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ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 140746

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) Program Support	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: Tank 241-C-111/Waste Management/PS/AS	6. Cog. Engr.: Andrew D. Rice	7. Purchase Order No.: N/A
8. Originator Remarks: This document is being released into the Supporting Document System for retrievability purposes.		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: N/A
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		14. Required Response Date: 12/05/94

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-DP-079	N/A	0	216-Day Report for Tank 241-C-111, Cores 58 and 59	Q	2	1	1

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
2	1	Cog.Eng. A. D. Rice	[signature]	12-5-94		Tle-06					
2	1	Cog. Mgr. J. G. Kristofzski	[signature]	12/5/94		Tle-06					
2	1	QA J. C. Langford	J.C. Langford	12-5-94		Tle-03					
		Safety									
		Env.									

DEC 1994 RECEIVED EDMC

18.	19.	20.	21. DOE APPROVAL (if required)
A. E. Young [signature] 12-5-94 Signature of EDT Originator Date	Authorized Representative for Receiving Organization Date	J. G. Kristofzski [signature] 12/5/94 Cognizant Manager Date	Ctrl. No. [] Approved [] Approved w/comments [] Disapproved w/comments

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BD-7400-172-1 (07/91)

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RELEASE AUTHORIZATION

Document Number:	WHC-SD-WM-DP-079, REV.0
Document Title:	216-Day Report for Tank 241-C-111, Cores 58, and 59
Release Date:	December 5, 1994

This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Kara M. Broz — December 5, 1994

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SUPPORTING DOCUMENT

1. Total Pages 405

2. Title	3. Number	4. Rev No.
216-Day Report for Tank 241-C-111, Cores 58 and 59	WHC-SD-WM-DP-079	0

5. Key Words

216-Day Report, Tank 241-C-111, Tank C-111, C-111, Cores 58 and 59

APPROVED FOR PUBLIC RELEASE

KMB 12/5/94

6. Author

Name: Andrew D. Rice

Signature

Organization/Charge Code 8E480/MDR2D

7. Abstract

N/A

8. RELEASE STAMP

OFFICIAL RELEASE BY WHC

DATE DEC 05 1994

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Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

WHC-SD-WM-DP-079, REV. 0

ANALYTICAL SERVICES

Project: 216-DAY REPORT FOR TANK 241-C-111, CORES 58 AND 59

Date Printed: DECEMBER 1, 1994

54-7600-075

Hanford Operations and Engineering Contractor for the US Department of Energy

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TABLE OF CONTENTS

Narrative 1

Sample Data Summary 7

Sampling and Custody Data 16

Communications 25

Logbook 30

Photographs 54

Sample Preparations 59

- Acid Digestion 60
- Fusion Digestion 65
- Fusion Digestion 69

Physical Analyses 73

- Differential Scanning Calorimetry 74
- Differential Scanning Calorimetry 80
- Differential Scanning Calorimetry 86
- Thermal Gravimetric Analysis 90
- Thermal Gravimetric Analysis 96
- Thermal Gravimetric Analysis 102
- Thermal Gravimetric Analysis 106

Inorganic Analyses 114

- Cyanide Analysis 115
- Cyanide Analysis 120

- Total Organic Analysis 129
- Total Organic Analysis 141
- Total Organic Analysis 151
- Total Organic Analysis 164

- Inductively Coupled Plasma Spectrography 171
- Inductively Coupled Plasma Spectrography 193
- Inductively Coupled Plasma Spectrography 206

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Radiochemical Analyses 230

Total Alpha Analyses 231
Total Alpha Analyses 243
Total Alpha Analyses 255
Total Alpha Analyses 261
Total Alpha Analyses 273

Gamma Enery Analysis 283
Gamma Enery Analysis 301
Gamma Enery Analysis 318
Gamma Enery Analysis 327

Strontium 90 349
Strontium 90 359
Strontium 90 369

This documents consists of pages 1 through 401.

