anal. Date	No. of Samp.	Split ID	Storage Location	Analysis/Prep. Method	Inst.	
AE	~~Particulates~~ total weight			4		Rab lab	GRAV	GRAV	

Special Instructions: Gross wt if no tare wts avail.

Section Manager Approval: [signature] 5/24/95
Patricia A. Klinger — Date

~~it appears that total weights have already been done — see pg 1 Tally sheet. Therefore, the samples were passed onto Rad Chem on 5/30/95~~ [signature]

Use 6K Filter as a blank corr. factor for determining tot. wt. of the other filters.

EO 3868 0.407, 0.407
71 0.400, 0.399
74 0.404, 0.405
77 0.419, 0.420

70mm GFF

QC 3659 (37mm GFF) 0.0747g, 0.0747g

000298

Other Sections Receiving Sample Portions: IW, WA

DataChem Laboratories/ 960 West LeVoy Drive / Salt Lake City, Utah 84123

Form: WO1.04-SWV2.12

PRINTED 5/23/1995 16:49

Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498 * | Reporting Group: AE

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AM 5-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Analysis: Particulates	# Bottles
11-May-1995	REAG BLK	EO 3868			FILTER	X	1
10-May-1995	EO-1	EO 3871			FILTER	X	1
9-May-1995	LO-1	EO 3874			FILTER	X	1
11-May-1995	FLD BLK	EO 3877			FILTER	X	1

Received: Date/Time/Signature 5-18-95/1000 Hmarylt McKewes

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Hmarylt McKewes	5-23-95 1700	WAHUNR-23-1	STORAGE R-23-1

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Printed 5/23/1995 16:41

000299

8292

Fernald Environmental Management Corporation
RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO:
SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFFL. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT 84123

	SAMPLE NUMBER		SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153657	REAG. BLK.	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* PARTICULATES ED 3868	ANALYSIS ED 3881
2	200153662	REAG. BLK.	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3869	
3	200153666	REAG. BLK.	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3870	
4	200153658	EO-1	G.F. FILTER	5/10/95 0930	PETRI DISH	1 x FLTR	NONE	* 3871	3882
5	200153663	EO-1	ACETONE	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3872	
6	200153667	EO-1	D.I. WATER	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3873	
7	200153659	LO-1	G.F. FILTER	5/9/95 1450	PETRI DISH	1 x FLTR	NONE	* 3874	3883
8	200153664	LO-1	ACETONE	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3875	
9	200153668	LO-1	D.I. WATER	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3876	
10	200153660	FLD BLK	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* 3877	3884
11	200153665	FLD BLK	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3879	

CAN SEAL NO. 2970

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOWOMETRY (AS LISTED IN METHOD 114)

* = TOTAL U (CE); GROSS A/B (DE); PARTICULATES (AE BE); GAMMA SCAN (EE)

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN							

5-17-95 COOLER SEALED w/ C-O-C TAPE

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaryllis McGuire
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	*WHITE*	REMAIN WITH SAMPLES
2	*YELLOW*	OFF-SITE LAB
3	*PINK*	FERMCO DATA REVIEW AND REPORTING
4	*BLUE*	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

FS-F-3366 (REV. 12/31/92)

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Fernald Environmental Restoration Management Corporation
RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO:
SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFF. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT. 84123

	SAMPLE NUMBER	SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153669 FLD BLK	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	PARTICULATES *ED 3880	ANALYSIS ED 3884
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

CAN SEAL NO: 2970

LAST ENTRY MNL 5-17-95

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOUOMETRY (AS LISTED IN METHOD 114)

*= TOTAL U; GROSS A/B; PARTICULATES; GAMMA SCAN

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN COOLER SEALED W/C-O-C TAPE MNL 5-17-95							

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amelia Mckewee
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	*WHITE*	REMAIN WITH SAMPLES
2	*YELLOW*	OFF-SITE LAB
3	*PINK*	FERMCO DATA REVIEW AND REPORTING
4	*BLUE*	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

FS-F-3366 (REV. 12/31/92)

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HAYDEN

DEN
MENTAL GROUP, INC.

Post-it® Fax Note 7671	Date 11-21-94	# of pages ▶ 8
To Customer Service	From D. Robinson	
Co./Dept.	Co.	
Phone #	Phone #	
Fax # 801-268-9992	Fax #	

November 21, 1994

Customer Service
DataChem Laboratories
960 West Levoy Drive
Salt Lake City, UT 84123

Subject: Laboratory Services / Subcontracting
FERMCO RFP # PES-80706

Dear Sir or Madam:

We are submitting a proposal in response to the above request and would like to receive a quotation from your firm for laboratory services. Your firm's name was given to us by FERMCO as a qualified subcontract laboratory.

We request a firm, fixed cost proposal to provide analytical support for the scope of work included with this letter. To summarize the analytical scope of work:

1. Provide analysis by USEPA Method 5 (40CFR Part 61) for three field samples from Source EP8-013 and one field sample from EP11-002. Filter, probe rinse (Acetone), and backhalf (H_2O) samples will be included as well as quality control samples (see below). Samples are to be analyzed for total particulate.

2. Following particulate analysis, the fractions for each field sample shall be composited and analyzed to total activity and uranium per EPA Method 114, and according to the protocol shown in Table 2 of the scope of work.

3. Proposed cost shall include cost to analyze and report results for all field samples and quality control samples. Quality control samples to be included in the sample sets:

   - Performance evaluation sample, to be supplied by FERMCO, and analyzed for total Uranium in the same manner as the composites (Item 6, scope of work).

   - Two field blank acetone rinse samples, two field blank filters, two laboratory filter blanks (supplied by Hayden), laboratory matrix spike/spike duplicate, and two container blanks.

F01033L94

TALLY SHEET

7678

RELEASE #: 1000006737 (Can 1 of 1)
PO #: 95-H053 (DCL-SLC)
DATE SHIPPED: 17-May-95
MATERIAL: Periodic Confirmatory Measurements – Filters, Acetone, Water

ANALYSIS: Total U; Gross A/B; Particulates; Gamma Scan

Composite Sample Number	Lot Number	Sample Container Size	AnaLis/ FACTS Number	Gross Weight lbs.	Tare Weight lbs.	Net Weight lbs.
REAG. BLK.	W050-725-P047-6737	PETRI DISH	200153657	0.106	0.088	0.018
REAG. BLK.	W050-725-P047-6737	1L PLST	200153662	0.511	0.141	0.370
REAG. BLK.	W050-725-P047-6737	1L PLST	200153666	0.943	0.141	0.802
EO-1	W050-725-P047-6737	PETRI DISH	200153658	0.106	0.088	0.018
EO-1	W050-725-P047-6737	1L PLST	200153663	0.423	0.141	0.282
EO-1	W050-725-P047-6737	1L PLST	200153667	1.128	0.141	0.987
LO-1	W050-725-P047-6737	PETRI DISH	200153659	0.101	0.088	0.013
LO-1	W050-725-P047-6737	1L PLST	200153664	0.542	0.141	0.401
LO-1	W050-725-P047-6737	1L PLST	200153668	0.934	0.141	0.793
FLD. BLK.	W050-725-P047-6737	PETRI DISH	200153660	0.106	0.088	0.018
FLD. BLK.	W050-725-P047-6737	1L PLST	200153665	0.476	0.141	0.335
FLD. BLK.	W050-725-P047-6737	1L PLST	200153669	1.163	0.141	1.022
				6.537	1.480	5.057

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FEMP	RADIOLOGICAL SURVEY REPORT COVER SHEET		SURVEY NUMBER: 95-05-G1-194	
DATE: 5-17-95	LOCATION: Lab	RCT: BVDunlap / D. Wessel	BADGE: 10148	PAGE: 1 OF 4
TIME: 0700	LEVEL: 580-	SIGNATURE: BVDunlap / D. Wessel		
WORK PERMIT NUMBER: N/A		REVIEWER:	BADGE:	
RWP NUMBER:		SIGNATURE:	DATE:	

ATTACHMENTS:		
3	Pg 2 MURF	
	Pg 3 & 4 Teletec Printout	

REASON FOR SURVEY	Sample surveyed for release to go offsite. Gross area smears taken. Direct frisk inside drum
	Release # ~~6666~~ 6737
	N/A

SUMMARY:

N/A

No.	Distribution of Copies
1	Radiological Records
2	Files

Supervisor Notified	Time	Date	Notified by:
			000304

MATERIAL UNRESTRICTED RELEASE FORM

SURVEY 95-05-G11-194

DATE: 5-17-95 | LOCATION: Lab | RCT: B.V. Dunlap / D. Wessel | SIGNATURE: B.V. Dunlap / D. Wessel | BADGE #: 10148 / 721

MODEL	SERIAL NUMBER	TYPE ALPHA or BETA/GAMMA	CAL/CHK DUE DATE	BKGD. (CPM)	CF	MDA (DPM)	PMP/PERFORMANCE TEST YES	PMP/PERFORMANCE TEST NO
LB5100	7	α, β, γ	6-95	.2 / 1.72	.289 / 418	18.2 / 19.8	X	
M-3	77101	β, γ	10-95	60	30	3K	X	
			N					
				A				

TIME	RCT INIT'S	MATERIAL DESCRIPTION	RELEASE CRITERIA SURF or VOL	RESULTS ALPHA REMOVABLE	RESULTS ALPHA FIXED + REM	RESULTS BETA/GAMMA REMOVABLE	RESULTS BETA/GAMMA FIXED + REM	RELEASE JUSTIFICATION	RECIPIENT	MATERIAL RELEASE EVALUATOR BADGE # and SIGNATURE (1)
0700	bv/DW	2001536667	SURF	-0 *	N/A	0 *	< MDCP		Doug Slack	
		2001536668		2 *		4 *	< MDCP			
		2001536669		2 *		4 *	< MDCP			
		2001536666		-0 *		4 *	< MDCP			
		2001536662		-0 *		0 *	< MDCP			
		2001536665		-0 *		-1 *	< MDCP			
		2001536664		2 *		-1 *	< MDCP			
		2001536663		2 *		8 *	< MDCP			N/A
		2001536658 (AF)		-0 *		0 *	< MDCP	*		
		2001536659 (AF)		5 *		-1 *	< MDCP	*		
		2001536660 (AF)		-0 *		0 *	< MDCP	*		
		2001536657 (AF)		2 *		0 *	< MDCP	*		
		10 gal Can		-0 *		0 *	< MDCP			
					N					
						A				

* M:ESH:BCRC; 93 613

Comments: Release # 6737
(AF) = Air Filter

REVIEW:	INITIAL	DATE

(1) Material Release Evaluator approval required in accordance with RC-DPT-019, (Release of Materials from the Fernald Environmental Management Project), if any of the following conditions exist:

a. Material has areas which are inaccessible for proper survey.
b. Process knowledge is used to support the release decision.
c. Material must be evaluated for the potential of contamination beneath any coating applied while the material was in the Controlled Area.
d. Material must be evaluated for the potential for any volume or in-depth radioactivity within the material matrix.
e. Special case items are being released, such as radioactive consumer products, industrial sources, etc.
f. Material has detectable activity present and the activity is below the contamination limits listed in Attachment A of RC-DPT-019.

000305

ED MAY 17, 1995 08:57:36 7678
ROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1 MIN)

AMPLE UMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	08:58:45
2	1	4	2	4	09:00:06
3	1	4	2	4	09:01:27
4	0	4	-0	4	09:02:48
5	0	2	-0	0	09:04:10
6	0	1	-0	-1	09:05:30
7	1	1	2	-1	09:06:51
8	1	6	2	8	09:08:13
9	0	2	-0	0	09:09:34
10	2	1	5	-1	09:10:55
11	0	2	-0	0	09:12:16
12	1	2	2	0	09:13:37
~~12~~	~~0~~	~~5~~	~~0~~	~~6~~	~~09:14:58~~ bad 5-17-95

PERATION COMPLETE

FEMP RADIOLOGICAL S... REPORT pg 3 of 4
SURVEY # 9505-G11-194 ... 5-17-95
BY Dunlap/D. Hesse/ BUR L. / D. Wenzl

GROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.16MIN)

SAMPLE NUMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	10:05:55

OPERATION COMPLETE

008307

FEMP RADIOLOGICAL SURVEY REPORT pg 4 of 4

SURVEY # 95-05-G11-194 DATED 5/15/95

	(name)	(signature)
RCT:	BU Dunlap / D Wheeler	BU Dunlap / D Wheeler
REVIEWER:		

8492

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ection: ER 26 05/17/19 95

RG93
IIDE 26

ACETONE, 3, UN1090, II

POTENTIAL HAZARDS

RE OR EXPLOSION

lammable/combustible material; may be ignited by heat, sparks or flames.
apors may travel to a source of ignition and flash back.
ontainer may explode in heat of fire.
apor explosion hazard indoors, outdoors or in sewers.
unoff to sewer may create fire or explosion hazard.

ALTH HAZARDS

ay be poisonous if inhaled or absorbed through skin.
apors may cause dizziness or suffocation.
ontact may irritate or burn skin and eyes.
ire may produce irritating or poisonous gases.
unoff from fire control or dilution water may cause pollution.

EMERGENCY ACTION

eep unnecessary people away; isolate hazard area and deny entry.
tay upwind; keep out of low areas.
ositive pressure self-contained breathing apparatus (SCBA) and
structural firefighters' protective clothing will provide limited
protection.
olate for 1/2 mile in all directions if tank, rail car or tank truck is
involved in fire.
ALL Emergency Response Telephone Number on Shipping Paper first.
If Shipping Paper not available or no answer, CALL CHEMTREC AT
1-800-424-9300.
f water pollution occurs, notify the appropriate authorities.

E

all Fires: Dry chemical, CO2, water spray or alcohol-resistant foam.
not use dry chemical extinguishers to control fires involving
itromethane or nitroethane.
rge Fires: Water spray, fog or alcohol-resistant foam.
ve container from fire area if you can do it without risk.
ply cooling water to sides of containers that are exposed to flames
ntil well after fire is out. Stay away from ends of tanks.
r massive fire in cargo area, use unmanned hose holder or monitor
ozzles; if this is impossible, withdraw from area and let fire burn.
thdraw immediately in case of rising sound from venting safety device
r any discoloration of tank due to fire.

LL OR LEAK

rt off ignition sources; no flares, smoking or flames in hazard area.
op leak if you can do it without risk.
ter spray may reduce vapor; but it may not prevent ignition in closed
paces.

000308

Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal.
Large Spills: Dike far ahead of liquid spill for later disposal.

FIRST AID

Move victim to fresh air and call emergency medical care; if not breathing, give artificial respiration; if breathing is difficult, give oxygen.
In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water.
Remove and isolate contaminated clothing and shoes at the site.

SURVEY RECORD

Date: 5-18-95 Survey Type: Meter: ✓ Smear: ✓ Leak Test: ___ Approved: ___ RSO Date: ___

By: MM

Survey Instrument:

Manufacturer: LUDLUM
Model Number 19
Serial Number: ~~159~~ 102872
Calib. Date: 9-30-94

FERMCO ~~MX-0199~~ IH. 5-18-95

BACKGROUND <0.011 mR/hr

Scintillation Counter:

Manufacturer: Ludlum
Model Number: 2929
Lab Instrument No.: 108227

Sample Count Time - 1 min.

	ALPHA	BETA
BLANK (CPM)	0.08	65.03
COUNTER EFFICIENCY (%)	0.3517	0.4083

Mixed Waste Lab Survey Location or Sealed Source Number	Instrument Reading	Disc Smears/Leak Test Swipes						Remarks
		Alpha			Beta			
		CPM	DPM	µCi	CPM	DPM	µCi	
M095 0341 OUTSIDE	<0.012 mR/hr	0			68			<0.011 mR/hr @ 1 METER
INSIDE	<0.012	0			63			
SAMPLE	<0.012	0			71			

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DATACHEM LABORATORIES COOLER RECEIPT CHECKLIST

1. Client Name: FERMCO
2. Project/Task/Site: REL. #: 6737
3. Time/Date of Receipt: 1000 5-18-95
4. # Coolers Received: 1
5. Custody Seals?: (Circle) Present/Absent* Intact/Broken*
   Tamper Evident: Yes/No
6. Condition of Coolers: Acceptable/Unacceptable
7. Comments on Cooler Condition (#6): 1 DRUM
8. Ice Present: Yes/No* Frozen/Melted
   Comments: RAD CHEM ONLY
9. Temp Control: Present/Not Included
10. Location Temp Taken: Control/Between Samples
11. Taken by: (Signature) 5-18-95 MARK MENDENHALL (Printed Name) 5-18-95 1130 (Date/Time)
12. Are all temperatures within project specific guidelines? Yes/No*

*CONTACT PROJECT MANAGER. COMPLETE INCIDENT REPORT.

Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp
1	MC95 0341	20 °C	6	MC95	°C	11	MC95	°C
2	MC95	°C	7	MC95	°C	12	MC95	°C
3	MC95	°C	8	MC95	°C	13	MC95	°C
4	MC95	°C	9	MC95	°C	14	MC95	°C
5	MC95	°C	10	MC95	°C	15	MC95	°C

SAMPLE RECEIVING INCIDENT REPORT

Client Sample #'s Affected: _____ DCL Set I.D: _____

DCL Sample #'s Affected: _____

- ☐ Cooler Temps out of Range
- ☐ Missing Cooler
- ☐ Broken/Leaking Samples
- ☐ Missing Samples/Bottles
- ☐ Missing Paperwork
- ☐ Incorrect Preservation
- ☐ Low Sample Volume
- ☐ Incorrect Bottle Type
- ☐ Missing/Incorrect Bottle Labels
- ☐ Other

BRIEFLY DESCRIBE PROBLEM:

Delivered to: _____ Project Manager

Delivered by: _____ Signature/Date/Time

RESPONSE REQUIRED WITHIN 24 HOURS

PROJECT MANAGER'S COMMENTS:

Returned to Sample Receipt by: _____ (Date/Time/Signature)

Accepted for Sample Receipt by: _____ (Date/Time/Signature)

8/95

Project Protocol Worksheet

Client	Hayden Environmental
Project	FERMCO Emissions Tests
Project Manager	Keith Nicholson
Account Number	3025
Project Duration	1 Month

Date 5/17/95

Mailby Days 20 days

Sample Stream	Project/ Method Type	QC Requirements			Preparation Requirements			Reporting Requirements			LOD/MDL/IDL Requirements		
595	EPA Clean Air	**Inorganic**			**Inorganic**			Full CLP SOW			CLP SOW		
		Blank			CLP SOW			CLP Forms Only			SW-846 Rev.		
		LCS			SW-846 Rev.			CLP Disk			EPA Clean H2O		
		MS			USAEC 1990			RLIMS	X		USAEC 1990		
		MSD			USAEC 1993			Raw Data			USAEC 1993		
		MD			Microwave			Custom Disk			NIOSH		
		USAEC			Hotplate			ARF			DCL SOP		
		MSA			DCL SOP			QC Forms (specify below)	X		Client specified		
		Tracer			Other			Case Narrative	X		Other	x	Method
		Other			**Radiochemistry**			Calibration data	X		**QC Limits**		
		Radiochemistry			Hotplate leach			Continuing Cal. data			Method	X	
		Blank	X		Muffle furnace			Reporting Basis			Statistical		
		LCS	X		Total dissolution			IRDMIS			Client specified		
		MS	X	U only	Microwave			# of TICs					
		MSD	X	U only	DCL SOP			Counting Error (1 or 2 sigma)					
		Tracer			Other	X	Mthd. 114	TPU					
		Other	X	MD	**Organic**			RPD					
		Organic			CLP SOW			RER					
		Blank			SW-846 Rev.			Send raw data	X				
		LCS			USAEC 1990			Store raw data					
		MS/MSD			USAEC 1993			Other					
		USAEC			Sonication								
		Surrogate			Soxhlet								
		Other			Continuous								
					Separatory funnel								
					DCL SOP								
					Other								

David Robinson

Batch samples with other sets? (•) yes ( ) no

MS/MD/MSD sample identified? ( ) yes (•) no

Specific spiking levels identified? (•) Method ( ) DCL SOP ( ) other (see comments)

Comments: Analyze for U by EPA method 114 A-5, and by laser phosphoremetry - report results separately. Desired detection limits are 50 ug/sample for colorimetric U, and 1 ug/sample for phosphoremetry. Analyze for gamma, alpha, and beta for method 114 G-1, A-4 and B-4. Desired detection limits are 10 pCi for alpha and beta, a 20 pCi/sample as Cs-137 for gamma. Liquid samples and filters are to be analyzed for total particulates prior to other analyses. The client will specify how any compositing of liquid samples is to be conducted.

000312

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DataChem Laboratories

PROJECT RESOURCE UTILIZATION SUMMARY

Date: 5/31/85

DCL Reference #: 585-458-AE

Company/Agency Name: Hayden Envir.

Analytes/Method: GRAV.

LABOR

Date	Personnel	Total Hours
5/31/85	[illegible]	1.5
6/6/85	R. [illegible]	15 min.

SUPPLIES

Item	Quantity

EQUIPMENT USAGE

Major Instrumentation	Total Hours
Sartorius Basic	.2

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DATA CHEM LABORATORIES

A SORENSON COMPANY

DataChem ID # 595-0498-AE

Analyte TOT. WT.

Filter Type GFF

Analyst [illegible]

Instrument Saturn R100

Method Gravimetric

Date Analyzed 5/31/95

Results in milligrams

Sample Number	No. 1	No. 2	No. 3	Average	Range	Range/Avg	LOD
EO 3868	0.407	0.407		0.407	0.000	Ø	NA
QL 39659	0.0747g	0.0747g					

Checked by [illegible] 6/6/95

PAK 6/6/95

000314

SALT LAKE CITY OFFICE
960 WEST LeVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
801 266-7700, FAX 801 268-9992

CINCINNATI OFFICE
4388 GLENDALE-MILFORD ROAD
CINCINNATI, OHIO 45242-3706
513 733-5336, FAX 513 733-5347

BALTIMORE OFFICE
10 JULIET LANE, SUITE #203
BALTIMORE, MARYLAND 21236-1220
410 494-3612, FAX 410 529-5355

RICHLAND OFFICE
313 WELLSIAN WAY
RICHLAND, WASHINGTON 99352-4116
509 943-5858, FAX 509 943-5654

LEADING ANALYTICAL CHEMISTRY INTO THE 21ST CENTURY℠

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DATA CHEM LABORATORIES
A Sorenson Company

COVER FORM (TYPE I)
SINGLE METHOD ANALYSES

SUMMARY INFORMATION

Form RLIMS63M-V1.0
06229511295286
Page 1

G954S00V

Date Reported.....: JUN 23 1995

Date Printed.....: 22-JUN-95 11:29
DCL Client Group..: S95-0498-FE

Client Ref Number.: Not Provided
Release Number....: Not Provided

Analysis Method...: EPA 114 A-5

Hayden Environmental Group, Inc.
Attention: David Robinson
561 Congress Park Drive
Dayton, OH 45459

Client Sample ID	Lab Sample ID
BL-57496-1	BL-57496-1
QC-57496-1	QC-57496-1
REAG BLK	EO 3881
EO-1	EO 3882
EO-1	EO 3882MD
LO-1	EO 3883
FLD BLK	EO 3884

000315

This report is 14 total pages.

Analyst: Robert B. Copenhafer

Reviewer: Norman K. Christensen

Laboratory Supervisor: Norman K. Christensen

001

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FAX (801) 268-9992

DATA CHEM LABORATORIES
A Sorenson Company

FORM H (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE GROUP COMMENTS

G954S00V

Date Printed.....: 22-JUN-95 11:29
DCL Client Group..: S95-0498-FE

lient Name.....: Hayden Environmental Group, Inc.

Release Number....: Not Provided

ample Group Comments

Possible positive interferences could have been in the extract of sample
) 3882. The developed color of this sample was brownish-yellow, versus clear,
right yellow of the standards.

eneral Information

The DCL QC Database maintains all numerical figures which are input from the pertinent data
ource. These data have not been rounded to significant figures nor have they been moisture corrected.
eports generated from the system, however, list data which have been rounded to the number of
ignificant figures requested by the client or deemed appropriate for the method. This may create
inor discrepancies between data which appear on the QC Summary Forms (Forms B-G) and those that would
e calculated from rounded analytical results. Additionally, if a moisture correction is performed,
ifferences will be observed between the QC data and the surrogate data reported on Form A (or other
eport forms) and corresponding data reported on QC Summary Forms. In these cases, the Form A will
ndicate the "Report Basis" as well as the moisture value used for making the correction.

ymbol Definitions

ND - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry).
B - For organic analysis the qualifier indicates that this analyte was found in the method blank.
For inorganic analysis the qualifier signifies the value is between the IDL and PQL.
J - The qualifier indicates that the value is between the MDL and the PQL. It is also
used for indicating an estimated value for tentatively identified compounds in mass
spectrometry where a 1:1 response is assumed.

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06229511295286
Page 3

S955N03C

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: BL-57496-1
DCL Sample Name...: BL-57496-1

ient Name.....: Hayden Environmental Group, Inc.
ient Ref Number....: Not Provided
mpling Site.....: Not Applicable
lease Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: Not Applicable
Reporting Units...: ug/sample
☐As Received ☐Dried

te Received.....: Not Applicable
L Client Group.....: S95-0498-FE

L Preparation Group: Not Applicable
te Prepared.....: 20-JUN-95 00:00
eparation Method...: EPA 114 A-5
iquot Weight/Volume: Not Applicable
t Weight/Volume....: Not Required

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

alytical Results

alyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
anium	20-JUN-95 00:00		ND		1	50

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06229511295286
Page 4

S955N03D

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: QC-57496-1
DCL Sample Name...: QC-57496-1

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: Not Applicable
Reporting Units...: ug/sample
☐As Received ☐Dried

Date Received.....: Not Applicable
DCL Client Group.....: S95-0498-FE

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Uranium	20-JUN-95 00:00		2100		1	50

Sample Comments

Target = 2250 ug/sample

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954S01F

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: REAG BLK |153657,62,66
DCL Sample Name...: EO 3881

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: ug/sample
Report Basis.....: ☐ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-FE

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Uranium	20-JUN-95 00:00		ND		1	50

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06229511295286
Page 6

S954S01G

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: EO-1 |153658,63,67
DCL Sample Name...: EO 3882

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: 10-MAY-95 00:00
Reporting Units...: ug/sample
Report Basis.....: ☐As Received ☐Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-FE

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Uranium	20-JUN-95 00:00		1500		1	50

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S955N03F

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: EO-1 |153658,63,67
DCL Sample Name...: EO 3882MD

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: Not Provided
Reporting Units...: ug/sample
Report Basis.....: ☐As Received ☐Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-FE

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Uranium	20-JUN-95 00:00		1500		1	50

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06229511295286
Page 8

S954S01H

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: LO-1 |153659,64,68
DCL Sample Name...: EO 3883

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: 09-MAY-95 00:00
Reporting Units...: ug/sample
Report Basis.....: ☐As Received ☐Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-FE

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Uranium	20-JUN-95 00:00		ND		1	50

000322

008

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954S01J

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-FE

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

Date Printed.....: 22-JUN-95 11:29
Client Sample Name: FLD BLK |153660,65,69
DCL Sample Name...: EO 3884

Matrix.....: F/LIQ
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: ug/sample
Report Basis.....: ☐ As Received ☐ Dried

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	MDL	Result	Flag	Dilution	CRDL
Uranium	20-JUN-95 00:00		ND		1	50

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DATA CHEM LABORATORIES
A Sorenson Company

FORM B (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
LABORATORY CONTROL SAMPLE (LCS)

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: F/LIQ
Reporting Units.....: ug/sample

LCS Source.....:

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5

Date Printed.....: 22-JUN-95 11:29
DCL Sample Name...: QC-57496-1

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Target	Result	Percent Recovery	QC Limits	QC Flag
Uranium	20-JUN-95 00:00	2250	2100	92.2		

NOTE: This data is from the LIMS not the QC database. (2073.8)

Sample Comments

Target = 2250 ug/sample

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DATA CHEM LABORATORIES
A Sorenson Company

FORM C (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
BLANK SAMPLE

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: F/LIQ
Reporting Units.....: ug/sample

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5

Date Printed.....: 22-JUN-95 11:29
DCL Sample Name...: BL-57496-1

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Result	CRDL
Uranium	20-JUN-95 00:00	ND	50

NOTE: This data is from the LIMS not the QC database.

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DATA CHEM LABORATORIES
A Sorenson Company

FORM E (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX DUPLICATE SAMPLE

Form RLIMS63E-V1.0
06229511295286
Page 12
S955N03F

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: F/LIQ
Reporting Units.....: ug/sample

DCL Preparation Group: Not Applicable
Date Prepared.....: 20-JUN-95 00:00
Preparation Method...: EPA 114 A-5

Date Printed.....: 22-JUN-95 11:29
DCL Sample Name...: EO 3882MD

DCL Analysis Group: G955N00Q
Analysis Method...: EPA 114 A-5
Instrument Type...: VIS SPEC
Instrument ID.....: 100-20
Column Type.....: Not Applicable

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Duplicate Result	Mean	Range	RPD	QC Limits	QC Flag
Uranium	20-JUN-95 00:00	1500	1500	1500	0.000	0.00		

NOTE: This data is from the LIMS not the QC database.

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DATA CHEM
LABORATORIES
A SORENSON COMPANY

Case Narrative

Method: EPA 114 A-5
Analysis: Uranium
Preparation Method: EPA 114 A-5
LIMS Group #: G955N00Q
DCL Set ID: S95-0498-FE

Client: Hayden Environmental Group
Account: 3025
Matrix: F/LIQ

General Set Information: Samples were analyzed for uranium according to method EPA 114 A-5 using visible spectrophotometry.