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NARRATIVE

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From: Program Support 8E480-94-110
Phone: 373-4225
Date: December 1, 1994
Subject: 216 DAY REPORT FOR TANK 241-C-111, CORES 58 AND 59

To: D. R. Bratzel

cc: A. D. Rice T6-06
JGK File/LB

References:

(1) WHC-SD-WM-TP-209, Rev. 1, "Tank 241-C-111 Tank Characterization Plan", dated April 20, 1994, Westinghouse Hanford Company, Richland, WA. 99352

(2) Internal Memo 7E720-94-115, "Prioritization of Tank 241-C-111 Analyses", dated April 20, 1994, Westinghouse Hanford Company, Richland, WA 99352

(3) Internal Memo 7E720-94-117, "Prioritization of Tank 241-C-111 Analyses", dated April 29, 1994, Westinghouse Hanford Company, Richland, WA 99352

(4) Internal Memo 7E720-94-118, "Guidance for Handling of Unusual "Rock-Like" Material in Tank 241-C-111 Core 58 Sample", dated April 29, 1994, Westinghouse Hanford Company, Richland, WA. 99352

(5) Internal Memo 7R260-94-001, "Guidance for Analysis of Tank 241-C-111 Samples", dated May 9, 1994, Westinghouse Hanford Company, Richland, WA. 99352

(6) Internal Memo 8E480-94-003, "45 Day Safety Screening For Tank 241-C-111, Cores 58 and 59", dated June 6, 1994, Westinghouse Hanford Company, Richland, WA. 99352

(7) Internal Memo 9454392, "Correction to C-111 Data Evaluation", dated June 21, 1994, Westinghouse Hanford Company, Richland, WA. 99352

Summary

Three core samples from tank C-111, and a field blank, were received by the 222-S laboratories. Cores 58, 59, and the field blank were analyzed in accordance with references (1), (2), (3), (4), and (5) above. A hot cell blank was analyzed at the direction of the hot cell chemist. No sample results exceeded the notification limits. Core 60 was not analyzed, in accordance with (5) above. The results of the safety screening analyses (DSC, TGA, and AT) for cores 58, 59, and the field blank were reported in (6), and

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amended in (7) above.

Sample Receipt and Extrusion

Core 58
The first C-111 sample (core 58) was taken from riser 6 on 4/11/94 and shipped to the 222-S lab the following day. A field blank, which consisted of demineralized water in a clean sampler, was included in this shipment. Core 58 was extruded on 4/14/94. This resulted in approximately 1.5 inches of sample, with a mass of 26.5 grams. About 9 inches of sample was expected.

The sample was dark brown, clay-like in consistency, and appeared homogeneous. No drainable liquid was present. 2.4 grams of liner liquid were recovered, but due to the small volume, the sample was discarded.

The Characterization Program, in accordance with the TCP, was notified of the low sample recovery (cc:mail dated 4/14/94), and guidance was requested and received from the program concerning how to proceed with analyses. It was decided to perform the safety screen analyses first (DSC, TGA, AT). Characterization analyses would not be performed until the safety screen work was completed.

During homogenization of core 58, it was noted that a portion of the sample appeared to be a rock. The Characterization Program was notified, and guidance was requested and received for handling and possible analysis of the "rock". In accordance with (4) above, it was later determined to be a rock, with a mass of about 8 grams. No analyses were performed on the rock, which was archived.

Core 59
Core 59, the second C-111 sample, was sampled from riser 3 on 4/22/94, and received at 222-S the same day. Core 59 was extruded on 4/25/94. About 1.7 grams of off-white, crusty material was recovered. Approximately 8 inches of sample was expected. No drainable liquid or liner liquid was detected. In accordance with the TCP, the Characterization Program was notified (cc:mail dated 4/25/94), and direction for analysis was requested and received from the program. It was decided to analyze for DSC, TGA, AT, and GEA only. No sample remained following these analyses, so no other data appears in this report for core 59.

Core 60
Due to the poor recoveries with the previous two samples, a third was requested. Core 60 was sampled from riser 6 on 4/29/94, and received at 222-S the same day. Extrusion took place on 5/2/94. About one inch of sample, with a mass of 19.7 grams, was recovered. Six inches of sample were expected. The appearance of this sample was very similar to core 58. No liquid was present. In accordance with the TCP, the program was notified (cc:mail dated 5/2/94), and direction for analysis was requested and received from the program. The program requested that this sample be set aside. No work was performed on core 60.

Field Blank

The field blank was collected in the hot cell, using the extrusion apparatus, on 4/26/94. The sampler valve was opened, allowing the liquid to flow over the sample collection pan into a graduated sample jar. The volume of liquid collected was approximately 170 ml.

Analytical Results

TGA (Moisture)
The weight percent water by Thermogravimetric Analysis (TGA) was performed by procedure LA-560-112. No analytical problems were encountered. Core 58 contained about 32% water by weight. This was at the low end of the expected range for a typical ferrocyanide sludge sample. Core 59 contained 0% water by weight. This sample was off white, dry, and crust-like in appearance.