Method Summary: The method was based on the measurement of a uranium-dibenzoylmethane complex. Absorbance was measured at 415nm. Uranium was first oxidized to uranium (VI) by potassium permanganate. An acid-deficient aluminum nitrate, tetrapropylammonium nitrate solution acted as a salting solution to quantitatively extract the uranium into a methyl isobutyl ketone (MIBK) solvent. The organic solvent was then scrubbed with an acid-deficient solution of aluminum nitrate containing tartrate, oxalate, and (ethylenedinitrilo)tetraacetic acid. Ferrous sulfamate was then added to remove interfering ions. Dibenzoylmethane, in a mixture of ethyl alcohol and pyridine, was added to the MIBK phase to develop the color.

Sample Preparation: The samples were prepared as composites of glass fiber filter samples and liquid samples.

Dilution(s): None required.

Method and Sample QC data: The method blank (BL-57496-1) was below the LOD. The LCS (QC-57496-1) recovery was 92.2%.

MD Analysis: The RPD between EO 3882 and EO 3882MD was 0.00.

Instrument QC: The ICV recovery was 91.8%, and the ICB was below the LOD. All other calibration verifications and blanks met method specified acceptance criteria

Flagging Codes: None.

NC/CAR: No NC/CARs were required for this set.

Miscellaneous Comments: The developed color of sample EO 3882 was brownish-yellow, and the developed color of the standards was a clear, bright yellow. It is possible that there were positive interferences in the sample.

Robert B. Copenhafer 6/22/95

Robert B. Copenhafer Date

DATA CHEM LABORATORIES
A SORENSON COMPANY

Datapackage Table of Contents

Information pertaining to this datapackage is divided into the four categories listed below (see colored divider sheets for an inventory list of each category). If an item on the inventory is not applicable, an "NA" is placed in the corresponding check box. A Case Narrative immediately precedes this Table of Contents and contains pertinent information about this datapackage.

Analytical Forms . . . . . Yellow
Sample Tracking Documentation . . . . . Pink
Analytical Documentation . . . . . Blue
Raw Data . . . . . Green

♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦

Analytical Forms
Inventory Checklist

[X] Case Narrative

[N/A] IRDMIS	[N/A] Commercial Forms
[ ] Data Review and Approval Form	[ ] Analytical or Environmental Report Form
[ ] IRDMIS Reports	[ ] Set Comments
[ ] GC/MS TICs	[X] Applicable QC Sheets

[X] RLIMS Forms	
[X] Cover Form	[N/A] Matrix Spike/Matrix Spike Duplicate Sample (Form F)
[X] Sample Group Comments (Form H)	[N/A] Surrogate Summary (Form G)
[X] Sample Analysis Data Sheet (Form A)	[N/A] Initial Calibration Form
[X] Laboratory Control Sample (Form B)	[N/A] Continuing Calibration Form
[X] Blank Sample (Form C)	[N/A] Serial Dilution Form
[N/A] Matrix Spike Sample (Form D)	[N/A] Endrin Breakdown or BFB/DFTPP GC/MS Tuning Form
[X] Matrix Duplicate Sample (Form E)	[N/A] Internal Standard Form

Analytical Forms
Reviewer Checklist

X The Analytical Forms Inventory Checklist above is complete.

X The Case Narrative was completed in accordance with procedures in DCL SOP XX-DC-020, "Datapackage Preparation and Validation."

X Only the correct report forms are used (IRDMIS or Commercial Forms or RLIMS Forms).

X All fields on the report forms are complete with the correct information, including signatures.

X Results for all samples are reported per client request.

X Units, methods, and dates are correct.

X Sample and/or set comments are complete.

000329

Assembled by: Signature 6/22/95 Date Reviewed by: Norman K. Christensen Signature 6/22/95 Date

DATA CHEM LABORATORIES
A SORENSON COMPANY

7678

Sample Tracking Documentation
Inventory Checklist

- [x] LIMS Grouping Reports
- [x] DataChem Laboratories (DCL) Chain-of-Custody Record
- [x] DCL Sample Work Order
- [N/A] Copy of numbered Nonconformance/Corrective Action Report (NC/CAR)
- [N/A] Copy of Client-Related Problem Report (CPR)

Sample Tracking Documentation
Reviewer Checklist

X The Sample Tracking Documentation Inventory Checklist above is complete.

X DCL Chain-of-Custody Record provides signatures for the sample portion reported in this data package.

X DCL Chain-of-Custody Record was completed in accordance with procedures in DCL SOP XX-DC-006 "Chain-of-Custody and Laboratory Tracking."

X Methods specified on the Sample Work Order were performed or an explanation for deviations is provided.

X Special instructions on the Sample Work Order were followed.

X Project Management instructions on the Project Protocol Worksheet were followed.

X Client's requests were met or an explanation is provided in the Case Narrative.

NA NC/CAR and/or CPR were completed in accordance with procedures in DCL SOP QC-DC-006 "Nonconformance/Corrective Action Report (NC/CAR) Procedures."

000330

Assembled by: [signature] 6/21/95 Reviewed by: Norman K. Christensen 6/22/95
Signature Date Signature Date

DataChem Laboratories
LIMS - Sample Master System
Analysis Group Report

Date: 21-JUN-1995 10:01
User: COPENHAFER

RLIMS15-V1.1

Analysis Run Name: G955N00Q

Group ID: G955N00Q

Samples: 7

Pos	Laboratory Sample Name	Field Sample Name	Laboratory Sample ID	Laboratory Group Name	Accnt. Number
1	BL-57496-1	BL-57496-1	S955N03C	S95-0498-FE	03025
2	QC-57496-1	QC-57496-1	S955N03D	S95-0498-FE	03025
3	EO 3881	REAG BLK	S954S01F	S95-0498-FE	03025
4	EO 3882	EO-1	S954S01G	S95-0498-FE	03025
5	EO 3882MD	EO-1	S955N03F	S95-0498-FE	03025
6	EO 3883	LO-1	S954S01H	S95-0498-FE	03025
7	EO 3884	FLD BLK	S954S01J	S95-0498-FE	03025

----- END OF LISTING -----

Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498 *

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AMG 5-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Reporting Group / Analysis: CE Total Uranium	DE Gross Alpha	DE Gross Beta	EE Gamma scan	# Bottles
11-May-1995	REAG BLK	EO 3881			F/LIQ	X	X	X	X	1
10-May-1995	EO-1	EO 3882			F/LIQ	X	X	X	X	1
9-May-1995	LO-1	EO 3883			F/LIQ	X	X	X	X	1
11-May-1995	FLD BLK	EO 3884			F/LIQ	X	X	X	X	1

Received: Date/Time/Signature 5-18-95 / 1000 / Amaryllis McClure

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Amaryllis McClure	06/07/95 1110	Dave Reddick	Prep Total U, α, β, γ α
Dave Reddick	06/07/95 1530	Max A. Barnett	γ Scan
Max A. Barnett	6/8/95 1600	Dave Reddick	Total U
Dave Reddick	6/9/95 0830	Robin Gulley	gross α/β
Robin Gulley	6/12/95 1600	Bobby Copenhafer	U anal.
Bobby Copenhafer	6/12/95 1605	R-84-1 RSC 6/12/95	Storage/R-84-1
R-84-1 RSC 6/20/95	6-20-95 0800	Bobby Copenhafer	U anal.

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: Uranium | Lab Notebook No.: 2950

Prepared/Analyzed by: RSC | Date/Time: 6-20-95 / 0800

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Bobby Copenhafer	6-20-95 0800	Bobby Copenhafer	U anal.

Check box if there is a continuation page ☐

Printed 5/22/1995 14:05

Form OFC1.01-SWV2.30

8292

7678

Sample Work Order

QC Clearance: _____

Project Manager: Keith R. Nicholson Bill Hayes

Client: Hayden Environmental Group, Inc.

Account: 03025

Project/Task: COMM-ENV

Date Received: 18-May-1995

Date for Mailing Report: 7-Jun-1995 per

DCL Root Set ID: S95-0498-FE

DCL Lab. Name: EO 3881–EO 3884

Total # Samples: 4

Sample Medium: F/LIQ

Earliest Sampling Date: 9-May-1995

Preparation Type:

Rep. Group	Ion Chromatography/UV_VIS Analytes Requested	Latest Prep. Date	Latest Anal. Date	No. of Samp.	Split ID	Storage Location	Analysis/Prep. Method	Inst.	
FE	Uranium			4		Rad Lab	EPA 114 A-5	~~COLOR~~ VIS SPEC	

Special Instructions: See NKC for method.

Section Manager Approval: NKC 6/1/95

Norman K. Christensen Date

000333

Other Sections Receiving Sample Portions: IM, IW, WA

DataChem Laboratories/ 960 West LeVoy Drive / Salt Lake City, Utah 84123

Form: WO1.04-SWV2.12

PRINTED 5/25/1995 11:46

Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498-FE | Reporting Group: FE

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AM 5-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix						Analysis: Uranium									# Bottles
11-May-1995	REAG BLK	EO 3881			F/LIQ						X									1
10-May-1995	EO-1	EO 3882			F/LIQ						X									1
9-May-1995	LO-1	EO 3883			F/LIQ						X									1
11-May-1995	FLD BLK	EO 3884			F/LIQ						X									1

Received: Date/Time/Signature 5-18-95 / 1000 / Amaryll S McGuire

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Amaryll S McGuire			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

000334

26728

Check box if there is a continuation page ☐

Printed 5/25/1995 11:46

Form: COFC1.01-SWV2.30

RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFFL. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT 84123

	SAMPLE NUMBER		SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153657	REAG. BLK.	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* PARTICULATES ED 3868	ANALYSIS ED 3881
2	200153662	REAG. BLK.	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3869 CAN SEAL NO. 2970	
3	200153666	REAG. BLK.	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3870	
4	200153658	EO-1	G.F. FILTER	5/10/95 0930	PETRI DISH	1 x FLTR	NONE	* 3871	3882
5	200153663	EO-1	ACETONE	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3872	
6	200153667	EO-1	D.I. WATER	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3873	
7	200153659	LO-1	G.F. FILTER	5/9/95 1450	PETRI DISH	1 x FLTR	NONE	* 3874	3883
8	200153664	LO-1	ACETONE	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3875	
9	200153668	LO-1	D.I. WATER	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3876	
10	200153660	FLD BLK	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* 3877	3884
11	200153665	FLD BLK	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3879	

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOUOMETRY (AS LISTED IN METHOD 114)

* = TOTAL U (CE); GROSS A/B (DE); PARTICULATES (AE BE); GAMMA SCAN (EE)

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN w/ line 5-17-95 COOLER	SEALED	w/ C-O-C	TAPE				

RELINQUISHED BY	DATE	TIME	RECEIVED DATE	RECEIVED TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaryllis McGuire
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	*WHITE*	REMAIN WITH SAMPLES
2	*YELLOW*	OFF-SITE LAB
3	*PINK*	FERMCO DATA REVIEW AND REPORTING
4	*BLUE*	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

FS-F-3366 (REV. 12/31/92)

00030

8292

RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO.: SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFFL. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT 84123

	SAMPLE NUMBER	SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153657 REAG. BLK.	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* PARTICULATES ED 3868	ANALYSIS ED 3881
2	200153662 REAG. BLK.	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3869	
3	200153666 REAG. BLK.	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3870	
4	200153658 EO-1	G.F. FILTER	5/10/95 0930	PETRI DISH	1 x FLTR	NONE	* 3871	3882
5	200153663 EO-1	ACETONE	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3872	
6	200153667 EO-1	D.I. WATER	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3873	
7	200153659 LO-1	G.F. FILTER	5/9/95 1450	PETRI DISH	1 x FLTR	NONE	* 3874	3883
8	200153664 LO-1	ACETONE	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3875	
9	200153668 LO-1	D.I. WATER	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3876	
10	200153660 FLD BLK	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* 3877	3884
11	200153665 FLD BLK	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3879	

CAN SEAL NO. 2970

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORIMITY OR FLOUOMETRY (AS LISTED IN METHOD 114) * = TOTAL U; GROSS A/B; PARTICULATES; GAMMA SCAN.

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN ~~COOLER~~ 5-17-95	SEALED	w/ C-O-C	TAPE				

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Angela McElwee
3.			3.		

NO.		DISTRIBUTION OF COPIES
1	WHITE	REMAIN WITH SAMPLES
2	YELLOW	OFF-SITE LAB
3	PINK	FERMCO DATA REVIEW AND REPORTING
4	BLUE	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

FS-F-3366 (REV. 12/31/92)

8292

RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFF. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT. 84123

	SAMPLE NUMBER	SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153669 FLD BLK	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	~~PARTICULATES~~ *ED 38880	~~ANALYSIS~~ ED 38884
2							CAN SEAL NO: 2970	
3								
4								
5								
6								
7								
8								
9								
10								
11								

LAST ENTRY MMC 5-17-95

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOUOMETRY (AS LISTED IN METHOD 114)

*= TOTAL U; GROSS A/B; PARTICULATES; GAMMA SCAN

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:

MMC 5-17-95 CAN COOLER SEALED W/C-O-C TAPE

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaly Lis McKewee
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	*WHITE*	REMAIN WITH SAMPLES
2	*YELLOW*	OFF-SITE LAB
3	*PINK*	FERMCO DATA REVIEW AND REPORTING
4	*BLUE*	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

FS-F-3366 (REV. 12/31/92)

8792

RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO: SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFF. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT. 84123

	SAMPLE NUMBER	SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	20053669 FLD BLK	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	*ED 3,880	ED 38884
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

CAN SEAL NO. 2970

LAST ENTRY mm 5-17-95

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOUOMETRY (AS LISTED IN METHOD 114)

*= TOTAL U; GROSS A/B; PARTICULATES; GAMMA SCAN

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN COOLER		SEALED W/C-O-C TAPE					

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Annie Hillsmacklowe
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	WHITE	REMAIN WITH SAMPLES
2	YELLOW	OFF-SITE LAB
3	PINK	FERMCO DATA REVIEW AND REPORTING
4	BLUE	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

FS-F-3368 (REV. 12/31/92)

00338

8192

7678

HAYDEN

DEN
NTAL GROUP, INC.

Post-it® Fax Note 7671	Date 11-21-94	# of pages ▸ 8
To Customer Service	From D. Robinson	
Co./Dept.	Co.	
Phone #	Phone #	
Fax # 801-268-9992	Fax #	

November 21, 1994

Customer Service
DataChem Laboratories
960 West Levoy Drive
Salt Lake City, UT 84123

Subject: **Laboratory Services / Subcontracting**
FERMCO RFP # PES-80706

Dear Sir or Madam:

We are submitting a proposal in response to the above request and would like to receive a quotation from your firm for laboratory services. Your firm's name was given to us by FERMCO as a qualified subcontract laboratory.

We request a firm, fixed cost proposal to provide analytical support for the scope of work included with this letter. To summarize the analytical scope of work:

1. Provide analysis by USEPA Method 5 (40CFR Part 61) for three field samples from Source EP8-013 and one field sample from EP11-002. Filter, probe rinse (Acetone), and backhalf (H_2O) samples will be included as well as quality control samples (see below). Samples are to be analyzed for total particulate.

2. Following particulate analysis, the fractions for each field sample shall be composited and analyzed to total activity and uranium per EPA Method 114, and according to the protocol shown in Table 2 of the scope of work.

3. Proposed cost shall include cost to analyze and report results for all field samples and quality control samples. Quality control samples to be included in the sample sets:

   - Performance evaluation sample, to be supplied by FERMCO, and analyzed for total Uranium in the same manner as the composites (Item 6, scope of work).

   - Two field blank acetone rinse samples, two field blank filters, two laboratory filter blanks (supplied by Hayden), laboratory matrix spike/spike duplicate, and two container blanks.

000339

F010331.94

TALLY SHEET

7678

RELEASE #: 1000006737 (Can 1 of 1)
PO #: 95-H053 (DCL-SLC)
DATE SHIPPED: 17-May-95
MATERIAL: Periodic Confirmatory Measurements - Filters, Acetone, Water

ANALYSIS: Total U; Gross A/B; Particulates; Gamma Scan

Composite Sample Number	Lot Number	Sample Container Size	AnaLis/ FACTS Number	Gross Weight lbs.	Tare Weight lbs.	Net Weight lbs.
REAG. BLK.	W050-725-P047-6737	PETRI DISH	200153657	0.106	0.088	0.018
REAG. BLK.	W050-725-P047-6737	1L PLST	200153662	0.511	0.141	0.370
REAG. BLK.	W050-725-P047-6737	1L PLST	200153666	0.943	0.141	0.802
EO-1	W050-725-P047-6737	PETRI DISH	200153658	0.106	0.088	0.018
EO-1	W050-725-P047-6737	1L PLST	200153663	0.423	0.141	0.282
EO-1	W050-725-P047-6737	1L PLST	200153667	1.128	0.141	0.987
LO-1	W050-725-P047-6737	PETRI DISH	200153659	0.101	0.088	0.013
LO-1	W050-725-P047-6737	1L PLST	200153664	0.542	0.141	0.401
LO-1	W050-725-P047-6737	1L PLST	200153668	0.934	0.141	0.793
FLD. BLK.	W050-725-P047-6737	PETRI DISH	200153660	0.106	0.088	0.018
FLD. BLK.	W050-725-P047-6737	1L PLST	200153665	0.476	0.141	0.335
FLD. BLK.	W050-725-P047-6737	1L PLST	200153669	1.163	0.141	1.022
				6.537	1.480	5.057

7678

FEMP	RADIOLOGICAL SURVEY REPORT COVER SHEET		SURVEY NUMBER: 95-05-G11-194	
DATE: 5-17-95	LOCATION: Lab	RCT: BVDunlap / D. Wessel	BADGE: 10148	PAGE: 1 OF 4
TIME: 0700	LEVEL: 580-	SIGNATURE: BVDunlap / D. Wessel		
WORK PERMIT NUMBER: N/A		REVIEWER:	BADGE:	
RWP NUMBER:		SIGNATURE:	DATE:	

ATTACHMENTS:		
3	Pg 2 MURF	
	Pg 3 & 4 Teunelco Printout	

REASON FOR SURVEY	
	Sample surveyed for release to go offsite. Gross area smears taken. Direct frisk inside drum
	Release # ~~6666~~ 6737 N/A

SUMMARY:

N/A

No.	Distribution of Copies
1	Radiological Records
2	Files

Supervisor Notified	Time	Date	Notified by:

000341

FS-F-1993-0 (REV. 04/18/95)

MATERIAL UNRESTRICTED RELEASE FORM

SURVEY 95-05-G11-194

DATE:	LOCATION:	RCT:	SIGNATURE:	BADGE #:
5-17-95	Lab	B.V. Dunlap / D. Wessel	B.V. Dunlap / D. Wessel	10148 / 721

MODEL	SERIAL NUMBER	TYPE ALPHA or BETA/GAMMA	CAL DUE DATE	BKGD. (CPM)	CF	MDA (DPM)	INSP/PERFORMANCE TEST YES	INSP/PERFORMANCE TEST NO
LB5100	7	α, β, γ	6-95	.2 / 1.72	.289 / 4.18	18.2 / 19.8	X	
M-3	77101	β, γ	10-95	60	30	3K	X	
			N					
				A				

TIME	RCT INIT	MATERIAL DESCRIPTION	RELEASE CRITERIA SURF or VOL	RESULTS ALPHA REMOVABLE	RESULTS ALPHA FIXED + REM	RESULTS β/γ BETA/GAMMA REMOVABLE	RESULTS β/γ BETA/GAMMA FIXED + REM	RELEASE JUSTIFICATION	RECIPIENT	MATERIAL RELEASE EVALUATOR BADGE # and SIGNATURE (1)
0700	bv/DW	200153667	SURF	-0 *	N/A	0 *	<MDCR		Doug Stack	
		200153668		2 *		4 *	<MDCR			
		200153669		2 *		4 *	<MDCR			
		200153666		-0 *		4 *	<MDCR			
		200153662		-0 *		0 *	<MDCR			
		200153665		-0 *		-1 *	<MDCR			
		200153664		2 *		-1 *	<MDCR			
		200153663		2 *		8 *	<MDCR			
		200153658 (AF)		-0 *		0 *	<MDCR	*		N/A
		200153659 (AF)		5 *		-1 *	<MDCR	*		
		200153660 (AF)		-0 *		0 *	<MDCR	*		
		200153657 (AF)		2 *		0 *	<MDCR	*		
		10 gal Can		-0 *		0 *	<MDCR			
					N					
						A				

* M:ESH:RCRC: 93 613

Comments: Release # 6737
(AF) = Air Filter

REVIEW:	INITIAL	DATE

(1) Material Release Evaluator approval required in accordance with RC-DPT-019, (Release of Materials from the Fernald Environmental Management Project), if any of the following conditions exist:

a. Material has areas which are inaccessible for proper survey.
b. Process knowledge is used to support the release decision.
c. Material must be evaluated for the potential of contamination beneath any coating applied while the material was in the Controlled Area.
d. Material must be evaluated for the potential for any volume or in-depth radioactivity within the material matrix.
e. Special case items are being released, such as radioactive consumer products, industrial sources, etc.
f. Material has detectable activity present and the activity is below the contamination limits listed in Attachment A of RC-DPT-019.

PS-F-3915 (06/22/94) equil.

000342

8292

VED MAY 17, 1995 08:57:36

GROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1 MIN)

7678

SAMPLE NUMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	08:58:45
2	1	4	2	4	09:00:06
3	1	4	2	4	09:01:27
4	0	4	-0	4	09:02:48
5	0	2	-0	0	09:04:10
6	0	1	-0	-1	09:05:30
7	1	1	2	-1	09:06:51
8	1	6	2	8	09:08:13
9	0	2	-0	0	09:09:34
10	2	1	5	-1	09:10:55
11	0	2	-0	0	09:12:16
12	1	2	2	0	09:13:37
~~12~~	~~0~~	~~5~~	~~0~~	~~6~~	~~09:14:58~~ bad 5-17-95

OPERATION COMPLETE

FEMP RADIOLOGICAL SURVEY REPORT pg 3 of 4
SURVEY # 9505-GH-194 DATE 5-17-95
(PRINT) (SIGN)
BY Dunlap/D. Wesse/ BUR Lp/D Wenell

000343

WED MAY 17, 1995 10:04:45 WE
GROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1 MIN)

SAMPLE NUMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	10:05:55

OPERATION COMPLETE OF

000344

FEMP RADIOLOGICAL SURVEY REPORT pg 4 of 4
SURVEY # 95-05-G11-194 DATED 5/17/95
(name) (signature)
RCT: BV Durlad / D Wesel / BV Durlad / D Wesel
REVIEWER:

8292

ACETONE, 3, UN1090, II

POTENTIAL HAZARDS

FIRE OR EXPLOSION

Flammable/combustible material; may be ignited by heat, sparks or flames.
Vapors may travel to a source of ignition and flash back.
Container may explode in heat of fire.
Vapor explosion hazard indoors, outdoors or in sewers.
Runoff to sewer may create fire or explosion hazard.

HEALTH HAZARDS

May be poisonous if inhaled or absorbed through skin.
Vapors may cause dizziness or suffocation.
Contact may irritate or burn skin and eyes.
Fire may produce irritating or poisonous gases.
Runoff from fire control or dilution water may cause pollution.

EMERGENCY ACTION

Keep unnecessary people away; isolate hazard area and deny entry.
Stay upwind; keep out of low areas.
Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.
Isolate for 1/2 mile in all directions if tank, rail car or tank truck is involved in fire.
CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, CALL CHEMTREC AT 1-800-424-9300.
If water pollution occurs, notify the appropriate authorities.

FIRE

Small Fires: Dry chemical, CO_2, water spray or alcohol-resistant foam.
Do not use dry chemical extinguishers to control fires involving nitromethane or nitroethane.
Large Fires: Water spray, fog or alcohol-resistant foam.
Move container from fire area if you can do it without risk.
Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.
For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

SPILL OR LEAK

Shut off ignition sources; no flares, smoking or flames in hazard area.
Stop leak if you can do it without risk.
Water spray may reduce vapor; but it may not prevent ignition in closed spaces.

Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal.
Large Spills: Dike far ahead of liquid spill for later disposal.

FIRST AID

Move victim to fresh air and call emergency medical care; if not breathing, give artificial respiration; if breathing is difficult, give oxygen.
In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water.
Remove and isolate contaminated clothing and shoes at the site.

SURVEY RECORD

Date: 5-18-95

By: MM

Survey Type: Meter: ✓ Smear: ✓ Leak Test: ____

Approved: ____ RSO

Date: ____

Survey Instrument:

Manufacturer: LUDLUM
Model Number 19
Serial Number: ~~[illegible]~~ 102872
Calib. Date: 9-30-94

FERMCO ~~MX-0199~~ IH. mm 5-18-95

BACKGROUND <0.011 mR/hr

Scintillation Counter:

Manufacturer: Ludlum
Model Number: 2929
Lab Instrument No.: 108227

Sample Count Time - 1 min.

	ALPHA	BETA
BLANK (CPM)	0.08	69.03
COUNTER EFFICIENCY (%)	12.3517	0.4083

Mixed Waste Lab Survey Location or Sealed Source Number	Instrument Reading	Disc Smears/Leak Test Swipes						Remarks
		Alpha			Beta			
		CPM	DPM	µCi	CPM	DPM	µCi	
MC95 1241 OUTSIDE	<0.012 mR/hr	0			68			<0.011 mR/hr @ 1 METER
INSIDE	<0.012	0			63			
SAMPLE	<0.012	0			71			

0003427

82928

DATACHEM LABORATORIES COOLER RECEIPT CHECKLIST

7678

1. Client Name: FERMCO
2. Project/Task/Site: REL. #: 6737
3. Time/Date of Receipt: 1000 5-18-95
4. # Coolers Received: 1
5. Custody Seals?: (Circle) Present/Absent* Intact/Broken*
   Tamper Evident: Yes/No
6. Condition of Coolers: Acceptable/Unacceptable
7. Comments on Cooler Condition (#6): 1 DRUM
8. Ice Present: Yes/No* Frozen/Melted
   Comments: RAD CHEM ONLY
9. Temp Control: Present/Not Included
10. Location Temp Taken: Control/Between Samples
11. Taken by: (Signature) MARK MENDENHALL (Printed Name) 5-18-95 (Date/Time) 5-18-95 1130
12. Are all temperatures within project specific guidelines? Yes/No*

*CONTACT PROJECT MANAGER. COMPLETE INCIDENT REPORT.

Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp
1	MC95 0341	20 °C	6	MC95	°C	11	MC95	°C
2	MC95	°C	7	MC95	°C	12	MC95	°C
3	MC95	°C	8	MC95	°C	13	MC95	°C
4	MC95	°C	9	MC95	°C	14	MC95	°C
5	MC95	°C	10	MC95	°C	15	MC95	°C

SAMPLE RECEIVING INCIDENT REPORT

Client Sample #'s Affected: _____ DCL Set I.D: _____

DCL Sample #'s Affected: _____

- ☐ Cooler Temps out of Range
- ☐ Missing Cooler
- ☐ Broken/Leaking Samples
- ☐ Missing Samples/Bottles
- ☐ Missing Paperwork
- ☐ Incorrect Preservation
- ☐ Low Sample Volume
- ☐ Incorrect Bottle Type
- ☐ Missing/Incorrect Bottle Labels
- ☐ Other

BRIEFLY DESCRIBE PROBLEM:

Delivered to: _____ Project Manager

Delivered by: _____ Signature/Date/Time

RESPONSE REQUIRED WITHIN 24 HOURS

PROJECT MANAGER'S COMMENTS:

Returned to Sample Receipt by: _____ (Date/Time/Signature)

Accepted for Sample Receipt by: _____ (Date/Time/Signature)

8/95

Project Protocol Worksheet

Client	Hayden Environmental
Project	FERMCO Emissions Tests
Project Manager	Keith Nicholson
Account Number	3025
Project Duration	1 Month

Date 5/17/95

Mailby Days 20 days

Sample Stream	Project/ Method Type	QC Requirements			Preparation Requirements			Reporting Requirements		LOD/MDL/IDL Requirements		
S95	EPA Clean Air	**Inorganic**			**Inorganic**			Full CLP SOW		CLP SOW		
		Blank			CLP SOW			CLP Forms Only		SW-846 Rev.		
		LCS			SW-846 Rev.			CLP Disk		EPA Clean H2O		
		MS			USAEC 1990			RLIMS	X	USAEC 1990		
		MSD			USAEC 1993			Raw Data		USAEC 1993		
		MD			Microwave			Custom Disk		NIOSH		
		USAEC			Hotplate			ARF		DCL SOP		
		MSA			DCL SOP			QC Forms (specify below)	X	Client specified		
		Tracer			Other			Case Narrative	X	Other	x	Method
		Other			**Radiochemistry**			Calibration data	X	**QC Limits**		
		Radiochemistry			Hotplate leach			Continuing Cal. data		Method	X	
		Blank	X		Muffle furnace			Reporting Basis		Statistical		
		LCS	X		Total dissolution			IRDMIS		Client specified		
		MS	X	U only	Microwave			# of TICs				
		MSD	X	U only	DCL SOP			Counting Error (1 or 2 sigma)				
		Tracer			Other	X	Mthd. 114	TPU				
		Other	X	MD	**Organic**			RPD				
		Organic			CLP SOW			RER				
		Blank			SW-846 Rev.			Send raw data	X			
		LCS			USAEC 1990			Store raw data				
		MS/MSD			USAEC 1993			Other				
		USAEC			Sonication							
		Surrogate			Soxhlet							
		Other			Continuous							
					Separatory funnel							
					DCL SOP							
					Other							

David Robinson

Batch samples with other sets?	(●) yes	( ) no
MS/MD/MSD sample identified?	( ) yes	(●) no
Specific spiking levels identified?	(●) Method	
	( ) DCL SOP	
	( ) other (see comments)	

Comments: Analyze for U by EPA method 114 A-5, and by laser phosphoremetry - report results separately. Desired detection limits are 50 ug/sample for colorimetric U, and 1 ug/sample for phosphoremetry. Analyze for gamma, alpha, and beta for method 114 G-1, A-4 and B-4. Desired detection limits are 10 pCi for alpha and beta, a 20 pCi/sample as Cs-137 for gamma. Liquid samples and filters are to be analyzed for total particulates prior to other analyses. The client will specify how any compositing of liquid samples is to be conducted.

000349

7678

Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498-FE | Reporting Group: FE

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AM 5-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Analysis: Uranium	# Bottles
11-May-1995	REAG BLK	EO 3881			F/LIQ	X	1
10-May-1995	EO-1	EO 3882			F/LIQ	X	1
9-May-1995	LO-1	EO 3883			F/LIQ	X	1
11-May-1995	FLD BLK	EO 3884			F/LIQ	X	1

Received: Date/Time/Signature 5-18-95 / 1000 / Amaryllis McGuire

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Amaryllis McGuire			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

000350

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Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Printed 5/25/1995 11:46

DATA CHEM

SAMPLE DISPOSAL CONTROL FORM

ataChem Laboratories ID Number: S95-0498-FE Analyst: HSC

ate of Analysis: 6/20/95 Analyzed For: Uranium

DISPOSAL CLASSIFICATION†

ample Number	Not Hazardous	Hazardous	Code‡	Explanation
EO 3881	[✓]	[ ]		
EO 3882	[✓]	[ ]		* Analysis done by lab. Chem. group
EO 3883	[✓]	[ ]		confirms sample as not Hazardous.
EO 3884	[✓]	[ ]		
	[ ]	[ ]		
	[ ]	[ ]		
	[ ]	[ ]		
	[ ]	[ ]		

A sample (either solid or liquid) is to be classified as hazardous waste upon disposal if it exhibits any of the following conditions:

Code (if classified as hazardous)

1. If it or its extract contains levels of the contaminants ≥ those specified in Table 1.
2. If it contains significant levels of organic solvents.
3. If it is corrosive (pH ≤ 2 or ≥ 12.5).
4. If it is reactive or explosive.
5. If it contains ≥ 50ppm PCB.
6. If it is determined by the chemist or manager that the sample is hazardous, poisonous, or toxic (e.g., some of the pesticide formulations). If this code is used, an explanation must be provided.

TABLE 1 TCLP levels.

EPA HW No.	Contaminant	Limit (mg/l)
D004	Arsenic	5.000
D005	Barium	100.0
D018	Benzene	0.5
D006	Cadmium	1.0
D019	Carbon Tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0
D022	Chloroform	6.0
D007	Chromium	5.0
D023	o-Cresol	200.0*
D024	m-Cresol	200.0*
D025	p-Cresol	200.0*
D026	Cresol	200.0*
D016	2,4-D	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D012	Endrin	0.02
D031	Heptachlor	0.008
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D008	Lead	5.0
D013	Lindane	0.4
D009	Mercury	0.2
D014	Methoxychlor	10.0
D035	Methyl Ethyl Ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D010	Selenium	1.0
D011	Silver	5.0
D039	Tetrachloroethylene	0.7
D015	Toxaphene	0.5
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D017	2,4,5-TP Silvex	1.0
D043	Vinyl Chloride	0.2

* If the concentrations for o-, m-, and p-cresol can not be differentiated, the total cresol concentration is used.

The constituents in bold are the original EP toxicity constituents.

000351

DataChem Laboratories

PROJECT RESOURCE UTILIZATION SUMMARY

Date: 6/21/95

DCL Reference #: S95-0498-FE

Company/Agency Name: Hayden Environmental Group, Inc

Analytes/Method: Uranium / ASTM E 318-91

LABOR

Date	Personnel	Total Hours
6/19/95	RSC	9
6/20/95	RSC	10
6/20/95	SJS	8
6/21/95	RSC	8.5
6/22/95	RSC	1.5

SUPPLIES

Item	Quantity
Evergreen Disp Centrifuge tubes	25

EQUIPMENT USAGE

Major Instrumentation	Total Hours
Hitachi 100-20	1.5

DATA CHEM
LABORATORIES
A SORENSON COMPANY

Case Narrative

Analysis:	Gross Alpha/ Gross Beta	**Client:**	Hayden Environmental Group
		Account:	3025
Preparation SOP#:	WR-DC-200	**Matrix:**	Filter/ Liquid
Analysis SOP#:	WR-EP-300		
DCL Set ID's:	S95-0498-DE		

General Set Information: The above sample set consisted of four filter samples with additional liquid material that was added upon completion of the dissolution of the filter.

Method Summary: The sample was ashed in a muffle furnace, wet ashed using hydrofluoric acid followed by ashing with concentrated nitric acid. At this point, the additional liquid sample material was added and the combined volume was reduced to approximately 3 mL. The sample was transferred into a PMP container and diluted to 50 mL. A 10 mL aliquot was removed to prepare the sample for analysis. The sample was evaporated and transferred to a flamed, acid-washed, stainless steel planchet and dried under infra-red lamps. After cooling, the prepared sample was counted on a gas proportional counter.

Sample Preparation: The samples were analyzed according to procedure with no exceptions.

Quality Control Data:

Laboratory Control Sample: One LCS was analyzed within this data set and met all QC requirements.

Blank: One blank was analyzed within this data set and was within QC requirements.

Matrix Spike/ Matrix Spike Duplicate: One matrix spike and matrix spike duplicate was analyzed within this data set. The recovery for the matrix spike was 105% and was flagged by QC. Upon review, it was determined that this result was acceptable.

This report is 13 total pages.

Instrument QC: All initial and continued calibrations were within QC requirements.

NC/CAR: No NC/ CARs were required for this lot.

Miscellaneous Comments: The contractual control limits of 10 pCi/ sample for alpha and beta were met for all samples.

Robin Lully 6/14/95

Robin Lully Date

7678

DATA CHEM LABORATORIES
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COVER FORM (TYPE I)
SINGLE METHOD ANALYSES

SUMMARY INFORMATION

Form RLIMS63M-V1.0
06149509532299
Page 1

G954P01Y

Date Reported.....:

Date Printed.....: 14-JUN-95 09:53
DCL Client Group..: S95-0498-DE

Client Ref Number.: Not Provided
Release Number....: Not Provided

Analysis Method...: WR-EP-300

Hayden Environmental Group, Inc.
Attention: David Robinson
561 Congress Park Drive
Dayton, OH 45459

Client Sample ID	Lab Sample ID
BL-57147-1	BL-57147-1
QC-57147-1	QC-57147-1
REAG BLK	EO 3881
EO-1	EO 3882
LO-1	EO 3883
FLD BLK	EO 3884

000355

Robin Lully
Analyst: Robin D. Lully

Christy Webster
Reviewer:

Cl Sabell
Laboratory Supervisor:

003

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FAX (801) 268-9992

DATA CHEM LABORATORIES
A Sorenson Company

FORM H (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE GROUP COMMENTS

G954P01Y

Date Printed.....: 14-JUN-95 09:53
DCL Client Group..: S95-0498-DE

Client Name.....: Hayden Environmental Group, Inc.

Release Number....: Not Provided

General Information

The DCL QC Database maintains all numerical figures which are input from the pertinent data source. These data have not been rounded to significant figures nor have they been moisture corrected. Reports generated from the system, however, list data which have been rounded to the number of significant figures requested by the client or deemed appropriate for the method. This may create minor discrepancies between data which appear on the QC Summary Forms (Forms B-G) and those that would be calculated from rounded analytical results. Additionally, if a moisture correction is performed, differences will be observed between the QC data and the surrogate data reported on Form A (or other report forms) and corresponding data reported on QC Summary Forms. In these cases, the Form A will indicate the "Report Basis" as well as the moisture value used for making the correction.

Symbol Definitions

ND - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry).
B - For organic analysis the qualifier indicates that this analyte was found in the method blank. For inorganic analysis the qualifier signifies the value is between the IDL and PQL.
J - The qualifier indicates that the value is between the MDL and the PQL. It is also used for indicating an estimated value for tentatively identified compounds in mass spectrometry where a 1:1 response is assumed.

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S955802Q

Date Printed.....: 14-JUN-95 11:29
Client Sample Name: BL-57147-1
DCL Sample Name...: BL-57147-1

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: Not Applicable
Reporting Units...: pCi/sample
☐As Received ☐Dried

Date Received.....: Not Applicable
DCL Client Group.....: S95-0498-DE

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-DC-200
Aliquot Weight/Volume: 350.0 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000-A2
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Detection Limit	Result±Error ±TPU Error	Flag	Dilution	CRDL
Gross Alpha	09-JUN-95 00:00	1.2E-1	1.6E-1±8.1E-2 ±8.7E-2		1	10
Gross Beta	09-JUN-95 00:00	3.4E-1	9.9E-1±2.1E-1 ±2.9E-1		1	10

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06149509532299
Page 4

S955802R

Date Printed.....: 14-JUN-95 09:53
Client Sample Name: QC-57147-1
DCL Sample Name...: QC-57147-1

:lient Name.....: Hayden Environmental Group, Inc.
:lient Ref Number....: Not Provided
;ampling Site.....: Not Applicable
ıelease Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: Not Applicable
Reporting Units...: pCi/~~L~~ Sample
☐As Received ☐Dried

ıate Received.....: Not Applicable
ıCL Client Group.....: S95-0498-DE

ıCL Preparation Group: G955802X
ıate Prepared.....: 09-JUN-95 00:00
reparation Method...: WR-DC-200
liquot Weight/Volume: 350.0 mL
et Weight/Volume....: Not Required

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000-A3
Column Type.....: Not Applicable

nalytical Results

nalyte	Date Analyzed	Detection Limit	Result±Error ±TPU Error	Flag	Dilution	CRDL
ross Alpha	09-JUN-95 00:00	1.8E-1	7.0E1±1.3E0 ±1.4E1		1	10
ross Beta	09-JUN-95 00:00	3.8E-1	5.6E1±1.0E0 ±1.1E1		1	10

R. Gilly
6/14/95

000358

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S954P067

Date Printed.....: 14-JUN-95 09:53
Client Sample Name: REAG BLK |153657,62,66
DCL Sample Name...: EO 3881

Client Name.....: Hayden Environmental Group, Inc.
Client Ref Number....: Not Provided
Sampling Site.....: Rel# 1000006737
Release Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: pCi/~~Lit~~ Sample
Report Basis.....: ☒ As Received ☐ Dried

Date Received.....: 18-MAY-95 00:00
DCL Client Group.....: S95-0498-DE

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-DC-200
Aliquot Weight/Volume: 10.0 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000-A2
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Detection Limit	Result±Error ±TPU Error	Flag	Dilution	CRDL
Gross Alpha	09-JUN-95 00:00	5.6E-1	5.1E0±6.8E-1 ±1.2E0		5	10
Gross Beta	09-JUN-95 00:00	8.9E-1	5.5E0±7.3E-1 ±1.3E0		5	10

R. Jolly
6/14/95

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06149509532299
Page 6

S954P068

Date Printed.....: 14-JUN-95 09:53
Client Sample Name: EO-1 |153658,63,67
DCL Sample Name...: EO 3882

:lient Name.....: Hayden Environmental Group, Inc.
:lient Ref Number....: Not Provided
:ampling Site.....: Rel# 1000006737
:elease Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: 10-MAY-95 00:00
Reporting Units...: pCi/~~Lit~~ Sample
Report Basis.....: ☒ As Received ☐ Dried

:ate Received.....: 18-MAY-95 00:00
:CL Client Group.....: S95-0498-DE

:CL Preparation Group: G955802X
:ate Prepared.....: 09-JUN-95 00:00
:reparation Method...: WR-DC-200
:liquot Weight/Volume: 10.0 mL
:et Weight/Volume....: Not Required

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000-A3
Column Type.....: Not Applicable

nalytical Results

nalyte	Date Analyzed	Detection Limit	Result±Error ±TPU Error	Flag	Dilution	CRDL
ross Alpha	09-JUN-95 00:00	8.6E-1	4.2E0±7.8E-1 ±1.1E0		5	10
ross Beta	09-JUN-95 00:00	9.9E-1	2.0E0±7.4E-1 ±8.4E-1		5	10

R. Tully
6/14/95

ES

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06149509532299
Page 7

S954P069

Date Printed.....: 14-JUN-95 09:53
Client Sample Name: LO-1 |153659,64,68
DCL Sample Name...: EO 3883

lient Name.....: Hayden Environmental Group, Inc.
lient Ref Number....: Not Provided
ampling Site.....: Rel# 1000006737
elease Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: 09-MAY-95 00:00
Reporting Units...: pCi/~~Lit~~ Sample
Report Basis.....: ☒ As Received ☐ Dried

ate Received.....: 18-MAY-95 00:00
CL Client Group.....: S95-0498-DE

CL Preparation Group: G955802X
ate Prepared.....: 09-JUN-95 00:00
eparation Method...: WR-DC-200
liquot Weight/Volume: 10.0 mL
t Weight/Volume....: Not Required

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000 - A4
Column Type.....: Not Applicable

nalytical Results

alyte	Date Analyzed	Detection Limit	Result±Error ±TPU Error	Flag	Dilution	CRDL
oss Alpha	09-JUN-95 00:00	7.7E-1	6.5E0±8.4E-1 ±1.5E0		5	10
oss Beta	09-JUN-95 00:00	1.1E0	2.9E0±8.3E-1 ±1.0E0		5	10

R. Jolley
6/14/95

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.0
06149509532299
Page 8

S954P06B

Date Printed.....: 14-JUN-95 09:53
Client Sample Name: FLD BLK |153660,65,69
DCL Sample Name...: EO 3884

lient Name.....: Hayden Environmental Group, Inc.
lient Ref Number....: Not Provided
ampling Site.....: Rel# 1000006737
elease Number.....: Not Provided

Matrix.....: F/LIQ
Date Sampled.....: 11-MAY-95 00:00
Reporting Units...: pCi/~~Lit~~ Sample
Report Basis.....: ☒ As Received ☐ Dried

ate Received.....: 18-MAY-95 00:00
CL Client Group.....: S95-0498-DE

CL Preparation Group: G955802X
ate Prepared.....: 09-JUN-95 00:00
reparation Method...: WR-DC-200
liquot Weight/Volume: 10.0 mL
et Weight/Volume....: Not Required

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000-B2
Column Type.....: Not Applicable

nalytical Results

nalyte	Date Analyzed	Detection Limit	Result±Error ±TPU Error	Flag	Dilution	CRDL
oss Alpha	09-JUN-95 00:00	7.1E-1	5.3E0±7.6E-1 ±1.3E0		5	10
oss Beta	09-JUN-95 00:00	8.6E-1	4.4E0±6.9E-1 ±1.1E0		5	10

R. Jolly
6/14/95

DATA CHEM LABORATORIES
A Sorenson Company

FORM B (TYPE I)
SINGLE METHOD ANALYSES

Form RLIMS63B-V1.0
06149511185670
Page 3

S955802R

QUALITY CONTROL DATA SHEET
LABORATORY CONTROL SAMPLE (LCS)

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: F/LIQ
Reporting Units.....: pCi/~~L~~ Sample

LCS Source.....: Pu-239 ISL 2/15
Sr-90 ISL 2/25

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-DC-200

Date Printed.....: 14-JUN-95 11:18
DCL Sample Name...: QC-57147-1

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000
Column Type.....: Not Applicable

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Target	Result	Percent Recovery	QC Limits	QC Flag
Gross Alpha	09-JUN-95 00:00	68.8	69.7	101.	40.0/160.	
Gross Beta	09-JUN-95 00:00	50.4	55.8	111.	50.0/150.	

R. Jolly
6/14/95

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DATA CHEM LABORATORIES
A Sorenson Company

FORM C (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
BLANK SAMPLE

Form RLIMS63C-V1.0
06149511185670
Page 4

S955802Q

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: F/LIQ
Reporting Units.....: pCi/sample

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-DC-200

Date Printed.....: 14-JUN-95 11:18
DCL Sample Name...: BL-57147-1

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: HT-1000
Column Type.....: Not Applicable

Analytical Results

Analyte	Date Analyzed	Result	CRDL
Gross Alpha	09-JUN-95 00:00	0.163	1
Gross Beta	09-JUN-95 00:00	0.992	4

R. Gulley
6/14/95

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DATA CHEM LABORATORIES
A Sorenson Company

FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

Form RLIMS63F-V1.0
06149511185670
Page 5

S954Y05L

Client Name.....: Hayden Environmental Group, Inc.
Release Number.....: Not Provided

Matrix.....: WATER
Reporting Units.....: pCi/L Sample

DCL Preparation Group: G955802X
Date Prepared.....: 09-JUN-95 00:00
Preparation Method...: WR-EP-300

Date Printed.....: 14-JUN-95 11:18
DCL Sample Name...: MXS 03847MS

DCL Analysis Group: G955802X
Analysis Method...: WR-EP-300
Instrument Type...: GPC
Instrument ID.....: ~~GPC~~ HT-1000
Column Type.....: Not Applicable

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
Gross Alpha	12-JUN-95 00:00	0.159	73.3	69.4	105.	45.0/105.	*
Gross Beta	12-JUN-95 00:00	1.13	50.6	51.9	95.3	45.0/105.	

S954Y05M

DCL Sample Name...: MXS 03847MSD

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
Gross Alpha	12-JUN-95 00:00	66.9	96.1	70.1	6.42	9.2	0.000/50.0	
Gross Beta	12-JUN-95 00:00	51.9	101.	51.3	1.35	2.6	0.000/50.0	

R. Jolley
6/14/95

DATA CHEM LABORATORIES
A SORENSON COMPANY

7678

Datapackage Table of Contents

Information pertaining to this datapackage is divided into the four categories listed below (see colored divider sheets for an inventory list of each category). If an item on the inventory is not applicable, an "NA" is placed in the corresponding check box. A Case Narrative immediately precedes this Table of Contents and contains pertinent information about this datapackage.

Analytical Forms ..... Yellow
Sample Tracking Documentation ..... Pink
Analytical Documentation ..... Blue
Raw Data ..... Green

♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦

Analytical Forms
Inventory Checklist

[X] Case Narrative

[NA] IRDMIS	[NA] Commercial Forms
[ ] Data Review and Approval Form	[ ] Analytical or Environmental Report Form
[ ] IRDMIS Reports	[ ] Set Comments
[ ] GC/MS TICs	[ ] Applicable QC Sheets

[X] RLIMS Forms	
[X] Cover Form	[X] Matrix Spike/Matrix Spike Duplicate Sample (Form F)
[X] Sample Group Comments (Form H)	[NA] Surrogate Summary (Form G)
[X] Sample Analysis Data Sheet (Form A)	[NA] Initial Calibration Form
[X] Laboratory Control Sample (Form B)	[NA] Continuing Calibration Form
[X] Blank Sample (Form C)	[NA] Serial Dilution Form
[NA] Matrix Spike Sample (Form D)	[NA] Endrin Breakdown or BFB/DFTPP GC/MS Tuning Form
[NA] Matrix Duplicate Sample (Form E)	[NA] Internal Standard Form

Analytical Forms
Reviewer Checklist

X The Analytical Forms Inventory Checklist above is complete.
X The Case Narrative was completed in accordance with procedures in DCL SOP XX-DC-020, "Datapackage Preparation and Validation."
X Only the correct report forms are used (IRDMIS or Commercial Forms or RLIMS Forms).
X All fields on the report forms are complete with the correct information, including signatures.
X Results for all samples are reported per client request.
X Units, methods, and dates are correct.
X Sample and/or set comments are complete.

000366

Assembled by: Robin Jelly (Signature) 6/14/95 (Date) Reviewed by: Christy Webster (Signature) 6-15-95 (Date)

DATA CHEM LABORATORIES
A SORENSON COMPANY

7678

Sample Tracking Documentation
Inventory Checklist

- [x] LIMS Grouping Reports
- [x] DataChem Laboratories (DCL) Chain-of-Custody Record
- [x] DCL Sample Work Order
- [NA] Copy of numbered Nonconformance/Corrective Action Report (NC/CAR)
- [NA] Copy of Client-Related Problem Report (CPR)

Sample Tracking Documentation
Reviewer Checklist

X The Sample Tracking Documentation Inventory Checklist above is complete.

X DCL Chain-of-Custody Record provides signatures for the sample portion reported in this data package.

X DCL Chain-of-Custody Record was completed in accordance with procedures in DCL SOP XX-DC-006 "Chain-of-Custody and Laboratory Tracking."

X Methods specified on the Sample Work Order were performed or an explanation for deviations is provided.

X Special instructions on the Sample Work Order were followed.

X Project Management instructions on the Project Protocol Worksheet were followed.

X Client's requests were met or an explanation is provided in the Case Narrative.

NA NC/CAR and/or CPR were completed in accordance with procedures in DCL SOP QC-DC-006 "Nonconformance/Corrective Action Report (NC/CAR) Procedures."

000367

Assembled by: Robin Tully 6/14/95 Reviewed by: Christy Webster 6/5-95
Signature Date Signature Date

DataChem Laboratories
LIMS - Sample Master System
Preparation Group Report

Date: 14-JUN-1995 13:41
User: LULLY

RLIMS15-V1.1

Preparation Run Name: G955802X

Group ID: G955802X

Samples: 18

Pos	Laboratory Sample Name	Field Sample Name	Laboratory Sample ID	Laboratory Group Name	Accnt. Number
1	BL-57147-1	BL-57147-1	S955802Q	S95-0498-DE	03025
2	QC-57147-1	QC-57147-1	S955802R	S95-0498-DE	03025
3	EO 3881	REAG BLK	S954P067	S95-0498-DE	03025
4	EO 3882	EO-1	S954P068	S95-0498-DE	03025
5	EO 3883	LO-1	S954P069	S95-0498-DE	03025
6	EO 3884	FLD BLK	S954P06B	S95-0498-DE	03025
7	MXS 03841	E14SW0800390	S954Y05C	RX-0047-BC	03107
8	MXS 03842	E14SW0800393	S954Y05D	RX-0047-BC	03107
9	MXS 03843	E14SW0800395	S954Y05F	RX-0047-BC	03107
10	MXS 03844	E14SW0800398	S954Y05G	RX-0047-BC	03107
11	MXS 03845	E14SW0800400	S954Y05H	RX-0047-BC	03107
12	MXS 03846	E14SW0800403	S954Y05J	RX-0047-BC	03107
13	MXS 03847	E14SW0800406	S954Y05K	RX-0047-BC	03107
14	MXS 03847MS	4SW0800406MS	S954Y05L	RX-0047-BC	03107
15	MXS 03847MSD	SW0800406MSD	S954Y05M	RX-0047-BC	03107
16	MXS 03848	E14SW0800409	S954Y05N	RX-0047-BC	03107
17	MXS 03849	E14SW0800412	S954Y05P	RX-0047-BC	03107
18	MXS 03850	E14SW0800415	S954Y05Q	RX-0047-BC	03107

----- END OF LISTING -----

R. Lully
6/14/95

Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498 * | Reporting Group

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AMG 5-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix						Analysis: Total Uranium	Gross Alpha	Gross Beta	Gamma scan						# Bottles
											CE	DE	DE	EE						
11-May-1995	REAG BLK	EO 3881			F/LIQ						X	X	X	X						1
10-May-1995	EO-1	EO 3882			F/LIQ						X	X	X	X						1
9-May-1995	LO-1	EO 3883			F/LIQ						X	X	X	X						1
11-May-1995	FLD BLK	EO 3884			F/LIQ						X	X	X	X						1

Received: Date/Time/Signature 5-18-95 / 1000 / Amaryllis McGuire

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Amaryllis McGuire	06/07/95 1110	Dave Reddick	Prep Total U, α, β, γ
Dave Reddick	06/07/95 1530	Max A. Barnett	γ Scan
Max A. Barnett	6/8/95 1600	Dave Reddick	Total U
Dave Reddick	6/9/95 0830	Robin Gulley	gross α/β
Robin Gulley	6/12/95 1600	Sally Copenhaver	U anal.
Sally Copenhaver	6/12/95 1605	L-84-1 TGC 6/12/95	Storage/L-84-1

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Form: COCC1.01-SWV2.30

Printed 5/22/1995 14:05

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Sample Work Order

QC Clearance: _____

Project Manager: Keith R. Nicholson

Client: Hayden Environmental Group, Inc.

Account: 03025

Project/Task: COMM-ENV

Date Received: 18-May-1995

Date for Mailing Report: 17-Jun-1995

RUSH

DCL Root Set ID: S95-0498 *

DCL Lab. Name: EO 3881–EO 3884

Total # Samples: 4

Sample Medium: F/LIQ

Earliest Sampling Date: 9-May-1995

Preparation Type:

Rep. Group	Radiochemistry Analytes Requested	Latest Prep. Date	Latest Anal. Date	No. of Samp.	Split ID	Storage Location	Analysis/Prep. Method	Inst.	
CE	Total Uranium	29-May-1995[c]	8-Jul-1995[c]	4		Rab lab			
DE	Gross Alpha	8-Jun-1995[c]	8-Jul-1995[c]	4		↓			
DE	Gross Beta	8-Jun-1995[c]	8-Jul-1995[c]	4					
EE	Gamma scan	29-May-1995[c]	8-Jul-1995[c]	4		↓			

Based on date of collection

Special Instructions: _____

Section Manager Approval: [signature] 5-24-95

Charlie C. Walker — Date

000370

Other Sections Receiving Sample Portions: IM, IW

DataChem Laboratories/ 960 West LeVoy Drive / Salt Lake City, Utah 84123

rm: WO1.04-SWV2.12

PRINTED 5/23/1995 16:49

Earliest Sampling Date: 9-May-1995

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 7-Jun-1995

Project/Job/Task: COMM-ENV | Split: | Root Set ID: S95-0498 •

Client: Hayden Environmental Group, Inc. | Account: 03025

Comments:

Verified: AM 9-23-95

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Reporting Group	CE	DE	DE	EE	# Bottles
						Analysis	Total Uranium	Gross Alpha	Gross Beta	Gamma scan	
11-May-1995	REAG BLK	EO 3881			F/LIQ		X	X	X	X	1
10-May-1995	EO-1	EO 3882			F/LIQ		X	X	X	X	1
9-May-1995	LO-1	EO 3883			F/LIQ		X	X	X	X	1
11-May-1995	FLD BLK	EO 3884			F/LIQ		X	X	X	X	1

Received: Date/Time/Signature 5-18-95 / 1000 / Amaryllis McClure

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Amaryllis McClure			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

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Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Printed 5/22/1995 14:05

Fernald Environmental Restoration Management Corporation
RSO - ANALYTICAL LABORATORY SERVICES

Page 1 of 2

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO:
SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFFL. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT 84123

	SAMPLE NUMBER		SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153657	REAG. BLK.	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* PARTICULATES ED 3868	RESULTS ED 3881
2	200153662	REAG. BLK.	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3869	
3	200153666	REAG. BLK.	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3870	
4	200153658	EO-1	G.F. FILTER	5/10/95 0930	PETRI DISH	1 x FLTR	NONE	* 3871	3882
5	200153663	EO-1	ACETONE	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3872	
6	200153667	EO-1	D.I. WATER	5/10/95 0930	PLASTIC	1 x 1L	NONE	* 3873	
7	200153659	LO-1	G.F. FILTER	5/9/95 1450	PETRI DISH	1 x FLTR	NONE	* 3874	3883
8	200153664	LO-1	ACETONE	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3875	
9	200153668	LO-1	D.I. WATER	5/9/95 1450	PLASTIC	1 x 1L	NONE	* 3876	
10	200153660	FLD BLK	G.F. FILTER	5/11/95 1030	PETRI DISH	1 x FLTR	NONE	* 3877	3884
11	200153665	FLD BLK	ACETONE	5/11/95 1030	PLASTIC	1 x 1L	NONE	* 3879	

CAN SEAL NO. 2470

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORIMTY OR FLUOROMETRY (AS LISTED IN METHOD 114)

*= TOTAL U (CE); GROSS A/B (DE); PARTICULATES (AE, BE); GAMMA SCAN (EE)

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN SEALED w/ COOLER		w/ C-o-C TAPE			

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaryllis McGlower
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	WHITE	REMAIN WITH SAMPLES
2	YELLOW	OFF-SITE LAB
3	PINK	FERMCO DATA REVIEW AND REPORTING
4	BLUE	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

000372

8492

Fernald Environmental Restoration Management Corporation
RSO - ANALYTICAL LABORATORY SERVICES

OFF-SITE LABORATORY CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD (OCTR)

REFERENCE DOCUMENT NO:
SAR/CR: SPL-95-1376

PURCHASE ORDER NO.: 95-H053	OFF-SITE LAB CONTACT: KEITH NICHOLSON	REPORT TO: FERMCO, P.O. BOX 398704, CINCINNATI, OH 45239-8704
RELEASE NO.: 1000006737	FERMCO CONTACT/PHONE: RICH DAIN (513) 738-9157	
SAMPLE SHIPMENT DATE: 5-17-95	REQUIRED REPORT DATE: PER CONTRACT (NORMAL)	RECEIVING LAB NAME: DATACHEM
SAMPLE SHIPPER: M. CORNELL	SAMPLE TEAM: EFF. MON. & CNTL	RECEIVING LAB ADDRESS: 960 W. LEVOY DR. SALT LAKE CITY, UT. 84123

	SAMPLE NUMBER	SAMPLE DESCRIPTION/TYPE/CODE	DATE/TIME COLLECTED	CONTAINER TYPE	SAMPLE VOLUME	PRESERVATION	ANALYSIS REQUESTED	CONDITION UPON RECEIPT*
1	200153669 FLD BLK	D.I. WATER	5/11/95 1030	PLASTIC	1 x 1L	NONE	*EO 3880	EO 3884
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

CAN SEAL NO: 2970

LAST ENTRY MNL 5-17-95

SPECIAL INSTRUCTIONS: TOTAL U ANALYSES ARE TO BE PERFORMED BY LASER PHOSPHORMETRY & EITHER COLORMITY OR FLOUOMETRY (AS LISTED IN METHOD 114)

*= TOTAL U; GROSS A/B; PARTICULATES; GAMMA SCAN

SAMPLE PLAN NUMBER:	PROJECT NAME:	CHARGE NUMBER:
N/A	PERIODIC CONFIRMATORY MSMTS.	7 ECB 2

CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:	CAN NO.:	SEAL NO.:
				CAN COOLER	SEALED w/C-O-C TAPE						

RELINQUISHED			RECEIVED		
RELINQUISHED BY	DATE	TIME	DATE	TIME	RECEIVED BY
1. Mark Cornell	5-17-95	1300	1. 5-18-95	1000	Stephanie Smith
2. Stephanie Smith	5-18-95	1030	2. 5-18-95	1035	Amaly his McKewee
3.			3.		