Based on the DSC/TGA, the sample is believed to be composed primarily of aluminum hydroxide. The field blank contained > 99% water by weight, as expected.

DSC
The Differential Thermal Analysis was performed by procedure LA-514-113, and a Mettler Model 20 Differential Scanning Calorimeter (DSC). No analytical problems were noted. Core 58 contained a small exotherm averaging about 13 calories/gram (dry weight basis). The precision for core 58, as assessed by the relative percent deviation (RPD) of duplicate analyses, was 15.2%, which exceeded the requested 10% criteria. This is due to the relatively small peak that was detected. Core 59 contained no exotherms. DSC on the field blank was not requested.

Alpha Total
The Alpha Total (AT) analysis was performed by procedure LA-508-101. No analytical problems were noted. The core 59 alpha activity was more than a factor of ten times lower than core 58. This was in keeping with the atypical nature of this sample. The upper saltcake layer, from which the core 59 sample probably originated, is expected to contain significantly less radioactive material than the ferrocyanide sludge below.

ICP Ni
The ICP analysis for nickel was performed by procedure LA-505-151. No analytical problems were noted. To ensure that all the nickel in the sample was quantified, the nickel analysis was requested on a fusion preparation as well as an acid preparation. The fusion preparation was performed in a zirconium rather than a nickel crucible. This was to minimize the possible introduction of nickel into the sample during the fusion process. The acid preparation results were slightly higher (7.5%) than the fusion results, but likely within the systematic error. This would indicate that the acid digestion is sufficient to quantify Ni in a ferrocyanide tank. The average nickel results for core 58, 2.01E+4 μg/g (fusion) and 2.15E+4 μg/g (acid) were within the expected range of 1E+4 μg/g Ni.

Nickel was present in the hot cell blank just slightly above the detection limit for the sample, and less than detectable in the duplicate. The field blank Ni results were both below the detection limit.

Cyanide
The cyanide (CN) analysis was performed by procedure LA-695-102. No analytical problems were noted. The results for core 58 were much lower than expected, with the average being 55.0 μg CN/g (dry weight basis), and the expected range being 1000 μg CN/g.

No CN was detected in the field blank.

Total Organic Carbon
The total organic carbon (TOC) analysis was performed by procedure LA-342-100 for the solid sample (core 58), and LA-344-105 for the liquid samples (field and hot cell blanks). No analytical problems were noted. The solid sample procedure was chosen because it contains a step designed to break down tank sludge, and the liquid procedure was chosen because it provides a better detection limit. A spike was requested on the solid matrix sample, but was not performed. Spikes have proven unreliable for this procedure, apparently due to homogeneity problems, and the additional dose required to perform this test was not warranted given the limited usefulness of past spike results. The core 58 average result of 724 μg C/g was well below the notification limit, and in the expected range of 1000 μg C/g.

The field blank and hot cell blank results were below the detection limit for TOC.

Gamma Energy Analysis Cs-137
The gamma energy analysis (GEA) was performed by procedure LA-548-121. No analytical problems were noted. Initially a GEA was requested for both a fusion and a water preparation. The water preparation was dropped as unnecessary (cc:mail dated 6/28/94) due to the limited usefulness of the data and the sample dose rate. The Cs-137 results for core 58, 85.8 μCi/g, were lower than the expected range of 1000 μCi/g. The core 59 results were very low at 0.72 μCi/g. This sample was probably from the salt cake layer of the tank, which was expected to be low in activity compared to the sludge.

The hot cell blank was below the detection limit for Cs-137, but the field blank sample and duplicate results were above the detection limit. The small amount of contamination in the field blank bears no significance to core 58 and 59 results , which are at least a factor of 1000 higher.

Strontium 90
The Sr-90 analysis was performed by procedure LA-220-101. One rerun was requested. No other analytical problems were noted. The Sr-90 analysis was requested on both a fusion and an acid preparation. The results compare very well to one another, indicating that the acid digestion is sufficient to quantify Sr in tank wastes of this type. The average result for core 58, 4160

μCi/g (fusion) and 4270 μCi/g (acid), were within the expected range of 1000 μCi/g.

The field blank Sr-90 result averaged 2.21E-3 μCi/ml. This was most likely due to contamination during analysis, and is not significant compared to the core sample results.