NO.	DISTRIBUTION OF COPIES	
1	WHITE	REMAIN WITH SAMPLES
2	YELLOW	OFF-SITE LAB
3	PINK	FERMCO DATA REVIEW AND REPORTING
4	BLUE	ORIGINATOR

*IF SEALS ARE BROKEN, CONTACT THE FERMCO CONTACT LISTED ABOVE IMMEDIATELY.

F 8 (REV 92)

00340 8292

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HAYDEN

DEN
MENTAL GROUP, INC.

Post-it® Fax Note 7671	Date 11-21-94	# of pages ▶ 8
To Customer Service	From D. Robinson	
Co./Dept.	Co.	
Phone #	Phone #	
Fax # 801-268-9992	Fax #	

November 21, 1994

Customer Service
DataChem Laboratories
960 West Levoy Drive
Salt Lake City, UT 84123

Subject: Laboratory Services / Subcontracting
FERMCO RFP # PES-80706

Dear Sir or Madam:

We are submitting a proposal in response to the above request and would like to receive a quotation from your firm for laboratory services. Your firm's name was given to us by FERMCO as a qualified subcontract laboratory.

We request a firm, fixed cost proposal to provide analytical support for the scope of work included with this letter. To summarize the analytical scope of work:

1. Provide analysis by USEPA Method 5 (40CFR Part 61) for three field samples from Source EP8-013 and one field sample from EP11-002. Filter, probe rinse (Acetone), and backhalf (H_2O) samples will be included as well as quality control samples (see below). Samples are to be analyzed for total particulate.

2. Following particulate analysis, the fractions for each field sample shall be composited and analyzed to total activity and uranium per EPA Method 114, and according to the protocol shown in Table 2 of the scope of work.

3. Proposed cost shall include cost to analyze and report results for all field samples and quality control samples. Quality control samples to be included in the sample sets:

   - Performance evaluation sample, to be supplied by FERMCO, and analyzed for total Uranium in the same manner as the composites (Item 6, scope of work).

   - Two field blank acetone rinse samples, two field blank filters, two laboratory filter blanks (supplied by Hayden), laboratory matrix spike/spike duplicate, and two container blanks.

000374

F010331.94

TALLY SHEET

7678

RELEASE #: 1000006737 (Can 1 of 1)
PO #: 95-H053 (DCL-SLC)
DATE SHIPPED: 17-May-95
MATERIAL: Periodic Confirmatory Measurements – Filters, Acetone, Water

ANALYSIS: Total U; Gross A/B; Particulates; Gamma Scan

Composite Sample Number	Lot Number	Sample Container Size	AnaLis/ FACTS Number	Gross Weight lbs.	Tare Weight lbs.	Net Weight lbs.
REAG. BLK.	W050-725-P047-6737	PETRI DISH	200153657	0.106	0.088	0.018
REAG. BLK.	W050-725-P047-6737	1L PLST	200153662	0.511	0.141	0.370
REAG. BLK.	W050-725-P047-6737	1L PLST	200153666	0.943	0.141	0.802
EO-1	W050-725-P047-6737	PETRI DISH	200153658	0.106	0.088	0.018
EO-1	W050-725-P047-6737	1L PLST	200153663	0.423	0.141	0.282
EO-1	W050-725-P047-6737	1L PLST	200153667	1.128	0.141	0.987
LO-1	W050-725-P047-6737	PETRI DISH	200153659	0.101	0.088	0.013
LO-1	W050-725-P047-6737	1L PLST	200153664	0.542	0.141	0.401
LO-1	W050-725-P047-6737	1L PLST	200153668	0.934	0.141	0.793
FLD. BLK.	W050-725-P047-6737	PETRI DISH	200153660	0.106	0.088	0.018
FLD. BLK.	W050-725-P047-6737	1L PLST	200153665	0.476	0.141	0.335
FLD. BLK.	W050-725-P047-6737	1L PLST	200153669	1.163	0.141	1.022
				6.537	1.480	5.057

7678

FEMP	RADIOLOGICAL SURVEY REPORT COVER SHEET		SURVEY NUMBER: 95-05-G11-194	
DATE: 5-17-95	LOCATION: Lab	RCT: BV Dunlap / D. Wessel	BADGE: 10148	PAGE: 1 OF 4
TIME: 0700	LEVEL: 580-	SIGNATURE: BV Dunlap / D. Wessel		
WORK PERMIT NUMBER: N/A		REVIEWER:	BADGE:	
RWP NUMBER:		SIGNATURE:	DATE:	

ATTACHMENTS: 3	
Pg 2 MURF	
Pg 3 & 4 Tennelec Printout	

REASON FOR SURVEY	
Sample surveyed for release to go offsite. Gross area smears taken. Direct frisk inside drum	
Release # ~~6666~~ 6737 N/A	

SUMMARY:

N/A

No.	Distribution of Copies
1	Radiological Records
2	Files

Supervisor Notified	Time	Date	Notified by:
			000376

FS-F-1993-0 (REV. 04/18/95)

MATERIAL UNRESTRICTED RELEASE FORM

SURVEY 95-05-G11-194

DATE:	LOCATION:	RCT:	SIGNATURE:	BADGE #:
5-17-95	Lab	BV. Dunlap / D. Wessel	BV Dunlap / D Wessel	10148 / 721

MODEL #	SERIAL NUMBER	TYPE ALPHA or BETA/GAMMA	CAL DUE DATE	BKGD. (CPM)	CT	MDA (DPM)	INSP/PERFORMANCE TEST YES	NO
LB5100	7	α, β, γ	6-95	.2 / 1.72	.289 / 4.18	18.2 / 19.8	X	
M-3	77101	β, γ	10-95	60	30	3K	X	
			N					
				A				

TIME	RCT INIT	MATERIAL DESCRIPTION	RELEASE CRITERIA SURF or VOL	RESULTS ALPHA REMOVABLE	ALPHA FIXED + REM	BETA/GAMMA REMOVABLE	BETA/GAMMA FIXED + REM	RELEASE JUSTIFICATION	RECIPIENT	MATERIAL RELEASE EVALUATOR BADGE # and SIGNATURE (1)
0700	bv/DW	2001536667	SURF	-0 *	N/A	0 *	<MDCP		Doug Stack	
		2001536668		2 *		4 *	<MDCP			
		2001536669		2 *		4 *	<MDCP			
		2001536666		-0 *		4 *	<MDCP			
		2001536662		-0 *		0 *	<MDCP			
		2001536665		-0 *		-1 *	<MDCP			
		2001536664		2 *		-1 *	<MDCP			
		2001536663		2 *		8 *	<MDCP			
		2001536658 (AF)		-0 *		0 *	<MDCP	*		N/A
		2001536659 (NF)		5 *		-1 *	<MDCP	*		
		2001536660 (AF)		-0 *		0 *	<MDCP	*		
		2001536657 (AF)		2 *		0 *	<MDCP	*		
		10 gal Can		-0 *		0 *	<MDCP			
					N					
						A				

Comments: Release # 6737 * M:ESH:BCRC: 93 613

(AF) = Air Filter

REVIEW:	INITIAL	DATE

(1) Material Release Evaluator approval required in accordance with RC-DPT-019, (Release of Materials from the Fernald Environmental Management Project), if any of the following conditions exist:

a. Material has areas which are inaccessible for proper survey.
b. Process knowledge is used to support the release decision.
c. Material must be evaluated for the potential of contamination beneath any coating applied while the material was in the Controlled Area.
d. Material must be evaluated for the potential for any volume or in-depth radioactivity within the material matrix.
e. Special case items are being released, such as radioactive consumer products, industrial sources, etc.
f. Material has detectable activity present and the activity is below the contamination limits listed in Attachment A of RC-DPT-019.

000377

RC-DPT-019 (Rev. 0) cont.

8192

WED MAY 17, 1995 08:57:36

GROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1 MIN)

7678

SAMPLE NUMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	08:58:45
2	1	4	2	4	09:00:06
3	1	4	2	4	09:01:27
4	0	4	-0	4	09:02:48
5	0	2	-0	0	09:04:10
6	0	1	-0	-1	09:05:30
7	1	1	2	-1	09:06:51
8	1	6	2	8	09:08:13
9	0	2	-0	0	09:09:34
10	2	1	5	-1	09:10:55
11	0	2	-0	0	09:12:16
12	1	2	2	0	09:13:37
~~12~~	~~0~~	~~5~~	~~0~~	~~6~~	~~09:14:58~~ hd 5-17-95

OPERATION COMPLETE

FEMP RADIOLOGICAL S... REPORT pg 2 of 4
SURVEY # 9505-G11-194 ... 5-17-95
(...) ...)
BY Dunlap/D. Hesse/ BUR L/D Wenl

000378

ED MAY 17, 1995 10:04:45 WE
ROUP A SYSTEM #7 SMEARS FOR FREE RELEASE (1.1 MIN)

7678

AMPLE UMBER	GROSS ALPHA	GROSS B-g	REMOV. dpm_a	REMOV. dpm_B-g	TIME OF COUNT
1	0	2	-0	0	10:05:55

PERATION COMPLETE

FEMP RADIOLOGICAL SURVEY REPORT pg 4 of 4
SURVEY # 95-05-G11-194 DATED 5-17-95
(name) (signature)
RCT: Bu Dwlod Dbbsel Bu Dwlod Dbbsel
REVIEWER:

Section: ER 26 05/17/19 95

ERG93
GUIDE 26

ACETONE, 3, UN1090, II

POTENTIAL HAZARDS

FIRE OR EXPLOSION

Flammable/combustible material; may be ignited by heat, sparks or flames.
Vapors may travel to a source of ignition and flash back.
Container may explode in heat of fire.
Vapor explosion hazard indoors, outdoors or in sewers.
Runoff to sewer may create fire or explosion hazard.

HEALTH HAZARDS

May be poisonous if inhaled or absorbed through skin.
Vapors may cause dizziness or suffocation.
Contact may irritate or burn skin and eyes.
Fire may produce irritating or poisonous gases.
Runoff from fire control or dilution water may cause pollution.

EMERGENCY ACTION

Keep unnecessary people away; isolate hazard area and deny entry.
Stay upwind; keep out of low areas.
Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.
Isolate for 1/2 mile in all directions if tank, rail car or tank truck is involved in fire.
CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, CALL CHEMTREC AT 1-800-424-9300.
If water pollution occurs, notify the appropriate authorities.

FIRE

Small Fires: Dry chemical, CO2, water spray or alcohol-resistant foam.
Do not use dry chemical extinguishers to control fires involving nitromethane or nitroethane.
Large Fires: Water spray, fog or alcohol-resistant foam.
Move container from fire area if you can do it without risk.
Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.
For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

SPILL OR LEAK

Shut off ignition sources; no flares, smoking or flames in hazard area.
Stop leak if you can do it without risk.
Water spray may reduce vapor; but it may not prevent ignition in closed spaces.

Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal.
Large Spills: Dike far ahead of liquid spill for later disposal.

FIRST AID

Move victim to fresh air and call emergency medical care; if not breathing, give artificial respiration; if breathing is difficult, give oxygen.
In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water.
Remove and isolate contaminated clothing and shoes at the site.

SURVEY RECORD

Date: 5-18-95 Survey Type: Meter: ✓ Smear: ✓ Leak Test: ___ Approved: ___ RSO Date: ___

By: MM

Survey Instrument:

Manufacturer: LUDLUM
Model Number 19
Serial Number: ~~EQ~~ 102872
Calib. Date: 9-30-94

FERMCO ~~MX-0199~~ IH. mm 5-18-95

BACKGROUND <0.011 mR/hr

Scintillation Counter:

Manufacturer: Ludlum
Model Number: 2929
Lab Instrument No.: 108227

Sample Count Time - 1 min.

	ALPHA	BETA
BLANK (CPM)	0.08	65.03
COUNTER EFFICIENCY (%)	0.3517	0.4083

Mixed Waste Lab Survey Location or Sealed Source Number	Instrument Reading	Disc Smears/Leak Test Swipes						Remarks
		Alpha			Beta			
		CPM	DPM	µCi	CPM	DPM	µCi	
M095 0241 OUTSIDE	<0.012 mR/hr	0			68			<0.011 mR/hr @ 1 METER
INSIDE	<0.012	0			63			
SAMPLE	<0.012	0			71			

000382

26728

DATACHEM LABORATORIES COOLER RECEIPT CHECKLIST

1. Client Name: FERMCO
2. Project/Task/Site: REL. #: 6737
3. Time/Date of Receipt: 1000 5-18-95
4. # Coolers Received: 1
5. Custody Seals?: (Circle) Present/Absent*
   Intact/Broken*
   Tamper Evident: Yes/No
6. Condition of Coolers: Acceptable/Unacceptable
7. Comments on Cooler Condition (#6)
   1 DRUM
8. Ice Present: Yes/No*
   Frozen/Melted
   Comments: RAD CHEM ONLY
9. Temp Control: Present/Not Included
10. Location Temp Taken: Control/Between Samples
11. Taken by: (Signature)
    MARK MENDENHALL (Printed Name)
    5-18-95 1130 (Date/Time)
12. Are all temperatures within project specific guidelines?
    Yes/No*

*CONTACT PROJECT MANAGER. COMPLETE INCIDENT REPORT.

Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp	Cooler Received	DCL Cooler #	Temp
1	MC95 0341	20 °C	6	MC95	°C	11	MC95	°C
2	MC95	°C	7	MC95	°C	12	MC95	°C
3	MC95	°C	8	MC95	°C	13	MC95	°C
4	MC95	°C	9	MC95	°C	14	MC95	°C
5	MC95	°C	10	MC95	°C	15	MC95	°C

SAMPLE RECEIVING INCIDENT REPORT

Client Sample #'s Affected: _____ DCL Set I.D: _____

DCL Sample #'s Affected: _____

- ☐ Cooler Temps out of Range
- ☐ Missing Cooler
- ☐ Broken/Leaking Samples
- ☐ Missing Samples/Bottles
- ☐ Missing Paperwork
- ☐ Incorrect Preservation
- ☐ Low Sample Volume
- ☐ Incorrect Bottle Type
- ☐ Missing/Incorrect Bottle Labels
- ☐ Other

BRIEFLY DESCRIBE PROBLEM:

Delivered to: _____ Project Manager

Delivered by: _____ Signature/Date/Time

RESPONSE REQUIRED WITHIN 24 HOURS

PROJECT MANAGER'S COMMENTS:

Returned to Sample Receipt by: _____ (Date/Time/Signature)

Accepted for Sample Receipt by: _____ (Date/Time/Signature)

8/95

Project Protocol Worksheet

Client	Hayden Environmental
Project	FERMCO Emissions Tests
Project Manager	Keith Nicholson
Account Number	3025
Project Duration	1 Month

Date 5/17/95

Mailby Days 20 days

Sample Stream	Project/ Method Type	QC Requirements			Preparation Requirements			Reporting Requirements			LOD/MDL/IDL Requirements		
S95	EPA Clean Air	**Inorganic**			**Inorganic**			Full CLP SOW			CLP SOW		
		Blank			CLP SOW			CLP Forms Only			SW-846 Rev.		
		LCS			SW-846 Rev.			CLP Disk			EPA Clean H2O		
		MS			USAEC 1990			RLIMS	X		USAEC 1990		
		MSD			USAEC 1993			Raw Data			USAEC 1993		
		MD			Microwave			Custom Disk			NIOSH		
		USAEC			Hotplate			ARF			DCL SOP		
		MSA			DCL SOP			QC Forms (specify below)	X		Client specified		
		Tracer			Other			Case Narrative	X		Other	x	Method
		Other			**Radiochemistry**			Calibration data	X		**QC Limits**		
		Radiochemistry			Hotplate leach			Continuing Cal. data			Method	X	
		Blank	X		Muffle furnace			Reporting Basis			Statistical		
		LCS	X		Total dissolution			IRDMIS			Client specified		
		MS	X	U only	Microwave			# of TICs					
		MSD	X	U only	DCL SOP			Counting Error (1 or 2 sigma)					
		Tracer			Other	X	Mthd. 114	TPU					
		Other	X	MD	**Organic**			RPD					
		Organic			CLP SOW			RER					
		Blank			SW-846 Rev.			Send raw data	X				
		LCS			USAEC 1990			Store raw data					
		MS/MSD			USAEC 1993			Other					
		USAEC			Sonication								
		Surrogate			Soxhlet								
		Other			Continuous								
					Separatory funnel								
					DCL SOP								
					Other								

David Robinson

Batch samples with other sets? (●) yes ( ) no

MS/MD/MSD sample identified? ( ) yes (●) no

Specific spiking levels identified? (●) Method ( ) DCL SOP ( ) other (see comments)

Comments: Analyze for U by EPA method 114 A-5, and by laser phosphoremetry - report results separately. Desired detection limits are 50 ug/sample for colorimetric U, and 1 ug/sample for phosphoremetry. Analyze for gamma, alpha, and beta for method 114 G-1, A-4 and B-4. Desired detection limits are 10 pCi for alpha and beta, a 20 pCi/sample as Cs-137 for gamma. Liquid samples and filters are to be analyzed for total particulates prior to other analyses. The client will specify how any compositing of liquid samples is to be conducted.

000384

8292

DATA CHEM

SAMPLE DISPOSAL CONTROL FORM

DataChem Laboratories ID Number:_____ Analyst:_____

Date of Analysis:_____ Analyzed For:_____

DISPOSAL CLASSIFICATION†

Sample Number	Not Hazardous	Hazardous	Code‡	Explanation
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____
_____	[ ]	[ ]	____	_____

A sample (either solid or liquid) is to be classified as hazardous waste upon disposal if it exhibits any of the following conditions:

‡Code (if classified as hazardous)

1. If it or its extract contains levels of the contaminants ≥ those specified in Table 1.
2. If it contains significant levels of organic solvents.
3. If it is corrosive (pH ≤ 2 or ≥ 12.5).
4. If it is reactive or explosive.
5. If it contains ≥ 50ppm PCB.
6. If it is determined by the chemist or manager that the sample is hazardous, poisonous, or toxic (e.g., some of the pesticide formulations). If this code is used, an explanation must be provided.

TABLE 1 TCLP levels.

EPA HW No.	Contaminant	Limit (mg/l)
D004	Arsenic	5.000
D005	Barium	100.0
D018	Benzene	0.5
D006	Cadmium	1.0
D019	Carbon Tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0
D022	Chloroform	6.0
D007	Chromium	5.0
D023	o-Cresol	200.0*
D024	m-Cresol	200.0*
D025	p-Cresol	200.0*
D026	Cresol	200.0*
D016	2,4-D	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D012	Endrin	0.02
D031	Heptachlor	0.008
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D008	Lead	5.0
D013	Lindane	0.4
D009	Mercury	0.2
D014	Methoxychlor	10.0
D035	Methyl Ethyl Ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D010	Selenium	1.0
D011	Silver	5.0
D039	Tetrachloroethylene	0.7
D015	Toxaphene	0.5
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D017	2,4,5-TP Silvex	1.0
D043	Vinyl Chloride	0.2

* If the concentrations for o-, m-, and p-cresol can not be differentiated, the total cresol concentration is used.

The constituents in bold are the original EP toxicity constituents.

000385

DataChem Laboratories

PROJECT RESOURCE UTILIZATION SUMMARY

Date: _____

DCL Reference #: _____

Company/Agency Name: _____

Analytes/Method: _____

LABOR

Date	Personnel	Total Hours

SUPPLIES

Item	Quantity

EQUIPMENT USAGE

Major Instrumentation	Total Hours

DataChem Laboratories / 960 West LeVoy Drive / Salt Lake City, Utah 84123

DATA CHEM LABORATORIES
A SOREBSON COMPANY

7678

Analytical Documentation
Inventory Checklist

- [NA] Copy of TCLP Preparation Logbook Pages
- [X] Copy of Sample Preparation Notebook/Logbook Pages
- [X] Copy of Analyst's Notebook/Method Logbook Pages
- [X] Copy of Instrument Injection Logbook/Instrument Logbook/Run Log Pages
- [NA] Percent Solids/Percent Moisture Results
- [NA] Copy of Reagent Logbook Pages
- [NA] Copy of Working Standard Preparation Logbook Pages
- [X] Copy of Secondary or Intermediate Standard Preparation Logbook Pages
- [X] Copy of Primary Standard or Concentrated Stock Standard Preparation Logbook Pages
- [X] Certificates of Analysis for Standards
- [NA] Copy of Standard Verification Logbook Pages (including documentation for spiking solutions and calibration standards)
- [NA] Copy of Preparation Logbooks for solutions prepared by QC

All other miscellaneous documentation associated with this set (describe)

[NA] _____

Analytical Documentation
Reviewer Checklist

- [X] The Analytical Documentation Inventory Checklist above is complete.
- [X] Basic documentation procedures were followed in accordance with DCL SOP XX-DC-004 "Analytical Data Record Keeping."
- [X] All notebook and logbook pages contain page number, book number, title, and available space for pagination (if required).
- [X] All notebook and logbook pages were signed and dated by the analyst and reviewer before copying.
- [X] All copies are legible.
- [X] Standard preparation is documented in accordance with DCL SOP XX-DC-019 "Standards Purity, Preparation, Traceability and Verification" or by WR-DC-001 "The Acquisition, Preparation, and use of Radioactive Standard Reference Materials."
- [X] Documentation is provided to verify that standard calibration solutions and spiking solutions are traceable to a vendor certificate.

000387

Assembled by: Robin Tully 6/14/95 (Signature / Date) Reviewed by: Christy Webster 6-15-95 (Signature / Date)

TITLE Sample Preparation

Project No. 31
Book No. 2616

7678

From Page No.

Client	Acct. No.	Set No.	Matrix	Requested Anal.	Balance ID	Furnace ID
Hayden Enviro. Group	3025	595-0498	Filter/Liquid	Tot. U, Gross α, β, γ	102 695	RCL-FN-1

The glass fiber - air filters (EO 3868, 71, 74, 77) were placed in 250 mL pyrex griffin beakers and placed in a muffle furnace at 525°C for ≈ 72 hrs. After the samples had cooled to room temperature the samples were transferred to teflon beakers with conc. HNO_3. HF acid was then added to the beakers and they were placed on the hotplate until dissolution had taken place and the sample was near dryness. The samples were then wet ashed twice with conc. HNO_3 to expel off the HF. The samples were then brought up to ≈ 5-10 mL with conc. HNO_3.

The liquid samples, which were delivered to us after the Total Solids Analysis, were dissolved in HNO_3 and transferred into the filters accordingly:

EO 3881 (REAG. BLK)	EO 3882 (EO-1)	EO 3883 (LO-1)	EO 3884 (FLD BLK)
EO 3868 (F)	EO 3871 (F)	EO 3874 (F)	EO 3877 (F)
EO 3869 (Liq.)	EO 3872 (Liq.)	EO 3875 (Liq)	EO 3879 (Liq.)
EO 3870 (Liq.)	EO 3873 (Liq.)	EO 3876 (Liq.)	EO 3880 (Liq.)

The combined F/LIQ samples (EO 3881, 82, 83, 84) were then placed on a hotplate and were reduced to ≈ 2-3 mL. The samples were then transferred into 4 OZ PMP containers and diluted to the indicated amounts with 4 M HNO_3.

SAMPLE ID	Dilution
EO 3881	50.032 g.
EO 3882	50.025 g.
EO 3883	50.025 g.
EO 3884	50.043 g.

The Following are the amounts of sample that were remaining following the RADCHEM analysis.

SAMPLE ID	Dilution Amount Remaining.
EO 3881	34.086 g.
EO 3882	33.917 g.
EO 3883	22.325 g.
EO 3884	33.997 g.

To Page No.

Witnessed & Understood by me,	Date	Invented by	Date	
Ray Kern	6/9/95	Recorded by Dave Leddick	6/2/95	000388

Gross Alpha/Beta Proportional Counting Log

Client #1 : NA Acct No.: 3025 Set No.: S95-0498-DE

Client #2 : NA Acct No.: 3107 Set No.: RX-0047-BE

Client #3 : NA Acct No.: NA Set No.: NA

Prep. Group ID: 6955802X Date Prepared: 6/12/95 Matrix: water

Instrument: HT-1000 Date Analysis Started: 6/12/95 Pipet Used: 100µl Balance Used: R200D B310P, MC-1LC4200

LCS No.: QC-57147-1 MD No.: MXS-03847MSD Blank No.: BL-57147-1

Activity (pCi) = Conc (pCi/ml or g) x (Volume (ml) or Mass(g))

Decay Corrected Activity = Original Activity $(e^{-(0.693/T_{1/2})(\Delta T)})$

Alpha Standard Solution			
Source ID	Concentration (pCi/mL or g)	Aliquot Added (mL or g)	Decay Corrected Activity (pCi)
Pu-239 ISL 2/15	649 pCi/g	0.106	68.794
Beta Standard Solution			
Source ID	Concentration (pCi/mL or g)	Aliquot Added (mL or g)	Decay Corrected Activtiy (pCi)
Sr-90 TSL 2/35	250.493 Sr-90 on 11 July 94	0.104	242.516 pCi/g Sr-90 on 06/12/95

Sr/y-90 act: 50.443 pCi

*Self Absorption Correction Factor = a + b * log(c + x)*

Self Absorption Curve → Date: 2/7/95 Notebook: NA Page: NA α Coefficients → a: 0.9470 b: -0.2795 c: 0.6265

Self Absorption Curve → Date: 2/7/95 Notebook: NA Page: NA ß Coefficients → a: 0.9505 b: -0.0426 c: 0.0725

Sample						
Carrier	ID	Planchet	S.A.(mg)	Vol(mL)	Mass(g)	Filename
A2	BL-57147-1	F686	1.19	350.0	NA	RL0612A
A3	QC-57147-1	F687	1.30	350.0		RL0612A
A2	EO 3881	F688	82.17	10.0		RL0613A1
A3	3882	F689	74.16	↓		↓
A4	3883	F690	96.33	↓		RL0613A1
B2	3884	F691	105.17	10.0		RL0613B1
A4	MXS-03841	F692	44.28	350.0		RL0612A
B2	3842	F693	41.83	↓		RL0612B
B3	3843	F694	2.08	↓		↓
B4	3844	F695	1.80	350.0		RL0612B
C1	3845	F696	58.92	300.0		RL0612C
C2	3846	F697	37.91	350.0		↓
C3	3847	F698	28.29	300.0		RL0612C
A2	3847MS	F699	28.28	300.0		RL0613A
A3	3847MSD	F700	27.42	300.0		
A4	3848	F701	31.66	350.0		RL0613A
B2	3849	F702	35.17	350.0	↓	RL0613B
B3	3850	F703	68.80	250.0	NA	RL0613B

Robin Fully 6/13/95

Comments: Act. MS/MSD

	Pu-239 (g)	Added (Act)	Sr-90 (mL)	Act Added
MS	0.107	~~649 pCi~~ 69.44 pCi	0.107	51.898
MSD	0.1067	69.44 pCi	0.104	50.443 pCi

*N/A=Not Applicable

000389

Recorded by: Robin Fully Date: 6/13/95 Reviewed by: [illegible] Date: 6/13/95

Book No. 4046 Page No. 122

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Sample Number	Planchet Number	Tare wt(g)	TOTAL wt(g)	Sample wt(mg)	Count time(m)
BL-57147-1	F686	7.55778	7.55897	1.19	240
QC-57147-1	F687	7.47909	7.48039	1.30	240
E03881	F688	7.58649	7.66866	82.17	1000
3882	F689	7.54566	7.61982	74.16	↓
3883	F690	7.50894	7.60527	96.33	↓
3884	F691	7.57682	7.68199	105.17	1000
MXS-03841	F692	7.53608	7.58036	44.28	240
-03842	F693	7.46602	7.50785	41.83	↓
-03843	F694	7.51699	7.51907	2.08	↓
-03844	F695	7.54597	7.54777	1.80	↓
-03845	F696	7.52654	7.58506	58.52	↓
-03846	F697	7.53564	7.57355	37.91	↓
-03847	F698	7.50627	7.53456	28.29	↓
-03847MS	F699	7.55683	7.58511	28.28	↓
-03847MSD	F700	7.51630	7.54372	27.42	↓
-03848	F701	7.43377	7.46543	31.66	↓
-03849	F702	7.52102	7.55619	35.17	↓
-03850	F703	7.57964	7.64844	68.80	240

Samples E03881 → E03884 were hygroscopic and were flamed. Samples "mushroomed" upon flaming. Mashed residue into smaller particles and fixed using 0.1 M HNO_3. - All samples were wet ashed using 2x10ml HNO_3 (conc) before transferring to planchets with 0.1 N HNO_3.

R. Lully 6/13/95 — Activity corrections have been made on the QC samples to reflect Activity/Sample.

Recorded by: Robin Lully Date: 6/13/95 Reviewed by: Ray Kenn Date: 6/13/95

Activity corrections have also been made to reflect dilutions on samples E03881 → 3884. For dilution information - see notebook DCL# 2616 pg. 31. Dilution was $\frac{1\ FT}{50mL\ sam.}$ x 10mL Aliq. Samp. = 1 FT/5 sam. R. Lully 6/13/95

See calculation sheets in data notebook

000390

7678

RUN LOG

Instrument: HT-1000-1

000391

6/9/95	A1-A4	RLK	CKS0609A	CKS-1A ; 2A ; 3A ; 4A
↓	B1-B4	↓	CKS0609B	↓
	C1-C4		CKS0609C	
6/9/95	D1-D4	RLK	CKS0609D	CKS-1A ; 2A ; 3A ; 4A
6/9/95	B1-B4	RLK	RK0609B	BLANK ; LCS ; ST0526 ; EN-1729
↓	C1-C4	RLK	RK0609C	EO-2978 A, B ; C ; D
6/9/95	D1-D4	RLK	RK0609D	EO-0568 A ; B ; C ; D
6/12/95	A1-A4	RL	CKS-0612A	CKS-001A → CKS-004A
↓	B1-B4	↓	CKS0612B	void RL 6/12/95 ~~BL-57147-1, QC-57147-1, MXS-03841~~
	C1-C4		CKS0612C	QC 6/12/95 MK
	D1-D4		CKS0612D	CKS-001A → CKS-004A
	A2-A4		RL0612A	BL-57147-1, QC-57147-1, MXS-03841
	B2-B4		RL0612B	MXS-03842 → 03844
6/12/95	C1-C3	RL	RL0612C	MXS-03845 → 03847
6/13/95	A1-A4	RL	CKS0613A	CKS-001A → CKS-004A
↓	B1-B4	↓	CKS0613B	↓
	C1-C4		CKS0613C	CKS-001A → CKS-004A
	A2-A4		RL0613A	MXS-03847MS, 3847MSD, 3848
6/13/95	B2-B3	RL	RL0613B	MXS-03849, 03850
6/13/95	A2-A4	RL	RL0613A1	EO 3881 → 3883
6/13/95	B2	RL	RL0613B1	EO 3884

RADIOCHEMISTRY LABORATORY
RADIOACTIVE MATERIAL INVENTORY
INTERMEDIATE STANDARD LOG

Intermediate Standard ID: ISL 215 Standard Source ID: 2510-1

Reference Date/Time*: 347/1990/0500 MST RMI Source Log Ref. Book/Page: 2/8

*Use Julian date and military time

DCL Balance ID No.: 102683 for act.
102695 for tot. wt.

Date	Inits.	Solvent	Activity (pCi)†	Final Weight	Conc. (pCi/g)†	Witness
3/15/94	[illegible]	2M HNO3	66094.4	101.834	649.04	[illegible] RL 5/2/9:

Pu-239

Usage:

	Date	Inits.	Aliquot	Activity (pCi)†	Balance (pCi)†	Destination
1.	4/9/95	RL	0.320	207.693	42845.901	QC, MS, MSD 6953801D
2.	4/18/95	RL	0.320	207.693	42638.208	QC, MS, MSD 6953K01S
3.	4/24/95	OR	0.1	64.904	42573.304	Training Gross α/β QC
4.	4/24/95	RL	0.321	208.342	42364.962	QC, MS, MSD 6953R010
5.	4/24/95	RL	0.319	207.044	42157.918	QC, MS, MSD 6953R00G
6.	5/5/95	RL	0.106	68.798	42089.120	QC-69544200B OR RL 5/15/95
7.	5/17/95	RL	0.106	68.798	42020.322	QC - EPA AUDIT 69545006
8.	5/30/95	RL	0.105	68.798	41951.524	QC - DOE AUDIT 69544031
9.	5/30/95	RL	0.105	68.149	41883.375	QC - DOE AUDIT 69544031
10.	5/31/95	RL	1.754	1138.416	40744.959	QC - DOE AUDIT S95-0170
11.	5/31/95	RL	0.240	155.76	40589.199	QC - DOE AUDIT S95-0170
12.	6/9/95	RL	0.320	207.693	40381.506	QC, MS, MSD C955802X
13.						
14.						
15.						
16.						
17.						
18.						000393

† All activities are referenced to the source date/time. Decay corrections are to be made on the following page.

To Page:_____

7678

RADIOCHEMISTRY LABORATORY
RADIOACTIVE MATERIAL INVENTORY
STANDARD SOURCE LOG

Vendor: U.S. EPA Vendor Source ID: 2510-1

Date Received: _____ Received By: _____

CAUTION
RADIOACTIVE MATERIAL
SOL# 2510-1 WT. 5.0g
AMT. 1158 nanoCi/g
ISOTOPE Pu-239
DATE 12/13/90;0400PST
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY—LAS VEGAS

Place Source Label Above

Source Reference Date/Time*: 347/1990/0500MST Solvent: 4M HNO_3

ISOTOPE(S)	CONC. (pCi/g)	ISOTOPE(S)	CONC. (pCi/g)
PU-239	3/15/94 11,800 ~~118,000~~		

*Use Julian date and military time

Usage:

DCL Balance ID No.: 102683 for wt of activity 102695 for total weight

Date	Inits.	Aliquot	Activity (pCi)	Balance (pCi)	Destination	Witness
3/15/94	ich	5.5991	66069.4	Ø	ISL-2/15	[illegible]

Res-4-2-7678

U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory-Las Vegas
Nuclear Radiation Assessment Division

Calibration Certificate

Description

Principal radionuclide: PLUTONIUM-239 Half-life: 2.4×10^4 years

Nominal activity: 59 nano curies

Nominal volume: 5 ml in ampoule/bottle number: 2510-1

Measurement

Activity of principal radionuclide

Activity per gram of this solution

11.8 nano curies of Plutonium-239

at 0400 hours PST on December 13, 1990

Activity of daughter radionuclide

The principal activity was accompanied at the quoted time by

curies Per gram

of the daughter nuclide

Total mass of this solution

APPROX. 5.0 grams

Method of measurement

The activity of the primary solution was measured by an internal gas flow proportional counter.

The activity of the dilution was measured by liquid scintillation counting.

Useful Life

This radionuclide has decayed through half lives since it was obtained by EMSL-LV

We recommend that this solution should not be used after

Purity

The manufacturer states that activities other than that of the principal nuclide and of its daughter nuclides, if any, were estimated/known to be:

(1) see remarks	less than equal to	%	of the principal activity
(2)	less than equal to	%	of the principal activity
(3)	less than equal to	%	of the principal activity

The activity of impurity (1) is not (2) is not (3) is not included in the quoted figures of the principal activity.

Random Errors

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than ± 0.13 %
(The 99.7% confidence limits are given by t(sm) where t is obtained from the student t factor for the degree of freedom (n-1)).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error ($+\delta - \delta'$). These have been estimated not to exceed

+2.7 % or - 2.7 %

the overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error [t(sm)] at the 99.7% confidence limits and the worst case estimate of the systematic errors ($+\delta, -\delta'$)
The overall uncertainty is therefore calculated on the basis of + [t(sm) $+\delta$], - [t(sm) $+\delta$]
and is + 3.1 %, - 3.1 % of the quoted radioactive concentration.

Decay Schemes

This standardization is based on the following assumptions of the principle nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Plutonium-239 and impurities were assumed to decay 100 percent by alpha emission.

Chemical Composition of Solution

Carrier content per gram of solution:

Other components:

4M Nitric acid

Preservative:

Remarks

IMPURITIES:

Pu-238	0.033%	of the total activity
Pu-240	4.6×10^{-5}%	of the total activity
Pu-241	1.5×10^{-3}%	of the total activity
Pu-242	8.8×10^{-6}%	of the total activity
Pu-244	6.2×10^{-9}%	of the total activity

000396

Date Certificate Prepared December 13, 1990

Approval Signature Paul B. Hahn

Revised 1/84

Book No. 2 Page 61

RADIOCHEMISTRY LABORATORY
RADIOACTIVE MATERIAL INVENTORY
INTERMEDIATE STANDARD LOG

Intermediate Standard ID: ISL - 2/35 Standard Source ID: 2454-4

Reference Date/Time*: 42/1994/0500 RMI Source Log Ref. Book/Page: 2/12

*Use Julian date and military time

DCL Balance ID No.: 102695

Sr-90

Date	Inits.	Solvent	Activity (pCi)†	Final Weight	Conc. (pCi/g)†	Witness
10/4/95	CMW	2N HNO3	25059.840	100.042g	250.493	

Usage:

	Date	Inits.	Aliquot	Activity (pCi)†	Balance (pCi)†	Destination
1.	6/9/95	RL	0.315	78.905	2326.662	QC, MS, MSD 6955802X
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						

All activities are referenced to the source date/time. Decay corrections are to be made on the following page.

To Page:

7678

RADIOCHEMISTRY LABORATORY
RADIOACTIVE MATERIAL INVENTORY
STANDARD SOURCE LOG

Vendor: EPA Vendor Source ID: 7454-4

Date Received: 10-3-94 Received By: CCW

CAUTION
RADIOACTIVE MATERIAL
SOL# 2454-4 WT. 5.0g
AMT. 5020 nanoCi/g
ISOTOPE Sr-90
DATE 2/11/94 0400PST
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY—LAS VEGAS

Place Source Label Above

Source Reference Date/Time*: 42/1994/05:00 Solvent: 0.1M HCl

ISOTOPE(S)	CONC. (pCi/g)	ISOTOPE(S)	CONC. (pCi/g)
Sr-90	5020		

*Use Julian date and military time

Usage:

DCL Balance ID No.: 102695

Date	Inits.	Aliquot	Activity (pCi)	Balance (pCi)	Destination	Witness
10-4-94	CMW	4.992g	25059.840	Ø	ISL-2/35	PMR

7678

Rec. 10-3-94
(ccd)

U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory-Las Vegas
Nuclear Radiation Assessment Division

Calibration Certificate

Description

Principal radionuclide: Strontium-90 Half-life: 28.6 years

Nominal activity: 25 nano curies

Nominal volume: 5 ml in ampoule/bottle number: 2454-4

Measurement Activity of principal radionuclide

Activity per gram of this solution

5.02 nano curies of Strontium-90

at 0400 hours PST on February 11, 1994

Activity of daughter radionuclide

The principal activity was accompanied at the quoted time by

5.02 nano curies Per gram

of the daughter nuclide Yttrium-90

Total mass of this solution

Approx. 5.0 grams

Method of measurement

The activity of the primary solution was measured by four pi efficiency tracing.

The activity of the dilution was measured by liquid scintillation counting.

Useful Life

This radionuclide has decayed through 0.3 half lives since it was obtained by EMSL-LV

We recommend that this solution should not be used after December 1999

000399

Purity

The manufacturer states that activities other than that of the principal nuclide and of its daughter nuclides, if any, were estimated/known to be:

(1) others	less than	0.01 %	of the principal activity
(2)	less than equal to	%	of the principal activity
(3)	less than equal to	%	of the principal activity

The activity of impurity (1) is not (2) is not (3) is not included in the quoted figures of the principal activity.

Random Errors

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than ± 0.2 %
(The 99.7% confidence limits are given by t(sm) where t is obtained from the student t factor for the degree of freedom (n-1)).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error ($+\delta - \delta'$). These have been estimated not to exceed

+ 2.1 % or - 2.1 %

the overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error [t(sm)] at the 99.7% confidence limits and the worst case estimate of the systematic errors ($+\delta, -\delta'$)
The overall uncertainty is therefore calculated on the basis of + [t(sm) $+\delta$], - [t(sm) $+\delta'$]
and is + 2.5 %, - 2.5 % of the quoted radioactive concentration.

Decay Schemes

This standardization is based on the following assumptions of the principle nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Strontium-90 decays 100 percent by beta emission to yttrium-90. Yttrium-90 decays also by beta emission.

Chemical Composition of Solution

Carrier content per gram of solution:

100 micrograms strontium

100 micrograms yttrium

Other components:

0.1 M HCl

Preservative:

Remarks

000400

Date Certificate Prepared February 14, 1994

Approval Signature George Dellbeck

Revised 1/84

DATA CHEM LABORATORIES
A SORENSON COMPANY

7678

Raw Data
Radiochemistry/Mixed-Waste Department
Proportional Counting
Inventory Checklist

- [x] Section 1. Sample and QC Data
- [x] Section 2. Instrument Performance and Calibration Data

The following signatures verify that the raw data and all inventory and reviewer checklists in each raw data section (all green sheets) are complete and accurate.

000401

Assembled by: Robin Folley 6/14/95 Reviewed by: Christy Webster 6-15-95

Signature Date Signature Date

3/05

Section 1. Sample and QC Data
Proportional Counting
Inventory Checklist

- [X] Laboratory Control Sample (LCS) Instrument Print-Out
- [X] Blank Instrument Print-Out
- [X] Accuracy Sample (MS) Instrument Print-Out
- [X] Precision Sample (MSD/MD) Instrument Print-Out
- [X] Field Sample Instrument Print-Out
- [NA] Summary Instrument Print-Outs specifying appropriate backgrounds, efficiencies (unless corrected for a particular isotope of interest), and cross-talk values
- [X] Computer/Manual Calculation Sheets summarizing all calculational inputs and results

RL 6/15/95

Section 1. Sample and QC Data
Proportional Counting
Reviewer Checklist

X The Sample and QC Data Inventory Checklist above is complete.

X All appropriate QC for the project was performed.

X All appropriate QC data met acceptance criteria. Unacceptable QC data were documented, and justifications were provided for data used.

X Print-outs are initialed and dated.

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 12, 1995 10:21 pm

Data File
RL0612A.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer A:	1330	High	14400 sec.

Detector Parameters				
Alpha:	Window	Efficiency	Background	Crosstalk
Det A/1	65.9-100%	33.30%	0.37599999	7.5802469
Det A/2	65.4-100%	33.04%	0.044	9.2323008
Det A/3	69.6-100%	33.45%	0.122	7.116519
Det A/4	70.3-100%	34.13%	0.086	7.5292134
Beta:	Window	Efficiency	Background	Crosstalk
Det A/1	0 - 65.8%	44.30%	3.312	0.99590111
Det A/2	0 - 65.3%	44.49%	1.028	0.99997914
Det A/3	0 - 69.5%	42.67%	1.1900001	1.0001959
Det A/4	0 - 70.2%	45.59%	1.682	0.99723953

Det A/1	Sample:	MT	Sample Factor:	1		Jun 12, 1995 18:21:15		
Alpha	Gross:	28	Net:	0.00E+00	±0.094379	pCi:	0.00E+00	±0.1276563
Beta	Gross:	269	Net:	0.00E+00	±0.2802	pCi:	0.00E+00	±0.2849027
Det A/2	Sample:	BL-57147-1	Sample Factor:	1		Jun 12, 1995 18:21:15		
Alpha	Gross:	37	Net:	1.10E-01	±0.0529694	pCi:	1.50E-01	±0.0722076
Beta	Gross:	468	Net:	9.12E-01	±0.1974144	pCi:	9.23E-01	±0.1998666
Det A/3	Sample:	QC-57147-1	Sample Factor:	1		Jun 12, 1995 18:21:15		
Alpha	Gross:	10162	Net:	4.22E+01	±0.8238242	pCi:	5.69E+01	±1.109368
Beta	Gross:	12879	Net:	4.95E+01	±0.9074386	pCi:	5.22E+01	±0.9579056
Det A/4	Sample:	MXS-03841	Sample Factor:	1		Jun 12, 1995 18:21:15		
Alpha	Gross:	47	Net:	1.10E-01	±0.0616068	pCi:	1.45E-01	±0.0813111
Beta	Gross:	691	Net:	1.19E+00	±0.2426894	pCi:	1.17E+00	±0.2397748

R. Tully
6/13/95

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 13, 1995 01:57 pm

Data File
RL0613A.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer A:	1330	High	14400 sec.

Detector Parameters				
Alpha:	Window	Efficiency	Background	Crosstalk
Det A/1	65.9-100%	33.30%	0.37599999	7.5802469
Det A/2	65.4-100%	33.04%	0.044	9.2323008
Det A/3	69.6-100%	33.45%	0.122	7.116519
Det A/4	70.3-100%	34.13%	0.086	7.5292134
Beta:	Window	Efficiency	Background	Crosstalk
Det A/1	0 - 65.8%	44.30%	3.312	0.99590111
Det A/2	0 - 65.3%	44.49%	1.028	0.99997914
Det A/3	0 - 69.5%	42.67%	1.1900001	1.0001959
Det A/4	0 - 70.2%	45.59%	1.682	0.99723953

Det A/1	Sample:	MT	Sample Factor:	1		Jun 13, 1995 09:56:12		
Alpha	Gross:	26	Net:	0.00E+00	±0.094379	pCi:	0.00E+00	±0.1276563
Beta	Gross:	265	Net:	0.00E+00	±0.2802	pCi:	0.00E+00	±0.2849027
Det A/2	Sample:	MXS-03847MS	Sample Factor:	1		Jun 13, 1995 09:56:12		
Alpha	Gross:	6435	Net:	2.68E+01	±0.6553753	pCi:	3.65E+01	±0.8934045
Beta	Gross:	11389	Net:	4.40E+01	±0.855327	pCi:	4.45E+01	±0.8659514
Det A/3	Sample:	MXS-03847MSD	Sample Factor:	1		Jun 13, 1995 09:56:12		
Alpha	Gross:	6145	Net:	2.55E+01	±0.6409171	pCi:	3.43E+01	±0.8630639
Beta	Gross:	11113	Net:	4.33E+01	±0.8505125	pCi:	4.57E+01	±0.8978137
Det A/4	Sample:	MXS-03848	Sample Factor:	1		Jun 13, 1995 09:56:12		
Alpha	Gross:	57	Net:	1.52E-01	±0.0668007	pCi:	2.01E-01	±0.0881664
Beta	Gross:	623	Net:	9.02E-01	±0.233059	pCi:	8.91E-01	±0.23026

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 12, 1995 10:23 pm

Data File
RL0612C.SLK

Drawer Program Parameters			
	High Voltage	**Amp. Gain**	**Count Time**
Drawer C:	1330	High	14400 sec.

Detector Parameters				
Alpha:	**Window**	**Efficiency**	**Background**	**Crosstalk**
Det C/1	67.1-100%	33.45%	0.112	7.9523106
Det C/2	70.2-100%	33.25%	0.062	9.0144672
Det C/3	76.8-100%	32.90%	0.114	8.3989506
Det C/4	72.9-100%	32.80%	0.178	8.399148
Beta:	**Window**	**Efficiency**	**Background**	**Crosstalk**
Det C/1	0 - 67.0%	45.02%	1.256	1.0026717
Det C/2	0 - 70.1%	44.81%	1.262	0.99805158
Det C/3	0 - 76.7%	42.73%	1.252	0.99131513
Det C/4	0 - 72.8%	43.56%	1.63	1.0033267

Det C/1	**Sample:**	MXS-03845	**Sample Factor:**	1		**Jun 12, 1995 18:21:15**		
Alpha	**Gross:**	51	**Net:**	1.00E-01	±0.0652835	**pCi:**	1.35E-01	±0.0879113
Beta	**Gross:**	1007	**Net:**	2.93E+00	±0.2769665	**pCi:**	2.93E+00	±0.2771122
Det C/2	**Sample:**	MXS-03846	**Sample Factor:**	1		**Jun 12, 1995 18:21:15**		
Alpha	**Gross:**	33	**Net:**	7.60E-02	±0.0517424	**pCi:**	1.03E-01	±0.0700989
Beta	**Gross:**	779	**Net:**	1.98E+00	±0.2481209	**pCi:**	1.99E+00	±0.2494169
Det C/3	**Sample:**	MXS-03847	**Sample Factor:**	1		**Jun 12, 1995 18:21:15**		
Alpha	**Gross:**	44	**Net:**	6.90E-02	±0.0617288	**pCi:**	9.45E-02	±0.084527
Beta	**Gross:**	527	**Net:**	9.38E-01	±0.2114261	**pCi:**	9.89E-01	±0.2229007
Det C/4	**Sample:**	MT	**Sample Factor:**	1		**Jun 12, 1995 18:21:15**		
Alpha	**Gross:**	24	**Net:**	0.00E+00	±0.0649369	**pCi:**	0.00E+00	±0.0891874
Beta	**Gross:**	271	**Net:**	0.00E+00	±0.1965814	**pCi:**	0.00E+00	±0.203297

R. Tilley
6/13/95

000405

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 14, 1995 07:47 am

Data File
RL0613A1.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer A:	1330	High	60000 sec.

Detector Parameters				
Alpha:	**Window**	**Efficiency**	**Background**	**Crosstalk**
Det A/1	65.9-100%	33.30%	0.37599999	7.5802469
Det A/2	65.4-100%	33.04%	0.044	9.2323008
Det A/3	69.6-100%	33.45%	0.122	7.116519
Det A/4	70.3-100%	34.13%	0.086	7.5292134
Beta:	**Window**	**Efficiency**	**Background**	**Crosstalk**
Det A/1	0 - 65.8%	44.30%	3.312	0.99590111
Det A/2	0 - 65.3%	44.49%	1.028	0.99997914
Det A/3	0 - 69.5%	42.67%	1.1900001	1.0001959
Det A/4	0 - 70.2%	45.59%	1.682	0.99723953

Det A/1	Sample:	MT	Sample Factor:	1		Jun 13, 1995 15:08:04		
Alpha	Gross:	102	Net:	0.00E+00	±0.065828	pCi:	0.00E+00	±0.0890385
Beta	Gross:	1111	Net:	0.00E+00	±0.1954355	pCi:	0.00E+00	±0.1987156
Det A/2	Sample:	EO 3881	Sample Factor:	1		Jun 13, 1995 15:08:04		
Alpha	Gross:	341	Net:	2.97E-01	±0.0405961	pCi:	4.05E-01	±0.0553405
Beta	Gross:	1982	Net:	9.27E-01	±0.1241817	pCi:	9.39E-01	±0.1257242
Det A/3	Sample:	EO 3882	Sample Factor:	1		Jun 13, 1995 15:08:04		
Alpha	Gross:	376	Net:	2.54E-01	±0.0488036	pCi:	3.42E-01	±0.0657193
Beta	Gross:	1537	Net:	3.29E-01	±0.1224343	pCi:	3.47E-01	±0.1292435
Det A/4	Sample:	EO 3883	Sample Factor:	1		Jun 13, 1995 15:08:04		
Alpha	Gross:	457	Net:	3.71E-01	±0.0491565	pCi:	4.90E-01	±0.0648788
Beta	Gross:	2206	Net:	4.96E-01	±0.1459592	pCi:	4.90E-01	±0.1442063

R. Jully
6/14/95

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 14, 1995 07:48 am

Data File
RL0613B1.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer B:	1330	High	60000 sec.

Detector Parameters				
Alpha:	Window	Efficiency	Background	Crosstalk
Det B/1	74.3-100%	33.09%	0.148	7.6540756
Det B/2	77.3-100%	33.96%	0.066	7.2033896
Det B/3	78.4-100%	31.44%	0.09	9.5462275
Det B/4	77.8-100%	32.95%	0.11	8.0109806
Beta:	Window	Efficiency	Background	Crosstalk
Det B/1	0 - 74.2%	43.91%	1.516	0.99632984
Det B/2	0 - 77.2%	44.30%	0.95200002	0.99805003
Det B/3	0 - 78.3%	42.62%	1.368	1.0187516
Det B/4	0 - 77.7%	42.82%	1.62	1.0118318

Det B/1	Sample:	MT	Sample Factor:	1		Jun 13, 1995 15:08:13		
Alpha	Gross:	110	Net:	0.00E+00	±0.0412998	pCi:	0.00E+00	±0.0562227
Beta	Gross:	1440	Net:	0.00E+00	±0.132218	pCi:	0.00E+00	±0.1356371
Det B/2	Sample:	EO 3884	Sample Factor:	1		Jun 13, 1995 15:08:13		
Alpha	Gross:	361	Net:	2.95E-01	±0.0435191	pCi:	3.91E-01	±0.0577234
Beta	Gross:	1711	Net:	7.38E-01	±0.1175397	pCi:	7.50E-01	±0.1195187
Det B/3	Sample:	MT	Sample Factor:	1		Jun 13, 1995 15:08:13		
Alpha	Gross:	110	Net:	2.00E-02	±0.0333776	pCi:	2.87E-02	±0.0478207
Beta	Gross:	2023	Net:	6.53E-01	±0.135222	pCi:	6.90E-01	±0.1429025
Det B/4	Sample:	MT	Sample Factor:	1		Jun 13, 1995 15:08:13		
Alpha	Gross:	154	Net:	4.40E-02	±0.0379046	pCi:	6.02E-02	±0.0518197
Beta	Gross:	1618	Net:	0.00E+00	±0.1366726	pCi:	0.00E+00	±0.143762

R. Gulley
6/14/95

3-JUN-1995 10:08 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
AMPLE NAME..... : BL-57147-1
AMPLE ID..... : S955802Q

OUNTER ID..... : HT1000
OSITION NUMBER..... : A2
AMPLE ALPHA COUNT..... : 37.0
AMPLE BETA COUNT..... : 468.0
AMPLE COUNT TIME..... : 240.0 MIN.
AMPLE ALPHA BACK GROUND. : 0.0440
AMPLE BETA BACK GROUND.. : 1.0280
AMPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 0.3500 L
AMPLE ALPHA EFF..... : 0.3304
AMPLE BETA EFF ..... : 0.4449
AMPLE ALPHA ATTN..... : 0.8745
AMPLE BETA ATTN..... : 0.9462
PHA TO BETA X TALK..... : 0.09232
TA TO ALPHA X TALK..... : 0.01000
STEMATIC ERROR..... : 0.1000

RESULTS ALPHA

Activity/sample

PHA ACTIVITY..... : 4.648E-01 pCi/L x 0.350 L = 0.163 pCi/sam
PHA TWO SIG COUNT ERROR..... : 2.320E-01 x 0.350 L = 0.0812 pCi/sam
PHA TPU..... : 2.492E-01 pCi/L x 0.350 L = 0.0872 pCi/sam
PHA LLD..... : 2.414E-01 pCi/L x 0.350 L = 0.08449 pCi/sam
PHA MDC..... : 3.309E-01 pCi/L x 0.350 L = 0.1158 pCi/sam

RESULTS BETA

TA ACTIVITY..... : 2.835E+00 pCi/L x 0.350 L = 0.992 pCi/sam
TA TWO SIG COUNT ERROR..... : 6.052E-01 x 0.350 L = 0.2118 pCi/sam
TA TPU..... : 8.216E-01 pCi/L x 0.350 L = 0.2876 pCi/sam
TA LLD..... : 8.008E-01 pCi/L x 0.350 L = 0.2803 pCi/sam
TA MDC..... : 9.654E-01 pCi/L x 0.350 L = 0.3379 pCi/sam

R. Tully
6/13/95

3-JUN-1995 10:08 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
AMPLE NAME..... : QC-57147-1
AMPLE ID..... : S955802R

OUNTER ID..... : HT1000
OSITION NUMBER..... : A3
AMPLE ALPHA COUNT..... : 10162.0
AMPLE BETA COUNT..... : 12879.0
AMPLE COUNT TIME..... : 240.0 MIN.
AMPLE ALPHA BACK GROUND. : 0.1220
AMPLE BETA BACK GROUND.. : 1.1900
AMPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 0.3500 L
AMPLE ALPHA EFF..... : 0.3345
AMPLE BETA EFF ..... : 0.4267
AMPLE ALPHA ATTN..... : 0.8674
AMPLE BETA ATTN..... : 0.9447
LPHA TO BETA X TALK..... : 0.07117
ETA TO ALPHA X TALK..... : 0.01000
YSTEMATIC ERROR..... : 0.1000

RESULTS ALPHA

						Activity/Sample
LPHA ACTIVITY..... :	1.991E+02	pCi/L	x 0.350 L	=		69.69 pCi/sam
LPHA TWO SIG COUNT ERROR..... :	3.767E+00		x 0.350 L	=		1.318 pCi/sam
LPHA TPU..... :	3.920E+01	pCi/L	x 0.350 L	=		13.72 pCi/sam
LPHA LLD..... :	4.003E-01	pCi/L	x 0.350 L	=		0.140 pCi/sam
LPHA MDC..... :	5.154E-01	pCi/L	x 0.350 L	=		0.180 pCi/sam

RESULTS BETA

ETA ACTIVITY..... :	1.595E+02	pCi/L	x 0.350 L	=	55.83 pCi/sam
ETA TWO SIG COUNT ERROR..... :	2.905E+00		x 0.350 L	=	1.017 pCi/sam
ETA TPU..... :	3.140E+01	pCi/L	x 0.350 L	=	10.99 pCi/sam
ETA LLD..... :	8.998E-01	pCi/L	x 0.350 L	=	0.315 pCi/sam
ETA MDC..... :	1.082E+00	pCi/L	x 0.350 L	=	0.379 pCi/sam

R. Jolly
6/13/95

3-JUN-1995 16:15 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
MPLE NAME..... : MXS 03847MS
MPLE ID..... : S954Y05L