Sincerely,

Andrew D. Rice
Project Coordinator
373-4225

Attachments Sample Data Summary
Communications
Raw Data

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SAMPLE DATA SUMMARY

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DSC
LA-514-113

Sample I.D.	Lab I.D.	Notification Limit Cal/g*	Standard Recovery %	Sample Cal/g*	Duplicate Sample Cal/g*	Averge Result Cal/g*	RPD %
Core 58, Segment 1	K211	125	101.2	14.2	12.2	13.2	15.2
Core 59, Segment 1	K218	125	104	no exotherm	no exotherm	no exotherm	NA
Hot Cell Blank	K216	NA	95	no exotherm	NA	NA	NA

* Dry weight basis

TGA (% Water)
LA-560-112

Sample I.D.	Lab I.D.	Notification Limit %	Standard Recovery %	Sample %	Duplicate Sample %	Averge Result %	RPD %
Core 58, Segment 1	K211	((0.0932*DSC)-10.7)	99.6	30.8	32.5	31.6	5.4
Core 59, Segment 1	K218	((0.0932*DSC)-10.7)	98.4	0	0	0	NA
Hot Cell Blank	K216	NA	98.9	99.9	NA	NA	NA
Field Blank	K214	NA	98.8	99.9	99.7	99.8	0.2

CN
LA-695-102

Sample I.D.	Lab I.D.	Notification Limit ug CN/g*	Standard Recovery %	Prep. Blank ug CN/g	Sample Result ug CN/g*	Duplicate Sample ug CN/g*	Averge Result ug CN/g*	RPD %	SPIKE RESULT % REC	(Mean)/ (Detection Limit)	Detection Limit ug CN/g
Core 58, Segment 1	K211	3.9E+04	93.0	<2.00E-02	5.13E+01	5.85E+01	5.50E+01	13.0	109.1	22.65	1.66E+00

Sample I.D.	Lab I.D.	Notification Limit ug CN/mL	Standard Recovery %	Prep. Blank ug CN/mL	Sample Result ug CN/mL	Duplicate Sample ug CN/mL	Averge Result ug CN/mL	RPD %	SPIKE RESULT % REC	(Mean)/ (Detection Limit)	Detection Limit ug CN/mL
Field Blank	K214	NA	100.3	<0.03	<0.03	<0.03	NA	NA	101.9	NA	0.03

* Dry weight basis.

TOC
LA-342-100 / LA-344-105

Sample I.D.	Lab I.D.	Notification Limit ug C/g	Standard Recovery %	Prep. Blank ug C/g	Sample Result ug C/g	Duplicate Sample ug C/g	Averge Result ug C/g	RPD %	Spike Recovery %	(Mean)/ (Detection Limit)	Detection Limit ug C/g
Core 58, Segment 1	K211	3.0E+04	90.0	19.1	7.09E+02	7.38E+02	7.24E+02	4.01	NA	1.81	4.00E+02

Sample I.D.	Lab I.D.	Notification Limit ug C/mL	Standard Recovery %	Prep. Blank ug C/mL	Sample Result ug C/mL	Duplicate Sample ug C/mL	Averge Result ug C/mL	RPD %	Spike Recovery %	(Mean)/ (Detection Limit)	Detection Limit ug C/mL
Hot Cell Blank	K216	NA	100.3	N/A	<5.50E+00	NA	NA	NA	NA	NA	5.50E+00
Field Blank	K214	NA	95.0	<5.00E+00	<5.50E+00	<5.50E+00	NA	NA	100.3	NA	5.50E+00

Total Alpha
LA-508-101

Sample I.D.	Lab I.D.	Notification Limit uCi/g	Standard Recovery %	Prep. Blank uCi/g	Sample uCi/g	Duplicate Sample uCi/g	Averge Result uCi/g	RPD %	Spike Recovery %	(Mean)/ (Detection Limit)	Detection Limit uCi/g
Core 58, Segment 1	K211	41	81.6	<1.93E-01	2.59E+00	2.30E+00	2.45E+00	11.9	89.9	8.17	3.02E-01
Core 59, Segment 1	K218	41	102.4	<1.22E-02	1.21E-01	1.25E-01	1.23E-01	3.25	96.5	3.92	3.14E-02

Sample I.D.	Lab I.D.	Notification Limit uCi/mL	Standard Recovery %	Prep. Blank uCi/mL	Sample uCi/mL	Duplicate Sample uCi/mL	Averge Result uCi/mL	RPD %	Spike Recovery %	(Mean)/ (Detection Limit)	Detection Limit uCi/mL
Hot Cell Blank	K216	NA	93.3	NA	9.67E-07	NA	NA	NA	NA	NA	2.05E-07
Field Blank	K214	NA	90.5	<2.09E-07	<4.33E-07	<4.19E-07	NA	NA	101.6	NA	5.24E-07

Cs-137
LA-548-121

Sample I.D.	Lab I.D.	Notification Limit uCi/g	Standard Recovery %	Prep. Blank uCi/g	Sample Result uCi/g	Duplicate Sample uCi/g	Averge Result uCi/g	RPD %	(Mean)/ (Detection Limit)	Detection Limit uCi/g
Core 58, Segment 1	K211	NA	96.1	<5.51E-01	8.85E+01	8.30E+01	8.58E+01	6.41	155.72	5.51E-01
Core 59, Segment 1	K218	NA	105.5	<4.01E-02	7.15E-01	7.36E-01	7.25E-01	2.88	18.08	4.01E-02

Sample I.D.	Lab I.D.	Notification Limit uCi/mL	Standard Recovery %	Prep. Blank uCi/mL	Sample Result uCi/mL	Duplicate Sample uCi/mL	Averge Result uCi/mL	RPD %	(Mean)/ (Detection Limit)	Detection Limit uCi/mL
Hot Cell Blank	K216	NA	99.5	NA	<2.65E-04	NA	NA	NA	NA	NA
Field Blank	K214	NA	98.6	<2.27E-06	1.67E-04	1.63E-04	1.65E-04	0.02	72.69	2.27E-06

Ni

LA-220-101

Sample I.D.	Lab I.D.	Notification Limit ug Ni/g	Standard Recovery %	Prep. Blank ug Ni/mL	Sample Result ug Ni/g	Duplicate Sample ug Ni/g	Averge Result ug Ni/g	RPD %	Spike Recovery %	(Mean)/ (Detection Limit)	Detection Limit ug Ni/g
Core 58, Seg. 1 (fusion)	K211	NA	101.5	0.061	2.02E+04	1.99E+04	2.01E+04	1.49	104.0	NA	0.061
Core 58, Seg. 1 (acid)	K211	NA	94.74	<.02	2.13E+04	2.17E+04	2.15E+04	1.86	94.74	NA	0.021

Sample I.D.	Lab I.D.	Notification Limit ug Ni/mL	Standard Recovery %	Prep. Blank ug Ni/mL	Sample Result ug Ni/mL	Duplicate Sample ug Ni/mL	Averge Result ug Ni/mL	RPD %	Spike Recovery %	(Mean)/ (Detection Limit)	Detection Limit ug Ni/mL
Hot Cell Blank	K216	NA	99.72	<0.020	7.30E-02	NA	NA	NA	NA	NA	0.020
Field Blank	K214	NA	99.72	<0.020	<0.020	<0.020	NA	NA	101.4	NA	0.020

Sr-90
LA-220-101

Sample I.D.	Lab I.D.	Notification Limit uCi/g	Standard Recovery %	Prep. Blank uCi/g	Sample Result uCi/g	Duplicate Sample uCi/g	Averge Result uCi/g	RPD %	(Mean)/ (Detection Limit)	Detection Limit uCi/g
Core 58, Seg. 1 (fusion)	K211	NA	102	1.92E-01	4.13E+03	4.19E+03	4.16E+03	1.44	1704.92	2.44E+00
Core 58, Seg. 1 (acid)	K211	NA	99.7	1.17E+00	4.22E+03	4.31E+03	4.27E+03	2.11	1914.79	2.23E+00

Sample I.D.	Lab I.D.	Notification Limit uCi/mL	Standard Recovery %	Prep. Blank uCi/mL	Sample Result uCi/mL	Duplicate Sample uCi/mL	Averge Result uCi/mL	RPD %	(Mean)/ (Detection Limit)	Detection Limit uCi/mL
Field Blank	K214	NA	102	<3.42E-06	2.22E-03	2.19E-03	2.21E-03	1.36	0.32	6.86E-06

SAMPLING AND CUSTODY DATA

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CHAIN-OF-CUSTODY RECORD FOR CORE SAMPLING

(1) Shipment Number S94-001 (2) Sample Number 94-001 (3) Supervisor* M.C. Jones.