OUNTER ID..... : HT1000
OSITION NUMBER..... : A2
MPLE ALPHA COUNT..... : 6435.0
MPLE BETA COUNT..... : 11389.0
MPLE COUNT TIME..... : 240.0 MIN.
MPLE ALPHA BACK GROUND. : 0.0440
MPLE BETA BACK GROUND.. : 1.0280
MPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 0.3000 L
MPLE ALPHA EFF..... : 0.3304
MPLE BETA EFF ..... : 0.4449
MPLE ALPHA ATTN..... : 0.5387
MPLE BETA ATTN..... : 0.8887
PHA TO BETA X TALK..... : 0.09232
TA TO ALPHA X TALK..... : 0.01000
STEMATIC ERROR..... : 0.1000

RESULTS ALPHA

Activity/sample

PHA ACTIVITY..... :	2.444E+02	pCi/L	x 0.300 L =	73.32 pCi/sam
PHA TWO SIG COUNT ERROR..... :	5.751E+00		x 0.300 L =	1.725 pCi/sam
PHA TPU..... :	4.825E+01	pCi/L	x 0.300 L =	14.48 pCi/sam
PHA LLD..... :	4.572E-01	pCi/L	x 0.300 L =	0.1372 pCi/sam
PHA MDC..... :	6.267E-01	pCi/L	x 0.300 L =	0.1880 pCi/sam

RESULTS BETA

TA ACTIVITY..... :	1.686E+02	pCi/L	x 0.300 L =	50.58 pCi/sam
TA TWO SIG COUNT ERROR..... :	3.256E+00		x 0.300 L =	0.9768 pCi/sam
TA TPU..... :	3.321E+01	pCi/L	x 0.300 L =	9.963 pCi/sam
TA LLD..... :	9.947E-01	pCi/L	x 0.300 L =	0.2984 pCi/sam
TA MDC..... :	1.199E+00	pCi/L	x 0.300 L =	0.3597 pCi/sam

R. Jully
6/13/95

3-JUN-1995 16:15

R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
AMPLE NAME..... : MXS 03847MSD
AMPLE ID..... : S954Y05M

OUNTER ID..... : HT1000
OSITION NUMBER..... : A3
AMPLE ALPHA COUNT..... : 6145.0
AMPLE BETA COUNT..... : 11113.0
AMPLE COUNT TIME..... : 240.0 MIN.
AMPLE ALPHA BACK GROUND. : 0.1220
AMPLE BETA BACK GROUND.. : 1.1900
AMPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 0.3000 L
AMPLE ALPHA EFF..... : 0.3345
AMPLE BETA EFF ..... : 0.4267
AMPLE ALPHA ATTN..... : 0.5423
AMPLE BETA ATTN..... : 0.8893
LPHA TO BETA X TALK..... : 0.07117
ETA TO ALPHA X TALK..... : 0.01000
YSTEMATIC ERROR..... : 0.1000

RESULTS ALPHA

Activity / Sample

PHA ACTIVITY..... : 2.230E+02 pCi/L x 0.300 L = 66.90 pCi/sam
PHA TWO SIG COUNT ERROR..... : 5.454E+00 x 0.300 L = 1.636 pCi/sam
PHA TPU..... : 4.405E+01 pCi/L x 0.300 L = 13.22 pCi/sam
PHA LLD..... : 7.469E-01 pCi/L x 0.300 L = 0.2241 pCi/sam
PHA MDC..... : 9.617E-01 pCi/L x 0.300 L = 0.2885 pCi/sam

RESULTS BETA

TA ACTIVITY..... : 1.731E+02 pCi/L x 0.300 L = 51.93 pCi/sam
TA TWO SIG COUNT ERROR..... : 3.377E+00 x 0.300 L = 1.013 pCi/sam
TA TPU..... : 3.409E+01 pCi/L x 0.300 L = 10.23 pCi/sam
TA LLD..... : 1.115E+00 pCi/L x 0.300 L = 0.3345 pCi/sam
TA MDC..... : 1.341E+00 pCi/L x 0.300 L = 0.4023 pCi/sam

B. Fully
6/13/95

3-JUN-1995 10:08 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
MPLE NAME..... : MXS 03847
MPLE ID..... : S954Y05K

UNTER ID..... : HT1000
SITION NUMBER..... : C3
MPLE ALPHA COUNT..... : 44.0
MPLE BETA COUNT..... : 527.0
MPLE COUNT TIME..... : 240.0 MIN.
MPLE ALPHA BACK GROUND. : 0.1140
MPLE BETA BACK GROUND.. : 1.2520
MPLE BACK GROUND TIME.. : 500.0 MIN.
LUME..... : 0.3000 L
MPLE ALPHA EFF..... : 0.3290
MPLE BETA EFF ..... : 0.4273
MPLE ALPHA ATTN..... : 0.5386
MPLE BETA ATTN..... : 0.8887
PHA TO BETA X TALK..... : 0.08399
TA TO ALPHA X TALK..... : 0.00991
STEMATIC ERROR..... : 0.1000

RESULTS ALPHA

				Activity /sam
PHA ACTIVITY..... :	5.286E-01	pCi/L	x 0.300L =	0.1586 pCi/sam
PHA TWO SIG COUNT ERROR..... :	5.154E-01		x 0.300L =	0.1546 pCi/sam
PHA TPU..... :	5.257E-01	pCi/L	x 0.300L =	0.1577 pCi/sam
PHA LLD..... :	7.392E-01	pCi/L	x 0.300L =	0.2218 pCi/sam
PHA MDC..... :	9.550E-01	pCi/L	x 0.300L =	0.2865 pCi/sam

RESULTS BETA

TA ACTIVITY..... :	3.758E+00	pCi/L	x 0.300L = 1.127 pCi/sam
TA TWO SIG COUNT ERROR..... :	8.376E-01		x 0.300L = 0.25128 pCi/sam
TA TPU..... :	1.115E+00	pCi/L	x 0.300L = 0.3345 pCi/sam
TA LLD..... :	1.143E+00	pCi/L	x 0.300L = 0.3429 pCi/sam
TA MDC..... :	1.374E+00	pCi/L	x 0.300L = 0.4122 pCi/sam

R. Jolly
6/13/95

1-JUN-1995 09:13 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

ROUP ID..... : G955802X
MPLE NAME..... : EO 3881
MPLE ID..... : S954P067

OUNTER ID..... : HT1000
OSITION NUMBER..... : A2
MPLE ALPHA COUNT..... : 341.0
MPLE BETA COUNT..... : 1982.0
MPLE COUNT TIME..... : 1000.0 MIN.
MPLE ALPHA BACK GROUND. : 0.0440
MPLE BETA BACK GROUND.. : 1.0280
MPLE BACK GROUND TIME.. : 500.0 MIN.
OLUME..... : 1.0000 Filter
MPLE ALPHA EFF..... : 0.3304
MPLE BETA EFF ..... : 0.4449
MPLE ALPHA ATTN..... : 0.4109
MPLE BETA ATTN..... : 0.8690
PHA TO BETA X TALK..... : 0.09232
TA TO ALPHA X TALK..... : 0.01000
STEMATIC ERROR..... : 0.1000

RESULTS ALPHA

Activity/Sample

PHA ACTIVITY..... : 1.028E+00 pCi/flt x 5 = 5.14 pCi
PHA TWO SIG COUNT ERROR..... : 1.367E-01 x 5 = 0.6835 pCi
PHA TPU..... : 2.435E-01 pCi/flt x 5 = 1.217 pCi
PHA LLD..... : 1.254E-01 pCi/flt x 5 = 0.627 pCi
PHA MDC..... : 1.114E-01 pCi/flt x 5 = 0.557 pCi

RESULTS BETA

TA ACTIVITY..... : 1.098E+00 pCi/flt x 5 = 5.49 pCi
TA TWO SIG COUNT ERROR..... : 1.449E-01 x 5 = 0.725 pCi
TA TPU..... : 2.594E-01 pCi/flt x 5 = 1.297 pCi
TA LLD..... : 2.129E-01 pCi/flt x 5 = 1.0645 pCi
TA MDC..... : 1.770E-01 pCi/flt x 5 = 0.885 pCi

Prepared sample was a 1:5 dilution

R. Jolley
6/14/95

-JUN-1995 08:57 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

OUP ID..... : G955802X
MPLE NAME..... : EO 3882
MPLE ID..... : S954P068

UNTER ID..... : HT1000
SITION NUMBER..... : A3
MPLE ALPHA COUNT..... : 376.0
MPLE BETA COUNT..... : 1537.0
MPLE COUNT TIME..... : 1000.0 MIN.
MPLE ALPHA BACK GROUND. : 0.1220
MPLE BETA BACK GROUND.. : 1.1900
MPLE BACK GROUND TIME.. : 500.0 MIN.
LUME..... : 1.0000 Filter
MPLE ALPHA EFF..... : 0.3345
MPLE BETA EFF ..... : 0.4267
MPLE ALPHA ATTN..... : 0.4233
MPLE BETA ATTN..... : 0.8709
PHA TO BETA X TALK..... : 0.07117
TA TO ALPHA X TALK..... : 0.01000
STEMATIC ERROR..... : 0.1000

RESULTS ALPHA

				Activity/sample
PHA ACTIVITY..... :	8.470E-01 pCi/flt	x5	=	4.235 pCi
PHA TWO SIG COUNT ERROR..... :	1.568E-01	x5	=	0.784 pCi
PHA TPU..... :	2.283E-01 pCi/flt	x5	=	1.141 pCi
PHA LLD..... :	2.002E-01 pCi/flt	x5	=	1.001 pCi
PHA MDC..... :	1.721E-01 pCi/flt	x5	=	0.8605 pCi

RESULTS BETA

A ACTIVITY..... :	4.067E-01 pCi/flt	x5	=	2.033 pCi
A TWO SIG COUNT ERROR..... :	1.485E-01	x5	=	0.7425 pCi
A TPU..... :	1.685E-01 pCi/flt	x5	=	0.8425 pCi
A LLD..... :	2.383E-01 pCi/flt	x5	=	1.191 pCi
A MDC..... :	1.978E-01 pCi/flt	x5	=	0.989 pCi

prepared sample was a 1:5 dilution.

R. Fulley
6/14/95

-JUN-1995 08:57 R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

OUP ID..... : G955802X
MPLE NAME..... : EO 3883
MPLE ID..... : S954P069

UNTER ID..... : HT1000
SITION NUMBER..... : A4
MPLE ALPHA COUNT..... : 457.0
MPLE BETA COUNT..... : 2206.0
MPLE COUNT TIME..... : 1000.0 MIN.
MPLE ALPHA BACK GROUND. : 0.0860
MPLE BETA BACK GROUND.. : 1.6820
MPLE BACK GROUND TIME.. : 500.0 MIN.
LUME..... : 1.0000 Filter
MPLE ALPHA EFF..... : 0.3413
MPLE BETA EFF ..... : 0.4559
MPLE ALPHA ATTN..... : 0.3918
MPLE BETA ATTN..... : 0.8661
PHA TO BETA X TALK..... : 0.07529
TA TO ALPHA X TALK..... : 0.00997
STEMATIC ERROR..... : 0.1000

RESULTS ALPHA

Activity / Sample

PHA ACTIVITY..... : 1.295E+00 pCi/flt x5 = 6.475 pCi
PHA TWO SIG COUNT ERROR..... : 1.673E-01 x5 = 0.8365 pCi
PHA TPU..... : 3.040E-01 pCi/flt x5 = 1.52 pCi
PHA LLD..... : 1.780E-01 pCi/flt x5 = 0.89 pCi
PHA MDC..... : 1.545E-01 pCi/flt x5 = 0.7725 pCi

RESULTS BETA

TA ACTIVITY..... : 5.834E-01 pCi/flt x5 = 2.917 pCi
TA TWO SIG COUNT ERROR..... : 1.667E-01 x5 = 0.8335 pCi
TA TPU..... : 2.021E-01 pCi/flt x5 = 1.011 pCi
TA LLD..... : 2.666E-01 pCi/flt x5 = 1.333 pCi
TA MDC..... : 2.208E-01 pCi/flt x5 = 1.104 pCi

prepare sample was a 1:5 dilution

R. Jullig
6/14/95

-JUN-1995 08:57

R300-V1.0

DATACHEM LABORATORIES
GROSS ALPHA / BETA ANALYSES
SDG : NA

OUP ID..... : G955802X
MPLE NAME..... : EO 3884
MPLE ID..... : S954P06B

UNTER ID..... : HT1000
SITION NUMBER..... : B2
MPLE ALPHA COUNT..... : 361.0
MPLE BETA COUNT..... : 1711.0
MPLE COUNT TIME..... : 1000.0 MIN.
MPLE ALPHA BACK GROUND. : 0.0660
MPLE BETA BACK GROUND.. : 0.9520
MPLE BACK GROUND TIME.. : 500.0 MIN.
LUME..... : 1.0000 Filter
MPLE ALPHA EFF..... : 0.3396
MPLE BETA EFF ..... : 0.4430
MPLE ALPHA ATTN..... : 0.3812
MPLE BETA ATTN..... : 0.8645
PHA TO BETA X TALK..... : 0.07203
TA TO ALPHA X TALK..... : 0.00998
STEMATIC ERROR..... : 0.1000

RESULTS ALPHA

Activity / Sample

PHA ACTIVITY..... : 1.060E+00 pCi/flt x 5 = 5.30 pCi
PHA TWO SIG COUNT ERROR..... : 1.529E-01 x 5 = 0.7645 pCi
PHA TPU..... : 2.579E-01 pCi/flt x 5 = 1.2895 pCi
PHA LLD..... : 1.611E-01 pCi/flt x 5 = 0.8055 pCi
PHA MDC..... : 1.410E-01 pCi/flt x 5 = 0.705 pCi

RESULTS BETA

TA ACTIVITY..... : 8.821E-01 pCi/flt x 5 = 4.4105 pCi
TA TWO SIG COUNT ERROR..... : 1.384E-01 x 5 = 0.692 pCi
TA TPU..... : 2.215E-01 pCi/flt x 5 = 1.1075 pCi
TA LLD..... : 2.068E-01 pCi/flt x 5 = 1.034 pCi
TA MDC..... : 1.720E-01 pCi/flt x 5 = 0.860 pCi

Prepared sample was a 1:5 dilution

R. Jolly
6/14/95

Section 2. Instrument Performance and Calibration Data
Proportional Counting
Inventory Checklist

- [x] Instrument ID
- [x] Date and Time Calibrated, Calibration Check, Analysis Initials
- [x] NIST Traceable Certificate(s), and Activity of Standard(s)
- [x] Attenuation/Absorption Curve(s)
- [x] Instrument Efficiencies
- [x] Alpha/Beta Crosstalk
- [NA] Statistical Results Used to Demonstrate Detector Reliability
- [NA] Results of Chi-Square Tests Used to Evaluate Efficiency Checks
- [x] Background Counts Obtained for Each Detector
- [x] Background Count Duration
- [NA] Statistical Results Used to Demonstrate Background Reliability

Section 2. Instrument Performance and Calibration Data
Proportional Counting
Reviewer Checklist

X The Instrument Performance and Calibration Data Inventory Checklist above is complete.

X Specified analytical protocols are followed for particular contract requirements.

X Conditions of instrument setup are noted.

X NCR(s) noted, and affected instruments not used.

CALIBRATION/MAINTENANCE LOG

Instrument: HT-1000-1

	DATE	ANALYST	CALIBRATION/MAINTENANCE
10 min	4/26/95	RLK	Check sources all detectors
500 min	5/1/95	RLK	Backgrounds all detectors
200 min	5/10/95	RLK	BACKGROUND Collect all detectors
	5/10/95	RLK	Check sources Drawers A, B, + C
23 days (2200 lbs)	5/10/95	RLK	Changed gas bottles + filter
	5/11/95	RLK	Calibrated all detectors
100 min			Background collect all detectors
10 min	5/11/95	RLK	check sources All drawers/detectors
500 min	5/12/95	RLK	BACKGROUND COLLECT All detectors
10 min	5/21/95	WMS	Check sources Drawer A / detectors 1-4
100 min	5/21/95	WMS	Bkg collect Drawer A detectors 1-4
500 min	5-22-95	CMW	Background Collect: all detectors
	5-24-95	RLK	Check Sources all detectors
10 min	5-25-95	CMW	Check sources Drawer A, B, detectors 1-4
500 min (2200 lbs)	5-26-95	CMW	Background collect: all detectors
6 days	6-5-95	CMW	Changed gas bottles + filters
	6-5-95	RLK	Calibrated drawers A, B, + C
500 min	6-5-95	CMW	Background collect drawers A, B + C
	6-6-95	CMW	Calibrated drawer D
	6-6-95	CMW	Check sources drawers A, B
500 min	6-6-95	CMW	Background collect drawer D
	6-9-95	RLK	Check Sources / all detectors
	6-9-95	RLK	Background collect

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOURCE

7678

Radionuclide:	Pu-239	Customer:	DATACHEM LABORATORIES
Half Life:	(2.411 ± 0.003) x 10^4 years	P.O.No.:	7302
Catalog No.:	EAB-239	Reference Date:	July 1 1991 12:00 PST.
Source No.:	Q-088	Contained Radioactivity:	6,080 dpm.

Description of Source

a. Capsule type:	PL
b. Nature of active deposit:	Electrodeposited and diffusion bonded oxide
c. Active area/ diameter/volume:	45 mm
d. Backing:	0.254 mm stainless steel
e. Cover:	100 μgram/cm^2 gold

CAUTION!
DELICATE SURFACE
DO NOT WIPE
ACTIVE AREA

Radioimpurities

None detected

Method of Calibration

The source was assayed using a windowless internal gas flow proportional counter.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	± 1.3%
b. Random uncertainty in assay:	± 1.4%
c. Random uncertainty in weighing(s):	± 0.0%
d. Total uncertainty at the 99% confidence level:	± 2.7%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Notes

1. Nuclear data were taken from "Table of Isotopes", Seventh Edition, edited by Virginia S. Shirley.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials. (As in NRC Regulatory Guide 4.15)

QUALITY CONTROL

ISOTOPE PRODUCTS LABORATORIES
1800 No. Keystone Street.,
Burbank, California 91504
(818) 843 - 7000

000420

IPL Ref. No.: 388-4-1

CERTIFICATE OF CALIBRATION
BETA STANDARD SOURCE

7678

Radionuclide:	Sr-90	Customer:	DATACHEM LABORATORIES
Half Life:	28.5 ± 0.2 years	P.O.No.:	7302
Catalog No.:	EAB-090	Reference Date:	June 15 1991 12:00 PST.
Source No.:	P-638	Contained Radioactivity:	30,200 dpm.

Description of Source

a. Capsule type: PL

b. Nature of active deposit: Distributed and evaporated metallic salts

c. Active diameter/volume: 45 mm

d. Backing: Stainless steel

e. Cover: 0.9 mg/cm² aluminized myl

CAUTION!
DELICATE SURFACE
DO NOT WIPE
ACTIVE AREA

Radioimpurities

None detected

Method of Calibration

MYLAR COVER WILL REDUCE ACTIVITY BY

The source was prepared from a e concentration in μCi/gram was determined by a liquid scintiliatio

~~3.37%~~

3% - Sr-90

.37% - Y-90

Uncertainty of Measurement

a. Systematic uncertainty in instr

b. Random uncertainty in assay: ± 0.5%

c. Random uncertainty in weighing(s): ± 0.2%

d. Total uncertainty at the 99% confidence level: ± 2.2%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Notes

1. Nuclear data were taken from "Table of Isotopes", Seventh Edition, edited by Virginia S. Shirley.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials. (As in NRC Regulatory Guide 4.15)

QUALITY CONTROL

ISOTOPE PRODUCTS LABORATORIES
1800 No. Keystone Street.,
Burbank, California 91504
(818) 843 - 7000

000421

IPL Ref. No.: 379-75-7

DCL/RCL

TITLE DCL/RCL /CHECK SOURCES

Project No.

Book No. 2694

From Page No. 27

PU-239-001-IS (Activity = 657 pC/mL)

1/11/94 SR-90-001-IS (Act. = 220.7 pC/mL)

	PU-239-001-IS wt.(g)	PU-239-001-IS mL	SR-90-001-IS wt(g)	SR-90-001-IS mL	Activity PU-239	Activity SR-90
CKS-001	1.0006	1.0022	1.0010	1.0026	657.4	221.3
CKS-002	1.0088	1.0104	1.0077	1.0093	662.8	222.8
CKS-003	1.0052	1.0068	1.0013	1.0029	660.5	221.3
CKS-004	1.0096	1.0112	1.0004	1.0020	663.3	221.1
CKS-001	1.5064	1.5085	1.5070	1.5091	989.6	333.1
CKS-002	1.5098	1.5119	1.5100	1.5121	991.8	333.7
CKS-003	1.5017	1.5038	1.5179	1.5200	986.5	335.5
CKS-004	1.5003	1.5024	1.5348	1.53692	985.6	339.2

	PU-239	SR-90 (10/7/91)	Decay corrected SR-90 Activity (1/12/94)
CKS-001	1647.0 pC/	554.4	1025.2 pC/
CKS-002	1654.6 pC/	556.5	1029.1 pC/
CKS-003	1647.0 pC/	556.8	1029.7 pC/
CKS-004	1648.9 pC/	560.3	1036.1 pC/

CKS-001 Activities 10 minute counts

File Name	Det 1 α	Det 1 β	Det. 2 α	Det. 2 β	Det 3 α	Det 3 β	Det 4 α	Det 4 β
CKS-0118 A	1260	909	1220	889	1340	930	1410	983
CKS-0118 B	1490	1020	1390	1000	1500	1010	1480	998
CKS-0118 C	1230	871	1270	963	1320	913	1370	949
CKS-0118 D	1390	1010	~~1460~~ 1358	~~988~~ 948	1300	923	1360	970
CKS-0118 E	1290	874	1270	939	1400	971	1340	941
CKS-0119 A	1200	847	1320	966	1300	908	1380	969
$\bar{X}$	1310	922	1303	958	1360	943	1390	968
S	109.7	74.9	69.9	40.0	78.0	39.9	49.8	21.1
2σ	219	150	124	80	156	80	100	42
Target	1647	1025.2	1647	1025.2	1647	1025.2	1647.	1025.2
%	79.5%	89.9%	79.1%	93.4%	82.6%	92.0%	84.4%	94.4%

N=24 $\bar{X}_\alpha$ = 1341 ; S = 81.6 ; 2σ = 163 % rec = 81.42

$\bar{X}_\beta$ = 948 ; S = 48.3 ; 2σ = 97 % rec 92.47

To Page No. 28

Witnessed & Understood by me, Date 2-1-94

Invented by Date 1/20/94

Recorded by

DCL/RCL Project No.

TLE DCL/RCL Check sources Book No. 2694

om Page No. 27 | RK-0121A | 60 min counts

Sample	Planchet	Tare wt.	Planchet + Sample	Sample wt. (mg)	Self-Absorption Alpha F&A	Self-Absorption Beta F&A	Activity α	Activity β	Target α	Target β
CSC-001	C-614	7.34259	7.34525	2.66	0.79062	0.93306	1640	1030	1647.0	1025.0
CSC-002	C-615	7.33647	7.33938	2.91	0.78099	0.93112	1710	1050	1654.6	1028.9
CSC-003	C-616	7.19858	7.20055	1.97	0.82145	0.93946	1650	1020	1647.0	1029.4
CSC-004	C-617	7.33915	7.34113	1.98	0.82094	0.93935	1670	1040	1648.9	1035.9

% Recovery

CSC-001 α	CSC-001 β	CSC-002 α	CSC-002 β	CSC-003 α	CSC-003 β	CSC-004 α	CSC-004 β
99.57	100.5	~~100.3~~ 103.3	102.1	100.2	99.09	101.3	100.4

Sample	Detector 1 ALPHA	Detector 1 BETA	Detector 2 ALPHA	Detector 2 BETA	Detector 3 ALPHA	Detector 3 BETA	Detector 4 ALPHA	Detector 4 BETA	$\bar{x}$ ± 2s (α)	$\bar{x}$ ± 2s (β)
CSC-001	1570	1010	1560	1010	1660	992	1570	987	1590 ± 94	1000 ± 24
CSC-002	1640	1030	1680	1040	1750	1020	1650	1010	1680 ± 99	1025 ± 26
CSC-003	1640	1050	1600	1040	1770	1030	1740	1040	1688 ± 161	1040 ± 16
CSC-004	1590	1040	1580	1070	1640	1040	1630	1050	1610 ± 57	1050 ± 28

Sample	Detector 1 α	Detector 1 β	Detector 2 α	Detector 2 β	Detector 3 α	Detector 3 β	Detector 4 α	Detector 4 β	$\bar{x}$ ± 2s α	$\bar{x}$ ± 2s β
CSC-001	95.32	98.54	94.72	98.54	100.79	96.78	95.32	96.29	96.54 ± 5.70	97.54 ± 2.35
CSC-002	99.12	100.11	101.5	101.1	105.77	99.13	99.72	98.16	101.53 ± 6.01	99.63 ± 2.53
CSC-003	99.57	102.0	97.15	101.03	107.5	100.1	105.65	101.03	102.47 ± 9.81	101.04 ± 1.55
CSC-004	96.43	100.40	95.82	103.29	99.46	100.40	98.85	101.36	97.64 ± 3.57	101.36 ± 2.72
$\bar{x}$	97.61	100.26	97.30	100.99	103.38	99.10	99.89	99.21	99.55	99.89
± 2s	± 4.12	± 2.84	± 5.95	± 3.88	± 7.73	± 3.28	± 8.58	± 4.84	± 5.79	± 3.48

α) $\bar{x}$ = 99.54 ± 7.38 N = 16

β) $\bar{x}$ = 99.89 ± 3.75 N = 16

Ray Kern 1/25/94

To Page No. 28

nessed & Understood by me,	Date	Invented by	Date
R W Brock	2-1-94	Recorded by Ray Kern	1/25/94

7678

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 12, 1995 02:44 pm

Data File
CKS0612A.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer A:	1330	High	600 sec.

Detector Parameters				
Alpha:	Window	Efficiency	Background	Crosstalk
Det A/1	65.9-100%	33.30%	0.37599999	7.5802469
Det A/2	65.4-100%	33.04%	0.044	9.2323008
Det A/3	69.6-100%	33.45%	0.122	7.116519
Det A/4	70.3-100%	34.13%	0.086	7.5292134
Beta:	Window	Efficiency	Background	Crosstalk
Det A/1	0 - 65.8%	44.30%	3.312	0.99590111
Det A/2	0 - 65.3%	44.49%	1.028	0.99997914
Det A/3	0 - 69.5%	42.67%	1.1900001	1.0001959
Det A/4	0 - 70.2%	45.59%	1.682	0.99723953

Det A/1	Sample:	CKS-001A	Sample Factor:	1		Jun 12, 1995 14:34:41		
Alpha	Gross:	7959	Net:	7.96E+02	±17.485875	pCi:	1.08E+03	±23.651264
Beta	Gross:	8693	Net:	8.06E+02	±17.679556	pCi:	8.19E+02	±17.976281
Det A/2	Sample:	CKS-002A	Sample Factor:	1		Jun 12, 1995 14:34:41		
Alpha	Gross:	9147	Net:	9.15E+02	±18.745438	pCi:	1.25E+03	±25.553691
Beta	Gross:	9609	Net:	8.75E+02	±18.431018	pCi:	8.86E+02	±18.659958
Det A/3	Sample:	CKS-003A	Sample Factor:	1		Jun 12, 1995 14:34:41		
Alpha	Gross:	7951	Net:	7.95E+02	±17.47703	pCi:	1.07E+03	±23.534703
Beta	Gross:	8344	Net:	7.77E+02	±17.331055	pCi:	8.20E+02	±18.294919
Det A/4	Sample:	CKS-004A	Sample Factor:	1		Jun 12, 1995 14:34:41		
Alpha	Gross:	8025	Net:	8.02E+02	±17.558163	pCi:	1.06E+03	±23.173982
Beta	Gross:	8371	Net:	7.75E+02	±17.32431	pCi:	7.66E+02	±17.116251

R. Tulley
6/13/95

000424

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 12, 1995 03:19 pm

Data File
CKS0612B.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer B:	1330	High	600 sec.

Detector Parameters				
Alpha:	Window	Efficiency	Background	Crosstalk
Det B/1	74.3-100%	33.09%	0.148	7.6540756
Det B/2	77.3-100%	33.96%	0.066	7.2033896
Det B/3	78.4-100%	31.44%	0.09	9.5462275
Det B/4	77.8-100%	32.95%	0.11	8.0109806
Beta:	Window	Efficiency	Background	Crosstalk
Det B/1	0 - 74.2%	43.91%	1.516	0.99632984
Det B/2	0 - 77.2%	44.30%	0.95200002	0.99805003
Det B/3	0 - 78.3%	42.62%	1.368	1.0187516
Det B/4	0 - 77.7%	42.82%	1.62	1.0118318

Det B/1	Sample:	CKS-001A	Sample Factor:	1		Jun 12, 1995 15:09:31		
Alpha	Gross:	8089	Net:	8.09E+02	±17.62805	pCi:	1.10E+03	±23.997631
Beta	Gross:	8865	Net:	8.23E+02	±17.849637	pCi:	8.44E+02	±18.311231
Det B/2	Sample:	CKS-002A	Sample Factor:	1		Jun 12, 1995 15:09:31		
Alpha	Gross:	8954	Net:	8.95E+02	±18.546626	pCi:	1.19E+03	±24.600102
Beta	Gross:	9431	Net:	8.78E+02	±18.420567	pCi:	8.92E+02	±18.730712
Det B/3	Sample:	CKS-003A	Sample Factor:	1		Jun 12, 1995 15:09:31		
Alpha	Gross:	7386	Net:	7.39E+02	±16.844621	pCi:	1.06E+03	±24.133603
Beta	Gross:	8305	Net:	7.59E+02	±17.16269	pCi:	8.02E+02	±18.137521
Det B/4	Sample:	CKS-004A	Sample Factor:	1		Jun 12, 1995 15:09:31		
Alpha	Gross:	7231	Net:	7.23E+02	±16.666942	pCi:	9.88E+02	±22.785503
Beta	Gross:	7546	Net:	6.95E+02	±16.414393	pCi:	7.31E+02	±17.265828

R. Tully
6/13/95

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 12, 1995 03:31 pm

Data File
CKS0612C.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer C:	1330	High	600 sec.