(4) Tank 241-C-111 (5) Riser 6 (6) Segment 1 (7) Core 058 (8) Cask Serial Number 1007-C

Radiation Survey Data:	(9) FIELD	(26) LABORATORY
Over Top Dose Rate	< 0.5 mr/hr	< 0.5 mr/hr
Side Dose Rate	3 mr/hr	3 mr/hr
Bottom Dose Rate	7 mr/hr	7 mr/hr
Smearable Contamination	<Det (alpha)	<D (alpha)
	<Det (beta-gamma)	<D (beta-gamma)
	RPT* [signature] (Signature)	RPT* [signature] (Signature)

(10) Shipment Description:	
A. Work Package Number	2E-92-01256
B. Cask Seal Number	3761
C. Sampler Number Used	93-009
D. Date and Time Sampler Unseated	4-11-94/13:25
E. Expected Liquid Content	20%
F. Expected Solid Content	80%
G. Dose Rate Through Drill String	60 MR
H. Expected Sample Length	7.5" To 9.5"

(11) INFORMATION *(Include statement of laboratory tests to be performed.)*

TANK characterization Plan WHC-SD-cm-TP-209

(12) Field Comments: hit a hard layer 2" Befor End of stroke.

(27) Laboratory Comments

(13) POINT OF ORIGIN	(14) SENDER NAME	(16) DATE RELEASED	(18) DESTINATION	(20) RECIPIENT NAME	(22) DATE RECEIVED
241-C-111 200 EAST	Michael Jones	4-12-94	222-S	Sandra Cobb	04-12-94
	(15) SENDER SIGNATURE* [signature]	(17) TIME RELEASED 14:25		(21) RECIPIENT SIGNATURE* Sandra Cobb	(23) TIME RECEIVED 1430

(19) Seal Intact Upon Release? ☒ Yes ☐ No

(24) Seal Intact Upon Receipt? ☒ Yes ☐ No

(25) Seal Data Consistent with this Record?

Shipment No. ☒ Yes ☐ No Cask Seal No. ☒ Yes ☐ No Sample No. ☒ Yes ☐ No

DISTRIBUTION: White – Office of Sample Management; Pink – Process Engineering, R1-51; Yellow – Recipient of Sample; Goldenrod – Tank Farm Operations, T4-01

BC-6000-309 (02/90)

WHC-SD-WM-DP-079, REV 0

CHAIN-OF-CUSTODY RECORD FOR CORE SAMPLING

(1) Shipment Number S94-002 (2) Sample Number N/A (3) Supervisor* Michael C. Jones

(4) Tank 241-C-111 (5) Riser 6 (6) Segment N/A (7) Core N/A (8) Cask Serial Number 1005-C

Radiation Survey Data:	(9) FIELD	(26) LABORATORY
Over Top Dose Rate	< 0.5 mr/hr	<0.5 mr/hr
Side Dose Rate	< 0.5 mr/hr	<0.5 mr/hr
Bottom Dose Rate	< 0.5 mr/hr	<0.5 mr/hr
Smearable Contamination	< Det. (alpha)	<d (alpha)
	< Det. (beta-gamma)	<d (beta-gamma)
	RPT* (Signature)	RPT* (Signature)

(10) Shipment Description:

A. Work Package Number	2E-92-01256
B. Cask Seal Number	3762
C. Sampler Number Used	92-216
D. Date and Time Sampler Unseated	4-12-94 11:40
E. Expected Liquid Content	100 %
F. Expected Solid Content	0 %
G. Dose Rate Through Drill String	N/A
H. Expected Sample Length	185 cc.

(11) INFORMATION *(Include statement of laboratory tests to be performed.)*

TANK characterization Plan WHC-SD-WM-TP-209

(12) Field Comments:

WATER SAMPLE. Blank

DONE in the Field ON 4-12-94

(27) Laboratory Comments

(13) POINT OF ORIGIN	(14) SENDER NAME	(16) DATE RELEASED	(18) DESTINATION	(20) RECIPIENT NAME	(22) DATE RECEIVED
241-C TANK Farm	Michael Jones	4-12-94	222-S	Sandra Cobb	04-12-94
	(15) SENDER SIGNATURE*	(17) TIME RELEASED		(21) RECIPIENT SIGNATURE*	(23) TIME RECEIVED
		14:05		Sandra Cobb	1430

(19) Seal Intact Upon Release? ☒ Yes ☐ No

(24) Seal Intact Upon Receipt? ☒ Yes ☐ No

(25) Seal Data Consistent with this Record?

Shipment No.	Cask Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White – Office of Sample Management; Pink – Process Engineering, R1-51; Yellow – Recipient of Sample; Goldenrod – Tank Farm Operations, T4-01

BC-6000-309 (02/90)

CHAIN-OF-CUSTODY RECORD FOR CORE SAMPLING

(1) Shipment Number S94-002 (2) Sample Number 94-002 (3) Supervisor* M.C Jones

(4) Tank C-111 (5) Riser 3 (6) Segment 1 (7) Core 059 (8) Cask Serial Number C-1029

Radiation Survey Data:	(9) FIELD	(26) LABORATORY
Over Top Dose Rate	<0.5 mrem	<0.5 mR/hr
Side Dose Rate	<0.5 mrem	<0.5 mR/hr
Bottom Dose Rate	<0.5 mrem	<0.5 mR/hr
Smearable Contamination	LD mrem (alpha)	LD mR/hr (alpha)
	LD (beta-gamma)	LD (beta-gamma)
	RPT* [signature] (Signature)	RPT* [signature] (Signature)

(10) Shipment Description:

A. Work Package Number	2E-92-01256
B. Cask Seal Number	3778
C. Sampler Number Used	93-024
D. Date and Time Sampler Unseated	4-22-94 / 9:40
E. Expected Liquid Content	0%
F. Expected Solid Content	100%
G. Dose Rate Through Drill String	<.5
H. Expected Sample Length	7 7/8"

(11) INFORMATION *(Include statement of laboratory tests to be performed.)*

Characterization Plan WHC-SD-WM-TP-209

19

(12) Field Comments:
First sample is through some hard salt cake. Dose rate shows that there may be no sample in sampler. Also total length of sample shown on drill truck was 10" long.

(27) Laboratory Comments

(13) POINT OF ORIGIN	(14) SENDER NAME	(16) DATE RELEASED	(18) DESTINATION	(20) RECIPIENT NAME	(22) DATE RECEIVED
241-C-111	M.C Jones	4-22-94	222-S LAB	NATALIE LAPIERS	4-22-94
	(15) SENDER SIGNATURE* [signature]	(17) TIME RELEASED 2:10		(21) RECIPIENT SIGNATURE* [signature]	(23) TIME RECEIVED 1450 4-22-94

(19) Seal Intact Upon Release?	(24) Seal Intact Upon Receipt?	(25) Seal Data Consistent with this Record?		
		Shipment No.	Cask Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White – Office of Sample Management; Pink – Process Engineering, R1-51; Yellow – Recipient of Sample; Goldenrod – Tank Farm Operations, T4-01

BC-6000-309 (02/90)

WHC-SD-WM-DP-079, REV. 0

CHAIN-OF-CUSTODY RECORD FOR CORE SAMPLING

(1) Shipment Number 594-03 (2) Sample Number 94-003 (3) Supervisor* D.E. Melville

(4) Tank C-111 (5) Riser 6 (6) Segment 1 (7) Core 60 (8) Cask Serial Number C 1028

Radiation Survey Data:	(9) FIELD	(26) LABORATORY
Over Top Dose Rate	<0.2 mR/hr	<0.2 mR/hr
Side Dose Rate	<0.2 mR/hr	<0.2 mR/hr
Bottom Dose Rate	4.5 mR/hr	4-5 mR/hr
Smearable Contamination	<D (alpha)	<D (alpha)
	<D (beta-gamma)	<D (beta-gamma)
	RPT* (Signature) 4-29-94	RPT* (Signature) 4-29-94

(10) Shipment Description:

A. Work Package Number	2E-92-01256
B. Cask Seal Number	3757
C. Sampler Number Used	93-021
D. Date and Time Sampler Unseated	4-29-94 14:13
E. Expected Liquid Content	0%
F. Expected Solid Content	100%
G. Dose Rate Through Drill String	110 mrem/hr.
H. Expected Sample Length	6"

(11) INFORMATION *(Include statement of laboratory tests to be performed.)*

Characterization Plan WHC-SD-WM-TP-209

(12) Field Comments:

Contacted waste 11" from bottom of stroke. Hit solid object 4" from bottom of stroke.