Detector Parameters				
Alpha:	Window	Efficiency	Background	Crosstalk
Det C/1	67.1-100%	33.45%	0.112	7.9523106
Det C/2	70.2-100%	33.25%	0.062	9.0144672
Det C/3	76.8-100%	32.90%	0.114	8.3989506
Det C/4	72.9-100%	32.80%	0.178	8.399148
Beta:	Window	Efficiency	Background	Crosstalk
Det C/1	0 - 67.0%	45.02%	1.256	1.0026717
Det C/2	0 - 70.1%	44.81%	1.262	0.99805158
Det C/3	0 - 76.7%	42.73%	1.252	0.99131513
Det C/4	0 - 72.8%	43.56%	1.63	1.0033267

Det C/1	Sample:	CKS-001A	Sample Factor:	1		Jun 12, 1995 15:21:36	
Alpha	Gross:	8458	Net:	8.46E+02	±18.025631	pCi: 1.14E+03	±24.273454
Beta	Gross:	9148	Net:	8.46E+02	±18.101343	pCi: 8.47E+02	±18.110867
Det C/2	Sample:	CKS-002A	Sample Factor:	1		Jun 12, 1995 15:21:36	
Alpha	Gross:	8801	Net:	8.80E+02	±18.387488	pCi: 1.19E+03	±24.910761
Beta	Gross:	9607	Net:	8.80E+02	±18.475496	pCi: 8.85E+02	±18.572001
Det C/3	Sample:	CKS-003A	Sample Factor:	1		Jun 12, 1995 15:21:36	
Alpha	Gross:	7573	Net:	7.57E+02	±17.056531	pCi: 1.04E+03	±23.355999
Beta	Gross:	8411	Net:	7.76E+02	±17.342085	pCi: 8.18E+02	±18.28328
Det C/4	Sample:	CKS-004A	Sample Factor:	1		Jun 12, 1995 15:21:36	
Alpha	Gross:	8120	Net:	8.12E+02	±17.661802	pCi: 1.11E+03	±24.257579
Beta	Gross:	8455	Net:	7.76E+02	±17.344337	pCi: 8.02E+02	±17.936857

J. Tully
1/13/95

000426

DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 13, 1995 08:53 am.

Data File
CKS0613A.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer A:	1330	High	600 sec.

Detector Parameters				
Alpha:	Window	Efficiency	Background	Crosstalk
Det A/1	65.9-100%	33.30%	0.37599999	7.5802469
Det A/2	65.4-100%	33.04%	0.044	9.2323008
Det A/3	69.6-100%	33.45%	0.122	7.116519
Det A/4	70.3-100%	34.13%	0.086	7.5292134
Beta:	Window	Efficiency	Background	Crosstalk
Det A/1	0 - 65.8%	44.30%	3.312	0.99590111
Det A/2	0 - 65.3%	44.49%	1.028	0.99997914
Det A/3	0 - 69.5%	42.67%	1.1900001	1.0001959
Det A/4	0 - 70.2%	45.59%	1.682	0.99723953

Det A/1	Sample:	CKS-001A	Sample Factor:	1		Jun 13, 1995 08:42:47	
Alpha	Gross:	8213	Net:	8.21E+02	±17.7627	pCi:	1.11E+03 ±24.025696
Beta	Gross:	8640	Net:	7.98E+02	±17.602474	pCi:	8.12E+02 ±17.897905
Det A/2	Sample:	CKS-002A	Sample Factor:	1		Jun 13, 1995 08:42:47	
Alpha	Gross:	8927	Net:	8.93E+02	±18.518639	pCi:	1.22E+03 ±25.244519
Beta	Gross:	9472	Net:	8.64E+02	±18.30704	pCi:	8.74E+02 ±18.53444
Det A/3	Sample:	CKS-003A	Sample Factor:	1		Jun 13, 1995 08:42:47	
Alpha	Gross:	7738	Net:	7.74E+02	±17.241344	pCi:	1.04E+03 ±23.217327
Beta	Gross:	8455	Net:	7.89E+02	±17.469129	pCi:	8.33E+02 ±18.440672
Det A/4	Sample:	CKS-004A	Sample Factor:	1		Jun 13, 1995 08:42:47	
Alpha	Gross:	8132	Net:	8.13E+02	±17.674829	pCi:	1.07E+03 ±23.327963
Beta	Gross:	8307	Net:	7.68E+02	±17.244911	pCi:	7.59E+02 ±17.037805

R. Tully
6/13/95

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DCL_STD.REP

DataChem Laboratories Alpha/Beta Counting Report

Canberra HT-1000 System

Report Date: June 13, 1995 09:49 am

Data File
CKS0613B.SLK

Drawer Program Parameters			
	High Voltage	Amp. Gain	Count Time
Drawer B:	1330	High	600 sec.

Detector Parameters				
Alpha:	Window	Efficiency	Background	Crosstalk
Det B/1	74.3-100%	33.09%	0.148	7.6540756
Det B/2	77.3-100%	33.96%	0.066	7.2033896
Det B/3	78.4-100%	31.44%	0.09	9.5462275
Det B/4	77.8-100%	32.95%	0.11	8.0109806
Beta:	Window	Efficiency	Background	Crosstalk
Det B/1	0 - 74.2%	43.91%	1.516	0.99632984
Det B/2	0 - 77.2%	44.30%	0.95200002	0.99805003
Det B/3	0 - 78.3%	42.62%	1.368	1.0187516
Det B/4	0 - 77.7%	42.82%	1.62	1.0118318

Det B/1	Sample:	CKS-001A	Sample Factor:	1		Jun 13, 1995 09:39:00		
Alpha	Gross:	8448	Net:	8.45E+02	±18.014981	pCi:	1.15E+03	±24.524372
Beta	Gross:	8781	Net:	8.12E+02	±17.731548	pCi:	8.33E+02	±18.190088
Det B/2	Sample:	CKS-002A	Sample Factor:	1		Jun 13, 1995 09:39:00		
Alpha	Gross:	8766	Net:	8.77E+02	±18.350889	pCi:	1.16E+03	±24.340478
Beta	Gross:	9186	Net:	8.55E+02	±18.176582	pCi:	8.69E+02	±18.482619
Det B/3	Sample:	CKS-003A	Sample Factor:	1		Jun 13, 1995 09:39:00		
Alpha	Gross:	7240	Net:	7.24E+02	±16.677305	pCi:	1.04E+03	±23.893887
Beta	Gross:	8350	Net:	7.65E+02	±17.227041	pCi:	8.08E+02	±18.205527
Det B/4	Sample:	CKS-004A	Sample Factor:	1		Jun 13, 1995 09:39:00		
Alpha	Gross:	7273	Net:	7.27E+02	±16.715274	pCi:	9.94E+02	±22.851578
Beta	Gross:	7447	Net:	6.85E+02	±16.294483	pCi:	7.20E+02	±17.139699

J. Fully
1/13/95

RADIOCHEMISTRY LABORATORY

7678

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RADIOACTIVE MATERIAL INVENTORY
INTERMEDIATE STANDARD LOG

I.S. ID: Pu-239-001-IS
Solvent: 0.8 N HNO3
Concentration: 654 pCi/ml

Date: 4-8-92
Final Volume: 100 ml
Source I.D.: 2510-1

Usage: continued from page 13

Date	Amount	Activity (µCi)	Running Total (µCi)	I.D.
11/30/92	10 ml	6560 10^{-6} µCi	0.041454	CAL 11-54
3/17/93	0.8132 mL	0.000533^{5} µCi	0.040921	NB2345 P32 selfabsorption $
3/17/93	2.4396 mL	0.001600^{4}	0.039326	NB2345 P32 Selfabsorption $
3/18/93	0.8132 mL	0.000533^{5}	0.03879^{3}	NB2345 P32 Selfabsorption $
3/19/93	2.4396 mL	0.001600^{4}	0.03719^{3}	NB2345 P34 selfabs. $'s
3/25/93	1.6264 mL	0.001066^{9}	0.03612^{6}	NB 2345 P36 selfabs $'s
4/2/93	0.8132 mL	0.0005335	0.03559^{3}	NB 2345 P36 selfabs $'s
4/7/93	0.6099 mL	0.0004000^{9}	0.03519^{3}	NB 2345 P44 LCS for SX-0086+
4/9/93	0.4066	0.0002667^{3}	0.03492^{6}	NB 2345 P44 LCS for SX0086+
4/21/93	6.0864	0.003992^{7}	0.03093^{3}	Pu-239 standards
7/30/93	0.19903	0.0001305^{6}	0.03080^{2}	LC0430 for S93-0244 EM-1054 - 1056
8-18/93	0.20016	0.0001313^{0}	0.03067^{1}	LC0418 for CLP 13301-13 + ABYL00; NB2436 P17
8-21-93	2.977	0.001952^{9}	0.02871^{8}	Pu standards for selfabs. P21 NB2436
8-21-93	0.6087	0.000399^{3}	0.02831^{9}	selfabs. P22 NB 2436
8-16-93	0.09976	0.0000654^{4}	0.02825^{3}	LC0616, U93-0080, 0096, S93-310, 0285
8-23-93	0.09976	0.0000654^{4}	0.02818^{7}	LC0623 for A B C training
8-25-93	0.09976	0.0000654^{4}	0.02812^{2}	LC625 for S93-0294 + S93-0405
9-9-93	17.117 g	0.01122875	0.01689	U-Pu-Am WS lab Book #2360 pg 72
9-9-93	0.09990 mL 8/9/93	0.0000655^{3}	0.01682	LC-0805 for EPA Audit EM 2066
9-17-93	4.1773	0.0027403	0.01415^{0}	LCS for EPA Audit
1-11-94	4.0305	0.0026440	0.01150^{6}	check stds Source CKS-001-4
1-12-94	6.0182	0.0039479	0.007558^{1}	check source stds CKS-001-004
1/1/94 RL	0.300	0.000457	0.007101	Gross α/β LCS
1/7/94 RL	0.100	0.0000656	0.007035	Gross α/β LCS
5/10/94 RL	1.021	0.0006698	0.006365	Gross α/β LCS

RADIOCHEMISTRY LABORATORY

7678

RADIOACTIVE MATERIAL INVENTORY SOURCE LOG

CAUTION
RADIOACTIVE MATERIAL
SOLE 2510-1 WT. 5.0g
AMT. [redacted] g
ISOTOPE Pu-239
DATE 12/13/[redacted]:0400PST
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY—LAS VEGAS

Vendor I.D.: SRM 2510-1

Date Received:

RCL I.D.: ~~Pu-239-001-FS~~ PAK 2510-1

Isotopes/Form	Activity (µCi)	Mass	Date
Pu-239	0.065641	5.563g	4-8-92

Usage:

Date	Amount	Activity (µCi)	Running Total (µCi)	I.D.
4-8-92	5.563g	0.065641	Ø	Pu-239-001-FS

Rec - 4-2-92

7678

U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory-Las Vegas
Nuclear Radiation Assessment Division

Calibration Certificate

Description

Principal radionuclide: PLUTONIUM-239 Half-life: 2.4×10^4 years

Nominal activity: 59 nano curies

Nominal volume: 5 ml in ampoule/bottle number 2510-1

Measurement Activity of principal radionuclide

Activity per gram of this solution

11.8 nano curies of Plutonium-239

at 0400 hours PST on December 13, 1990

Activity of daughter radionuclide

The principal activity was accompanied at the quoted time by

curies Per gram

of the daughter nuclide

Total mass of this solution

APPROX. 5.0 grams

Method of measurement

The activity of the primary solution was measured by an internal gas flow proportional counter.

The activity of the dilution was measured by liquid scintillation counting.

Useful Life

This radionuclide has decayed through half lives since it was obtained by EMSL-LV

We recommend that this solution should not be used after

000431

Purity

The manufacturer states that activities other than that of the principal nuclide and of its daughter nuclides, if any, were estimated/known to be:

(1) see remarks	less than equal to	%	of the principal activity
(2)	less than equal to	%	of the principal activity
(3)	less than equal to	%	of the principal activity

The activity of impurity (1) is not (2) is not (3) is not included in the quoted figures of the principal activity.

Random Errors

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than ± 0.13 %

(The 99.7% confidence limits are given by t(sm) where t is obtained from the student t factor for the degree of freedom (n-1)).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error ($+\delta - \delta'$). These have been estimated not to exceed

+2.7 % or - 2.7 %

the overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error [t(sm)] at the 99.7% confidence limits and the worst case estimate of the systematic errors ($+\delta, -\delta'$)
The overall uncertainty is therefore calculated on the basis of + [t(sm) $+\delta$], - [t(sm) $+\delta$]
and is + 3.1 %, - 3.1 % of the quoted radioactive concentration.

Decay Schemes

This standardization is based on the following assumptions of the principle nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Plutonium-239 and impurities were assumed to decay 100 percent by alpha emission.

Chemical Composition of Solution

Carrier content per gram of solution:

Other components:

4M Nitric acid

Preservative:

Remarks

IMPURITIES:

Pu-238	0.033%	of the total activity
Pu-240	4.6×10^{-5}%	of the total activity
Pu-241	1.5×10^{-3}%	of the total activity
Pu-242	8.8×10^{-6}%	of the total activity
Pu-244	6.2×10^{-9}%	of the total activity

Date Certificate Prepared December 13, 1990

Approval Signature Paul B. Hahn

Revised 1/84

CONTINUED FROM Pg. 35

RADIOCHEMISTRY LABORATORY

767837

RADIOACTIVE MATERIAL INVENTORY
INTERMEDIATE STANDARD LOG

I.S. ID: Sr-90-001-IS
Solvent: 1.0 M HNO_3
Concentration: 220.7 pCi/mL

Date: 10-9-91
Final Volume: 100 mL
Source I.D.: 2454-2

Usage:

Date	Amount	Activity (µCi)	Running Total (µCi)	I.D.
10-19-93	0.99786 mL	0.0002202	0.00685482	Y-90-CS4
11-25-93	0.09837 mL	0.000217	0.00683311	TEFA-19
↓	↓	↓	0.00681142	20
↓	↓	↓	0.00678972	21
11/17/93	4.19528 mL	0.0009259	0.0059531	LCS for EPA Audit
1-4-94	0.99786 mL	0.0002202	0.0057329	T1 for Total Sr/Y/SC
↓	↓	↓	0.0055127	T3
↓	↓	↓	0.0052925	T3
↓	↓	↓	0.0050723	T5
1-4-94	0.99786	0.0002202	0.0048521	STDSPK1
↓	↓	↓	0.0046319	STDSPK2
1-11-94	4.0104	0.0008851	0.0037468	check source stds CKS-001-4
1-12-94	6.0697	0.001339	0.002407	check source stds CKS-001-004
2-1-94 RL	RL ~~0.099~~ 0.303 mL	0.000137	0.00227	gross α/β LCS
2-7-94 RL	0.100	0.00002207	0.00224793	gross α/β LCS

RADIOCHEMISTRY LABORATORY

7678

RADIOACTIVE MATERIAL INVENTORY SOURCE LOG

CAUTION
RADIOACTIVE MATERIAL
SOLN 2454-2 WT 5.0g
AMT. 4.58 nanoCi/g
ISOTOPE Sr-90
DATE 9/5/94 0400PST
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY—LAS VEGAS

Vendor I.D.: SPM 2454-2
Date Received: 9-30-91
RCL I.D.: 2454-2

THIS STD ACTIVITY IS NOT CORRECTED FOR Y-90 EQUILIBRIUM. CCW

Isotopes/Form	Activity (µCi)	Mass	Date
Sr-90/LIQ	0.022067	4.9541g	10-7-91

Usage:

Date	Amount	Activity (µCi)	Running Total (µCi)	I.D.
10-7-91	4.9541 g	0.022067	Ø	SR-90-001-IS

U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory-Las Vegas
Nuclear Radiation Assessment Division

Calibration Certificate

Description

Principal radionuclide: STRONTIUM-90 Half-life: 28.6 years

Nominal activity: 22.9 nano curies

Nominal volume: 5 ml in ampoule/bottle number 2454-2

Measurement

Activity of principal radionuclide

Activity per gram of this solution

4.58 nano curies of Strontium-90

at 0400 hours PST on September 5, 1990

Activity of daughter radionuclide

The principal activity was accompanied at the quoted time by

4.58 nano curies Per gram

of the daughter nuclide Yttrium-90

Total mass of this solution

APPROX. 5.0 grams

Method of measurement

The activity of the primary solution was measured by four pi efficiency tracing.

The activity of the dilution was measured by liquid scintillation counting.

Useful Life

This radionuclide has decayed through [ ] half lives since it was obtained by EMSL-LV

We recommend that this solution should not be used after September 1995

Purity

The manufacturer states that activities other than that of the principal nuclide and of its daughter nuclides, if any, were estimated/known to be:

(1) others	less than ~~equal to~~	0.01 %	of the principal activity
(2)	less than equal to	%	of the principal activity
(3)	less than equal to	%	of the principal activity

The activity of impurity (1) is not (2) is not (3) is not included in the quoted figures of the principal activity.

Random Errors

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than ± 0.11 %
(The 99.7% confidence limits are given by t(sm) where t is obtained from the student t factor for the degree of freedom (n-1)).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error ($+\delta - \delta'$). These have been estimated not to exceed

+ 1.1 % or - 1.1 %

the overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error [t(sm)] at the 99.7% confidence limits and the worst case estimate of the systematic errors ($+\delta, -\delta'$)
The overall uncertainty is therefore calculated on the basis of $+ [t(sm) + \delta], - [t(sm) + \delta]$
and is + 2.5 %, - 2.5 % of the quoted radioactive concentration.

Decay Schemes

This standardization is based on the following assumptions of the principle nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Strontium-90 decays 100 percent by beta emission to yttrium-90.

Yttrium-90 decays also by beta emission.

Chemical Composition of Solution

Carrier content per gram of solution:

100 micrograms strontium

100 micrograms yttrium

Preservative:

Other components:

0.1M HCl

Remarks

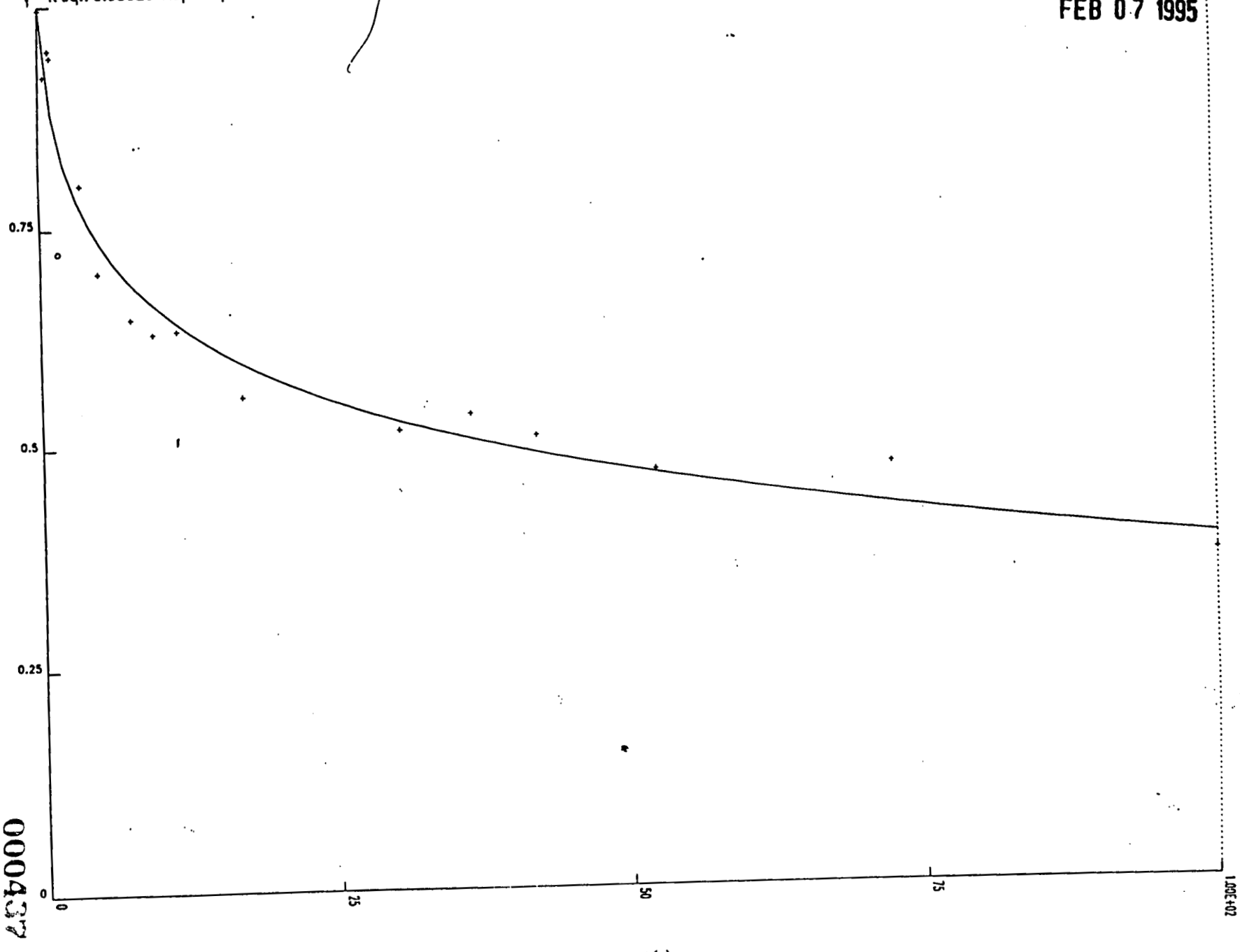
000436

Date Certificate Prepared September 6, 1990

Approval Signature Paul B. Hahn

Model: a+b*log10(c+x) a: 0.947 b: −0.2795 c: 0.62652
R sq.: 0.98529 Adj. R sq.: 0.98382 F Test L.O.F.: 0 F Test Reg.: 1

FEB 07 1995



000437

2678

DataChem Laboratories - Data Analysis Summary

Batch ID: 1993-2878 Analyte: Quartz

Model Type: Nernst a+b*log10(c+x) Model is Weighted.

a: 0.947 b: -0.2795 c: 0.62652

r^2: 0.98529 adjusted r^2: 0.98382 F-Test L.o.F.: 0 F-Test R.: 1

Blank Correction: 0 Scaling: 1

FEB 07 1995

Standards		Target	Response	Calculated	Relative Error	Date acquired Y/M/D
PU-00-A	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-B	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-C	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-D	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-E	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-F	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-G	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-00-H	1	0.00000	1.00000	1.00375	0.00375	1858/11/17
PU-521-02	1	0.41000	0.92720	0.94264	0.01666	1858/11/17
PU-521-01	1	0.81000	0.95580	0.90303	-0.05521	1858/11/17
PU-521-03	1	0.97000	0.94830	0.89021	-0.06125	1858/11/17
PU-520-02	1	3.45000	0.80260	0.77643	-0.03261	1858/11/17
PU-520-03	1	4.85000	0.70270	0.74059	0.05392	1858/11/17
PU-520-04	1	7.65000	0.64910	0.69046	0.06373	1858/11/17
PU-520-05	1	9.51000	0.63200	0.66586	0.05357	1858/11/17
PU-520-06	1	11.53000	0.63500	0.64380	0.01386	1858/11/17
PU-520-07	1	17.15000	0.56000	0.59767	0.06727	1858/11/17
PU-520-08	1	30.37000	0.51940	0.53018	0.02076	1858/11/17
PU-520-09	1	36.50000	0.53720	0.50828	-0.05384	1858/11/17
PU-520-10	1	42.12000	0.51050	0.49117	-0.03787	1858/11/17
PU-520-11	1	52.27000	0.46860	0.46531	-0.00702	1858/11/17
PU-520-12	1	72.25000	0.47230	0.42641	-0.09715	1858/11/17
PU-520-13	1	99.86000	0.36880	0.38742	0.05049	1858/11/17

Tests	Referent	Response	Calculated	Recovery Percent	Date acquired Y/M/D

No Tests Found

Blanks	Response	Calculated	Dilution	Volume	Conversion	Corrected

No Blanks Found

QCs	Response	Calculated	Dilution	Volume	Conversion	Corrected	B.C.

No QCs Found

Samples	Response	Calculated	Dilution	Volume	Conversion	Corrected	B.C.

No Samples Found

000438

8292

DataChem Laboratories - Data Analysis Summary

Batch ID: 1993-2858 Analyte: ~~Quality~~ Beta

Model Type: Nernst a+b*log10(c+x) Model is Weighted.

N = 16

a: 0.95053 b: -4.25527E-02 c: 7.25157E-02

r²: 0.83841 adjusted r²: 0.82799 F-Test L.o.F.: 0 F-Test R.: 0

Blank Correction: 0 Scaling: 1

rk

FEB 09 1995

Standards		Target	Response	Calculated	Relative Error	Date acquired Y/M/D
SR/Y-00-A	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-B	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-C	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-D	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-E	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-F	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-G	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-00-H	1	0.00000	1.00000	0.99903	-0.00097	1858/11/17
SR/Y-520-01	1	0.45000	0.89890	0.96253	0.07079	1858/11/17
SR/Y-520-02	1	2.51000	0.96620	0.93300	-0.03436	1858/11/17
SR/Y-520-03	1	4.30000	0.90410	0.92327	0.02120	1858/11/17
SR/Y-520-04	1	6.04000	0.92870	0.91708	-0.01251	1858/11/17
SR/Y-520-05	1	7.83000	0.93790	0.91233	-0.02726	1858/11/17
SR/Y-520-06	1	9.75000	0.89830	0.90831	0.01115	1858/11/17
SR/Y-520-08	1	13.43000	0.89000	0.90243	0.01397	1858/11/17
SR/Y-520-09	1	15.60000	0.87120	0.89968	0.03269	1858/11/17
SR/Y-520-10	1	16.87000	0.91730	0.89824	-0.02078	1858/11/17
SR/Y-520-11	1	19.23000	0.92100	0.89583	-0.02733	1858/11/17
SR/Y-512-03	1	19.61000	0.89060	0.89547	0.00547	1858/11/17
SR/Y-513-01	1	25.27000	0.87350	0.89080	0.01980	1858/11/17
SR/Y-512-04	1	27.52000	0.94770	0.88923	-0.06170	1858/11/17
SR/Y-513-02	1	37.63000	0.87700	0.88346	0.00736	1858/11/17
SR/Y-512-05	1	37.65000	0.92720	0.88345	-0.04719	1858/11/17
SR/Y-512-06	1	56.01000	0.85830	0.87612	0.02076	1858/11/17
SR/Y-512-07	1	60.96000	0.89050	0.87455	-0.01791	1858/11/17
SR/Y-512-08	1	66.55000	0.90700	0.87293	-0.03756	1858/11/17
SR/Y-512-09	1	82.52000	0.86990	0.86896	-0.00108	1858/11/17
SR/Y-513-04	1	94.16000	0.85900	0.86653	0.00876	1858/11/17
SR/Y-512-10	1	106.33000	0.86550	0.86428	-0.00141	1858/11/17
SR/Y-513-05	1	106.36000	0.84980	0.86428	0.01704	1858/11/17
SR/Y-512-13	1	164.63000	0.85350	0.85621	0.00317	1858/11/17
SR/Y-512-14	1	188.11000	0.84080	0.85375	0.01540	1858/11/17
SR/Y-512-15	1	202.89999	0.82720	0.85235	0.03040	1858/11/17
SR/Y-512-16	1	213.13000	0.81760	0.85144	0.04139	1858/11/17

Tests	Referent	Response	Calculated	Recovery Percent	Date acquired Y/M/D

No Tests Found

Blanks	Response	Calculated	Dilution	Volume	Conversion	Corrected

No Blanks Found

QCs	Response	Calculated	Dilution	Volume	Conversion	Corrected	B.C.

No QCs Found

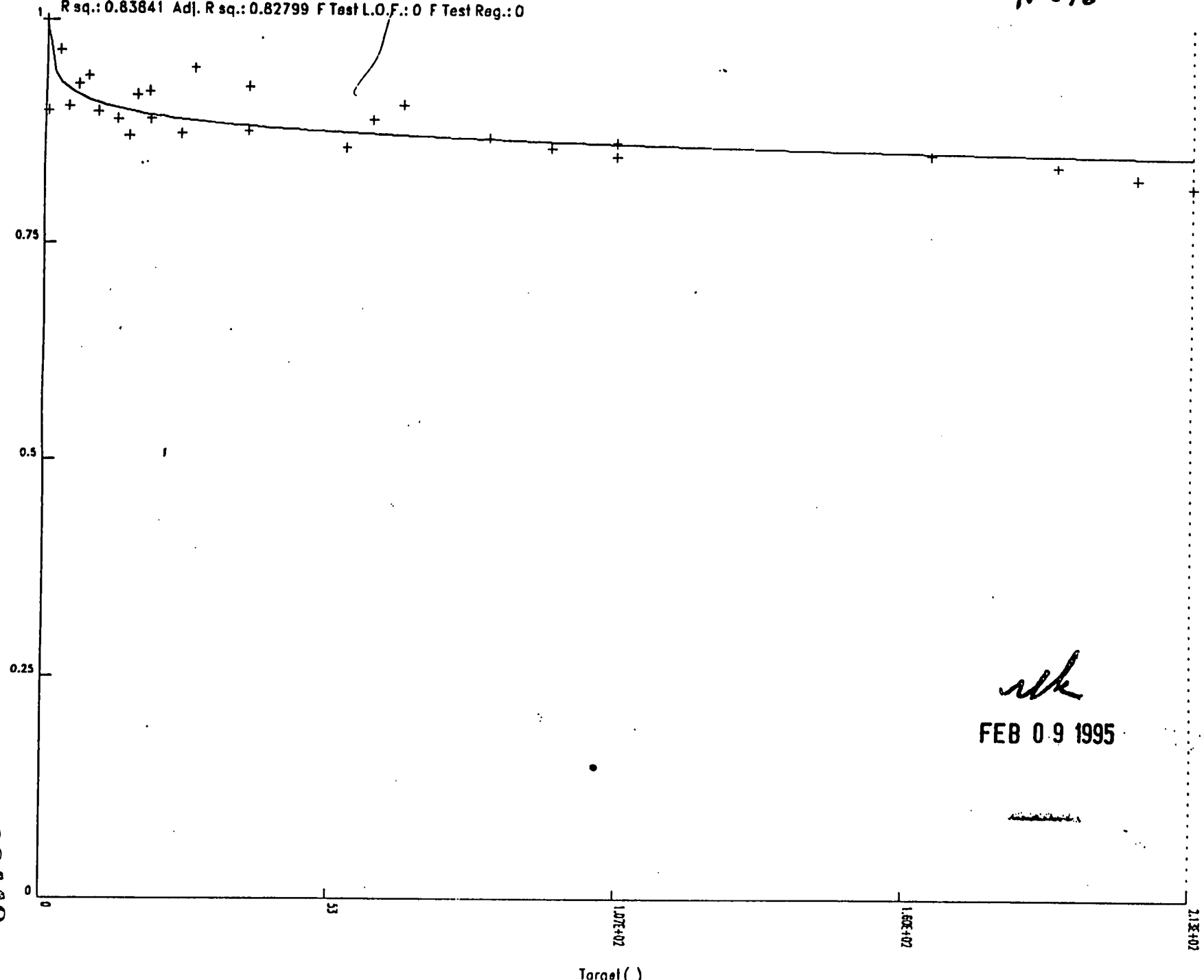
000439

8292

Page: 1 User: KERNS Date: 9-FEB-1995 16:13

Model: a+b*log10(c+x) a: 0.95053 b: -4.25527E-02 c: 7.25157E-02
R sq.: 0.83841 Adj. R sq.: 0.82799 F Test L.O.F.: 0 F Test Reg.: 0

N = 16



rlk

FEB 09 1995

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APPENDIX C

CALCULATIONS

NOMENCLATURE

A_n = Area of sampling nozzle, ft^2

A_s = Cross-sectional area of stack at sampling site, ft^2

B_{ws} = Proportion water vapor in stack gas by volume

CO = Percent carbon monoxide in stack gas by volume,dry basis, %

CO_2 = Percent carbon dioxide in stack gas by volume, dry basis, %

C_p = Pitot tube coefficient

C_1 = Concentration of filterable particulate in stack gas, gr/dscf

C_2 = Concentration of filterable particulate in stack gas, lb/dscf

C_α = Concentration of alpha particles in stack gas, ρci/dscf

C_β = Concentration of beta particles in stack gas, ρci/dscf

C_{c1} = Concentration of condensible particulate in stack gas, gr/dscf

C_{c2} = Concentration of condensible particulate in stack gas, lb/dscf

C_{U1} = Concentration of uranium in stack gas, mg/m^3

C_{U2} = Concentration of uranium in stack gas, lb/dscf

dia = Diameter of stack, Inches

ER = Filterable particulate emission rate, lb/hr

ER_α = Gross alpha emission rate, ρci/hr

ER_β = Gross beta emission rate, ρci/hr

ER_c = Condensible particulate emission rate, lb/hr

ER_U = Total uranium emission rate, lb/hr

ΔH = Average pressure drop across orifice

%I = Percent isokinetic sampling rate, %

M_d = Molecular weight of stack gas, dry conditions, lb/lb-mole

M_s = Molecular weight of stack gas, stack conditions, lb/lb-mole

Mn = Filterable particulate catch, mg

Mn_α = Gross alpha catch, pci

Mn_β = Gross beta catch, pci

Mn_c = Condensible particulate catch, mg

Mn_U = Total Uranium catch, μg

N_2 = Percent nitrogen in stack gas by volume, dry basis, %

O_2 = Percent oxygen in stack gas by volume, dry basis, %

Δp = Average velocity head of stack gas, inches H_2O

$\sqrt{\Delta p}$ = Average square root of velocity head pressure, inches H_2O

P_b = Barometric pressure, inches Hg

P_g = Static pressure of stack gas, inches H_2O

P_s = Absolute stack gas pressure, inches Hg

Q_a = Volumetric stack gas flow rate, stack conditions, acfm

Q_{std} = Volumetric stack gas flow rate, dry standard conditions, dscfm

θ = Elapsed time of test, minutes

T_m = Average dry gas meter temperature, °F

T_s = Average stack gas temperature, °F

V_{lc} = Mass of water collected, g

V_m = Volume of gas measured by dry gas meter, ft^3

V_{mc} = Volume of dry gas meter corrected for leak rate, ft^3

V_{mstd} = Volume of dry gas meter corrected to standard conditions, ft^3

V_{wstd} = Volume of water collected, standard conditions, ft^3

Vs = Stack gas velocity, fps

γ = dry gas meter calibration factor, dimensionless

Note: Standard conditions = 68°F and 29.92 inches Hg.

EXAMPLE CALCULATION RUN # LD-1

1. Volume Metered, Standard Conditions (68°F, 29.92 In Hg)

$$V_{mstd} = (17.647) \times (V_m) \times (Y) \times \frac{(P_b) + \frac{(\Delta H)}{(13.6)}}{(T_m + 460)}$$

$$V_{mstd} = (17.647) \times (184.732) \times (0.999) \times \frac{(29.40) + \frac{(1.35)}{(13.6)}}{(84.0 + 460)} = 176.565$$

2. Volume Water Vapor Collected Standard Conditions

$$V_{wstd} = (0.04707) \times (V_{lc})$$
$$V_{wstd} = (0.04707) \times (94.5) = 4.448$$

3. Percent Moisture By Volume

$$B_{ws} = \frac{(V_{wstd})}{(v_{wstd}) + (V_{mstd})} B_{ws} = \frac{(4.448)}{(4.448) + (176.565)} = 0.0246$$

4. Molecular Weight of Stack Gas, Dry Conditions

$$M_d = (0.44 \times CO_2) + (0.32 \times O_2) + (0.28 \times (N_2 + CO))$$
$$M_d = (0.44 \times 0.0) + (0.32 \times 21.0) + (0.28 \times 79.0) = 28.84$$

5. Molecular Weight of Stack Gas, Stack Conditions

$$M_s = [M_d \times (1 - B_{ws})] + (18 \times B_{ws})$$
$$M_s = [28.84 \times (1 - 0.0246)] + (18 \times 0.0246) = 28.57$$

6. Static Pressure, inches H_20

$$Ps = (Pb) + \frac{(Pg)}{(13.6)}$$
$$Ps = (29.40) + \frac{(-0.15)}{(13.6)} = 29.39$$

7. Stack Gas Velocity, fps

$$V_s = (85.49)\times(c_p)\times(\sqrt{\Delta p})\times\sqrt{\frac{(T_s+460)}{(P_s)\times(M_s)}}$$

$$V_s = (85.49)\times(0.84)\times(0.581)\times\sqrt{\frac{(132.4+460)}{(29.39)\times(28.57)}} = 35.05$$

8. Stack Gas Flow Rate, acfm

$$Q_a = (60)\times(V_s)\times(5.454E{-}03)\times(Dia)^2$$

$$Q_a = (60)\times(35.05)\times(5.454E{-}03)\times(23)^2 = 6{,}067.5$$

9. Stack Gas Flow Rate, dscf

$$Q_{std} = (17.647)\times(Q_a)\times(1-B_{ws})\times\frac{(P_s)}{(T_s+460)}$$

$$Q_{std} = (17.647)\times(6{,}067.5)\times(1-0.0246)\times\frac{(29.39)}{(132.4+460)} = 5{,}181.4$$

10. Isonkinetic Variation, %

$$\%I = 0.0944\times\frac{(T_s+460)\times(V_{mstd})}{(P_s)\times(V_s)\times(A_n)\times(\theta)\times(1-B_{ws})}$$

$$\%I = 0.0944\times\frac{(132.4+460)\times(176.565)}{(29.39)\times(35.05)\times(3.33E{-}04)\times(300)\times(1-0.0246)} = 98.55$$

11. Filterable Particulate Concentration, gr/dscf

$$C_1 = \frac{(0.0154)\times(Mn)}{(V_{mstd})}$$

$$C_1 = \frac{(0.0154)\times(6.60)}{(176.565)} = 5.76E{-}04$$

12. Filterable Particulate Concentration, lb,dscf

$$C_2 = (1.429E{-}04) \times (C_1)$$
$$C_2 = (1.429E{-}04) \times (5.76E{-}04) = 8.23E{-}08$$

13. Filterable Particulate Emission Rate, lb/hr

$$ER = (C_2) \times (Q_{std}) \times (60)$$
$$ER = (8.23E{-}08) \times (5{,}181.4) \times (60) = 0.026$$

14. Condensible Particulate Concentration, gr/dscf

$$C_1 = \frac{(0.0154) \times (Mn)}{(V_{mstd})}$$
$$C_1 = \frac{(0.0154) \times (0.0)}{(176.565)} = 0.00E{-}00$$

15. Condensible Particulate Concentration, lb,dscf

$$C_2 = (1.429E{-}04) \times (C_1)$$
$$C_2 = (1.429E{-}04) \times (0.00E{-}00) = 0.00E{-}00$$

16. Condensible Particulate Emission Rate, lb/hr

$$ER = (C_2) \times (Q_{std}) \times (60)$$
$$ER = (0.00E{-}00) \times (5{,}181.4) \times (60) = 0.00$$

17. Total Uranium Concentration, mg/m^3

$$C_{U_1} = \frac{(Mn_U)}{(V_{mstd}) \times (28.316)}$$
$$C_{U_1} = \frac{(ND)}{(176.565) \times (28.316)} = ND$$

18. Total Uranium Concentration, lb/dscf

$$C_{U_2} = \frac{(Mn_U)}{(V_{mstd}) \times (1.0E{+}06) \times (453.59)}$$

$$C_{U_2} = \frac{(ND)}{(176.565) \times (1.0E{+}06) \times (453.59)} = ND$$

19. Total Uranium Emission Rate, lb/hr

$$ER_U = (C_{U_2}) \times (Q_{std}) \times (60)$$

$$ER_U = (ND) \times (5{,}181.4) \times (60) = ND$$

20. Gross Alpha Concentration, pci/dscf

$$C_\alpha = \frac{(Mn_\alpha)}{(V_{mstd})}$$

$$C_\alpha = \frac{(6.50)}{(176.565)} = 3.68E{-}02$$

21. Gross Alpha Emission Rate, pci/hr

$$ER_\alpha = (C_\alpha) \times (Q_{std}) \times (60)$$

$$ER_\alpha = (3.68E{-}02) \times (5{,}181.4) \times (60) = 11{,}444.8$$

22. Gross Beta Concentration, pci/dscf

$$C_\beta = \frac{(Mn_\beta)}{(V_{mstd})}$$

$$C_\beta = \frac{(2.90)}{(176.565)} = 1.64E{-}02$$

23. Gross Beta Emission Rate, pci/hr

$$ER_\beta = (C_\beta) \times (Q_{std}) \times (60)$$

$$ER_\beta = (1.64E{-}02) \times (5{,}181.4) \times (60) = 5{,}106.1$$

CLIENT/PROJECT #:	Fermco A95010
SAMPLE LOCATION:	Laundry Dryer Hepa Filter Exhaust
DATE/TIME:	5/9/95 0927-1435
RUN #:	LD-1 Gross Alpha

STATIC PRESSURE("H20):	-0.15	"HG	29.39
BAROMETRIC("HG):	29.40		
SAMPLE TIME(min):	300.00	Vm(corr)	184.732
ACTUAL METER VOLUME:	184.732	DSCF	176.565
SQ. ROOT /\P:	0.581		
AVG ORIFICE /\H:	1.35		
AVG STACK TEMP °F:	132.4	°R	592.4
AVG METER TEMP °F:	84.0		
Cp PITOT :	0.84		
NOZZLE DIA.(inches):	0.247	An(ft^2)	3.33E-04
METER GAMMA:	0.999		
LEAK RATE(IF>0.02):			
CIRC STACK? 1=Y,0=N:	1	As(ft^2)	2.89
DIA OR DIM (inches):	23.00		
% O2 :	21.00	DRY MOLE WT	28.84
% CO2 :	0.00	ST MOLE WT	28.57
VOL CONDENSATE(ml):	94.50	% H20	2.46
Gross Alpha (Pci)	6.50		
Gross Alpha Std Dev (pci	0.84	NET WT(mg)	7.34
Gross Beta (pci)	2.90		
Gross Beta std dev (pci)	0.83		

********** CALCULATED RESULTS **********

Gas Velocity (Vs):	35.05	FT/SEC
Stack Gas Flow (Qs):	6067.5	ACFM
:	5181.4	DSCFM
Stack Gas Temp :	132	Deg F
Moisture (H20):	2.46	%
Isokinetic :	98.55	%

Alpha Particle Summary

Alpha Concentration (Cs)	3.68E-02	pci/DSCF
Alpha Std Dev concentrat	4.76E-03	pci/DSCF
Alpha Emission Rate:	11444.8	pci/hr
Alpha Std Dev Emission R	1479.0	pci/hr

Beta Particle Summary

Beta Concentration (Cs):	1.64E-02	pci/DSCF
Beta Std Dev concentrati	4.70E-03	pci/DSCF
Beta Emission Rate:	5106.1	pci/hr
Beta Std Dev Emission Ra	1461.4	pci/hr

COMMENTS:

CLIENT/PROJECT #: Fermco A95010
SAMPLE LOCATION: Laundry Dryer Hepa Filter Exhaust
DATE/TIME: 5/9/95 0927-1435
RUN #: LD-1 Filterable Particulate/Total Uranium

STATIC PRESSURE("H20):	-0.15	"HG	29.39
BAROMETRIC("HG):	29.40		
SAMPLE TIME(min):	300.00	Vm(corr)	184.732
ACTUAL METER VOLUME:	184.732	DSCF	176.565
SQ. ROOT /\P:	0.581		
AVG ORIFICE /\H:	1.35		
AVG STACK TEMP °F:	132.4	°R	592.4
AVG METER TEMP °F:	84.0		
Cp PITOT :	0.84		
NOZZLE DIA.(inches):	0.247	An(ft^2)	3.33E-04
METER GAMMA:	0.999		
LEAK RATE(IF>0.02):			
CIRC STACK? 1=Y,0=N:	1	As(ft^2)	2.89
DIA OR DIM (inches):	23.00		
% O2 :	21.00	DRY MOLE WT	28.84
% CO2 :	0.00	ST MOLE WT	28.57
VOL CONDENSATE(ml):	94.50	% H20	2.46
FILTER GAIN(mg):	-0.60		
RINSE GAIN(mg):	7.20	NET WT(mg)	6.60
ANALYTE #1 :	Uranium		
MOLE WEIGHT:	238.0		
µg/sample :	ND		
PPM :			

********** CALCULATED RESULTS **********

Gas Velocity (Vs):	35.05	FT/SEC
Stack Gas Flow (Qs):	6067.5	ACFM
:	5181.4	DSCFM
Stack Gas Temp :	132	Deg F
Moisture (H20):	2.46	%
Isokinetic :	98.55	%

FILTERABLE PARTICULATE SUMMARY

Concentration (Cs):	5.76E-04	Gr/DSCF
:	8.23E-08	lb/DSCF
Emission Rate (Er):	0.026	lb/hr

EMISSION DATA FOR Uranium

Concentration (Cs):	0.00E+00	lb/DSCF
:	0	PPM
Emission Rate (Er):	0.00E+00	lb/hr

COMMENTS:

7678

CLIENT/PROJECT #:	Fermco A95010
SAMPLE LOCATION:	Laundry Dryer Hepa Filter Exhaust
DATE/TIME:	5/9/95 0927-1435
RUN #:	LD-1 Condensable Particulate

STATIC PRESSURE("H2O):	-0.15	"HG	29.39
BAROMETRIC("HG):	29.40		
SAMPLE TIME(min):	300.00	Vm(corr)	184.732
ACTUAL METER VOLUME:	184.732	DSCF	176.565
SQ. ROOT /\P:	0.581		
AVG ORIFICE /\H:	1.35		
AVG STACK TEMP °F:	132.4	°R	592.4
AVG METER TEMP °F:	84.0		
Cp PITOT :	0.84		
NOZZLE DIA.(inches):	0.247	An(ft^2)	3.33E-04
METER GAMMA:	0.999		
LEAK RATE(IF>0.02):			
CIRC STACK? 1=Y,0=N:	1	As(ft^2)	2.89
DIA OR DIM (inches):	23.00		
% O2 :	21.00	DRY MOLE WT	28.84
% CO2 :	0.00	ST MOLE WT	28.57
VOL CONDENSATE(ml):	94.50	% H20	2.46
FILTER GAIN(mg):			
RINSE GAIN(mg):	0.00	NET WT(mg)	0.00
ANALYTE #1 :			
MOLE WEIGHT:			
µg/sample :			
PPM :			

********** CALCULATED RESULTS **********

Gas Velocity (Vs):	35.05	FT/SEC
Stack Gas Flow (Qs):	6067.5	ACFM
:	5181.4	DSCFM
Stack Gas Temp :	132	Deg F
Moisture (H2O):	2.46	%
Isokinetic :	98.55	%

FILTERABLE PARTICULATE SUMMARY

Concentration (Cs):	0.00E+00	Gr/DSCF
:	0.00E+00	lb/DSCF
Emission Rate (Er):	0.000	lb/hr
EMISSION DATA FOR	0	
Concentration (Cs):	NA	lb/DSCF
:	NA	PPM
Emission Rate (Er):	NA	lb/hr

COMMENTS:

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HAYDEN ENVIRONMENTAL GROUP, INC.

APPENDIX D

QUALITY ASSURANCE PROCEDURES AND RESULTS

QUALITY ASSURANCE PROCEDURES AND RESULTS

The sampling equipment used in this test series has been calibrated in accordance with procedures outlined in the USEPA Reference Methods for stationary source sampling and also in the Quality Assurance Handbook for Air Pollution Measurement Systems. All pertinent calibration data for the equipment used in this test series are included in this appendix. The following calibration procedures are employed.

a. **Probe-tips (Nozzles)**
Probe-tips are inspected before use to detect damage or irregularities. If the nozzle shows signs of damage, it is repaired and measured before use. The nozzle diameter is determined in the field by measuring three diameters with a precision micrometer. The average of the three measurements is the nozzle diameter.

b. **Pitot Tubes**
The S-type pitot tubes are built to the design specifications cited in Reference Method 2 and are calibrated annually in a wind tunnel. Standard pitot tubes are supplied from the manufacturer with a coefficient of 0.99. The pitot tubes, connecting lines, and manometers are leak-checked in the field before and after each test run.

c. **Thermocouples**
Thermocouples are calibrated upon receipt and annually thereafter. The thermocouples are calibrated at 32°F, ambient temperature, 212°F, and approximately 450°F.

d. **Fyrite Analyzers**
The fyrite analyzers are leak-checked on-site and the reagents are replenished as needed.

e. **Method 5 Control Consoles**
The dry gas meter and the orifice in the Method 5 control consoles are calibrated at six (6) points from 0 to 4 inches of mercury. The dry gas meter coefficient (y-factor) and the orifice constant (Delta H) are established from this calibration. The dry gas meter is calibrated after each test series to confirm the y-factors is used in all sample volume calculations. Hayden Environmental participates in the USEPA Method 5 Dry Gas Meter Inter-Laboratory Performance Audit.

f. **Barometers**
The aneroid field barometers are calibrated with a stationary mercury column barometer prior to each use. The reference barometer is permanently mounted in the Hayden Environmental Laboratory.

APEX INSTRUMENTS
REFERENCE METER CALIBRATION

Barometric Pressure 29.65
Meter Yw 1.00
K (deg R/inches Hg) 17.64

DGM Serial # 1334637
DATE 3/24/95

Filename A:\DGM_REF.15P\1334637.WK1

Time (minutes)	Pressure (inches H20)	Dry Gas Meter (DGM) Meter Readings Initial	Final	Volume (cubic feet)	Temperature Initial (degrees F)	Final (degrees F	Wet Test Meter (WTM) Meter Readings Initial	Final	Volume (cubic feet)	Temp (degrees F)	DGM Avg. Temp (degrees R)	WTM Avg. Temp (degrees R)	DGM Coefficient Yd	Coefficient Variation Yd-(Avg.Y
14	-0.70	567.414	572.748	5.334	72	71	304.828	310.226	5.398	68	532	528	1.0208	0.003
15	-0.70	578.182	584.003	5.821	71	70	314.725	320.642	5.917	68	531	528	1.0234	0.006
35	-0.70	584.003	591.749	7.746	70	69	320.642	328.511	7.869	68	530	528	1.0208	0.003
12.5	-1.40	591.749	598.567	6.818	69	68	328.511	335.415	6.904	67	529	527	1.0193	0.002
11.5	-1.40	598.567	604.861	6.294	68	69	335.415	341.795	6.380	67	529	527	1.0204	0.003
10.5	-1.40	604.861	610.592	5.731	69	69	341.795	347.599	5.804	67	529	527	1.0204	0.003
10	-2.40	610.592	618.018	7.426	69	69	347.599	355.091	7.492	67	529	527	1.0191	0.001
9	-2.40	618.018	624.741	6.723	70	70	355.091	361.853	6.762	67	530	527	1.0179	0.000
8	-2.40	624.741	630.729	5.988	70	71	361.853	367.865	6.012	67	531	527	1.0170	-0.001
6.5	-3.70	630.729	636.921	6.192	71	71	367.865	374.058	6.193	67	531	527	1.0174	-0.000
5.5	-3.70	640.641	645.824	5.183	71	71	377.771	382.935	5.164	67	531	527	1.0135	-0.004
6	-3.70	645.824	651.498	5.674	71	71	382.935	388.601	5.666	67	531	527	1.0158	-0.002
5	-5.90	651.498	657.552	6.054	71	71	388.601	394.591	5.990	67	531	527	1.0120	-0.006
5	-5.90	657.552	663.611	6.059	71	72	394.591	400.681	6.090	67	532	527	1.0291	0.011
5	-5.90	663.611	669.650	6.039	72	72	400.681	406.561	5.880	67	532	527	0.9978	-0.020

Avg. Yd= 1.018

I certify that the above Dry Gas Meter was calibrated in accordance with E.P.A. Method 5 , paragraph 7.1 ;CFR 40 Part 60, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 3785, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature

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Meter Post Test Calibration

Client	FERMCO	P.N.	A95010	Date	6/26/95
Ref. Meter	1334637	Yr	1.018	Pb	29.30
Meter Box	N-3	Pre Test Y	0.9988	▲ H	2.07
Vacumn	2.5	Calib. Time	10		

Performed By: Matt Hayden

Run#	Vr(f-i)	Tr(avg)	Vd(f-i)	Td(avg)	Y
1	7.704	78.0	8.025	96.0	1.005
2	7.605	78.0	7.795	84.8	1.000
3	7.537	78.0	7.756	88.5	1.003
Averages					1.003

$$Y = Y_r * \frac{(V_r) * (T_d + 460) * (Pb)}{(V_d) * (T_r + 460) * (Pb + \frac{\Delta H}{13.6})}$$

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HAYDEN ENVIRONMENTAL GROUP INC.

DGM/ORIFICE CALIBRATION

DATE 4/19/95

BAROMETRIC PRESSURE 29.20 in. Hg

CALIBRATOR MATHAYDEN

METER BOX NO. N-3

REFERENCE METER NO. 1334637

REFERENCE Y 1.018

ORIFICE SETTING in. H_2O	REFERENCE METER		DRY GAS METER			TIME θ min.	VACUUM
	GAS VOLUME V_R ft^3	TEMP. T_R °F	GAS VOLUME V_D ft^3	IN TEMP T_i °F	OUT TEMP T_o °F		
0.5	170.635	65°	332.340	68°	56°	12.4	5" HG
	175.449	66°	337.340	73°	72°		
	4.814	65.5	5.000	67.3			
1.0	047.937	66°	207.613	69°	67°	10	↓
	053.365	65°	213.175	72°	68°		
	5.426	65.5	5.562	69°			
1.5	162.012	65°	323.395	79°F	72°	10	↓
	168.453	65°	330.059	77°	72°		
	6.441	65°	6.664	57°			
2.0	070.561	65°	230.798	76°	69°	10	↓
	078.173	65°	238.563	77°	70°		
	7.612	65°	7.765	73°			
3.0	080.294	65°	240.722	77°	70°	10	↓
	089.633	65°	250.175	77°	71°		
	9.339	65°	9.453	73.75			
4.0	150.356	65°	311.418	74°	72°	10	↓
	160.999	65°	322.333	79°	72°		
	11.643	65°	10.915	73.5			

HAYDEN

Meter Box #	N-3	N-3	N-3
Date	4/19/95	4/19/95	4/19/95
Reference Meter #	1334637	1334637	1334637
Y Reference	1.018	1.018	1.018
Barometric Pressure	29.2	29.2	29.2
Orifice Setting ^ H (" H20)	0.5	1	1.5
Total Gas Volume Reference	4.814	5.428	6.44
Average Temperature Reference	65.5	65.5	69
Total Gas Volume Dry Gas Meter	5	5.562	6.664
Average Temperature Dry Gas Meter	67.3	69	75
Time (min)	12.4	10	10
Vacumn	5	5	5

******* Calculations **********

Meter Box Y	0.9823	0.9976	0.9912
Meter Box ^ H@	1.886	1.923	2.054

Meter Box #	N-3	N-3	N-3
Date	4/19/95	4/19/95	34808
Reference Meter #	1334637	1334637	1334637
Y Reference	1.018	1.018	1.018
Barometric Pressure	29.2	29.2	29.2
Orifice Setting ^ H (" H20)	2	3	4
Total Gas Volume Reference	7.612	9.339	10.643
Average Temperature Reference	65	65	65
Total Gas Volume Dry Gas Meter	7.765	9.453	10.915
Average Temperature Dry Gas Meter	73	73.75	73.5
Time (min)	10	10	10
Vacumn	5	5	5

******* Calculations **********

Meter Box Y	1.0081	1.0148	0.9986
Meter Box ^ H@	1.938	1.928	1.981

Average y	0.99876
Average delta H	1.95167

Meter Box Field Check

Meter Box #: N-3

Y: 1.019

delta H: 1.832

Date: 3/30/95

Calibrator: MH

Leak Check: O.K.

Barometric: 29.31 "MERC.

Run No.	Initial Volume	Final Volume	Net Volume	Initial Temp.	Final Temp.	Avg. Temp.	Y_c Comparison
1	995.505	002.680	7.175	55/52	66/61	58.5	0.988 < 1.046 < 1.049
2	003.259	010.594	7.335	66/61	64/58	62.25	0.988 < 1.0278 < 1.049
3	010.594	017.925	7.331	64/58	66/60	62.00	0.988 < 1.0280 < 1.049

$$y_c = \frac{10}{Vm} \times \sqrt{\frac{(0.0319) \times (Tm)}{(Pb)}}$$

Compare with Y_c

$0.97 * Y < Y_c < 1.03 * Y$

$0.97 * Y =$ 0.9886

$1.03 * Y =$ ~~1.0497~~

1 → 0.988 1.049 Yc 1.046

2 → " " Yc = 1.0278

.7512

1.046

0.7539

0.7537

000458

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HAYDEN ENVIRONMENTAL GROUP INC.

THERMOCOUPLE CALIBRATION

THERMOCOUPLE I.D.: SN LENGTH: _____ DATE: 4-19-95

CALIBRATED BY: JJ

REFERENCE THERMOMETER: Fisher Scientific 1498370

Source	Reference Thermometer Temperature °F	Test Thermocouple Temperature °F	Temperature Difference °F	Thermocouple Simulator	
				Display	*Setting*
Ambient Air	61°	61°	0°	100°	100°
Boiling Oil	389°	389°	0°	501°	500°
Boiling H_2O	212°	212°	0°	301°	300°
ice H_2O	34°	36°	0°	1°	0°

THERMOCOUPLE CALIBRATION

THERMOCOUPLE I.D.: I-1 LENGTH: _____ DATE: 4-24-95

CALIBRATED BY: JA

REFERENCE THERMOMETER: Fisher Scientific 17938 7D

Source	Reference Thermometer Temperature °F	Test Thermocouple Temperature °F	Temperature Difference °F	Thermocouple Simulator *Display*	Thermocouple Simulator *Setting*
Ambient Air	60°	61°	1°	99°	100°
ice Bath H_2O	35°	36°	1°	1°	0°

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