(27) Laboratory Comments

(13) POINT OF ORIGIN	(14) SENDER NAME	(16) DATE RELEASED	(18) DESTINATION	(20) RECIPIENT NAME	(22) DATE RECEIVED
241-C-111	D.E. Melville	4/29/94	222 S Lab.	MICHAEL A. COOK	4/29/94
	(15) SENDER SIGNATURE* Dave Melville	(17) TIME RELEASED 15:30		(21) RECIPIENT SIGNATURE*	(23) TIME RECEIVED 1615

(19) Seal Intact Upon Release?	(24) Seal Intact Upon Receipt?	(25) Seal Data Consistent with this Record? Shipment No.	Cask Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White – Office of Sample Management; Pink – Process Engineering, R1-51; Yellow – Recipient of Sample; Goldenrod – Tank Farm Operations, T4-01

BC-6000-309 (02/90)

WHC-SD-WM-DP-079, REV. 0

20

REQUEST FOR SPECIAL ANALYSIS (RSA)

RSA No. 1890

1. Sample Origin: C-111
2. Date Submitted: 4-25-94
3. Submitted By: RK FULLER
4. Requester Name: ANDY RICE
5. Requester Phone/MSIN: 373-5578 /
6. Charge Code/Work Package: N43CB
7. Date Required: 5-25-94

8. Customer ID	Collected Date	Collected Time	9. Laboratory ID
C5551	(JAR # 6005)		K211

12. Number of Samples: 1
13. Volume of Samples: 10 grams
14. Protocols: ☐ None ☐ RCRA ☐ NQA-1 ☒ Other SEL TCP ☐ CERCLA

15. Sample Type: ☐ Solid ☐ Soil ☐ Slurry ☐ Gas ☐ Water ☐ Waste ☐ Solution ☒ Sludge ☐ Oil ☐ Other (specify)

16. Storage Requirements: ☐ None ☒ Specify 222-S procedure for Rad samples

17. Process Knowledge/Known Listed Wastes: ☒ Unknown ☐ Known (Please attach list) ☐ Previously submitted for this Project

18. Survey: HPT Signature [signature] Dose Rate 22 Rad/hr Sample

19. Disposition of Waste: ☒ Return to Client/Location RK FULLER/HOT CELLS ☐ Dispose per 222-S Procedures ☐ Other

10. Determination	11. Expected Range
Direct ANALYSES:	
· DSC	
· TGA	
CN	
TOC	
FUSION DIGEST	
ICP (Ni only)	
TA	
Sr-90	
Cs-137	
~~Pu-239/240~~ RC 6-21-94	
~~WATER DIG. / GEA~~ not needed SKM 6-28-94	
ACID DIG. / ICP (Ni) Sr	

20. Additional Information: ALL DUPS SPIKE CN, TOC, TA
* Andy Rice will review CARDS.
* Fusion digestion must be done using zirconium crucibles.
* Note to be added to CN cards to perform dissolution by EDTA.
STD K209 Blank K210

21. Chain of Custody: ☒ No ☐ Yes Number:

22. Assigned Custodial Group (select one): ☐ PCL ☐ PDSU ☐ ENV ☐ Process

23. Sample Received By: Sandra Cobb
Date: 04-28-94 Time: 1455

24. Laboratory Manager (if required): 31
Date:

BC-6700-181 (11/92)

REQUEST FOR SPECIAL ANALYSIS (RSA)

RSA No. 1892

1. Sample Origin: C-111	2. Date Submitted: 4-26-94	4. Requester Name: AD RICE	6. Charge Code/Work Package: N4C3B
	3. Submitted By: AD RICE	5. Requester Phone/MSIN: 3-5878	7. Date Required: 5-26-94

8. Customer ID	Collected Date	Collected Time	9. Laboratory ID
C58FB	(JAR # 6008)		K214

12. Number of Samples: 1

13. Volume of Samples: ≈200 ml

14. Protocols: ☐ None ☐ RCRA ☐ NQA-1 ☒ Other ☐ CERCLA — SEE TCP

15. Sample Type: ☐ Solid ☐ Soil ☐ Slurry ☐ Gas ☒ Water ☐ Waste ☐ Solution ☐ Sludge ☐ Oil ☐ Other (specify)

16. Storage Requirements: ☒ None ☐ Specify

17. Process Knowledge/Known Listed Wastes: ☒ Unknown ☐ Known (Please attach list) ☐ Previously submitted for this Project

10. Determination	11. Expected Range
ICP - Ni	< LLD
CN	
TGA	
TOC	
GEA	
Sr-90	
TA	

18. Survey: HPT Signature [signature] — Dose Rate <0.5

19. Disposition of Waste: ☐ Return to Client/Location ☐ Dispose per 222-S Procedures ☒ Other: CONTACT A.D. RICE PRIOR TO DISPOSAL

20. Additional Information:

This sample is a field blank, shipped with Core 58.

ALL ANALYSES IN DUPLICATE.

MATRIX SPIKE FOR ICP, CN, TOC, TA.

STD K212 Blank K213

21. Chain of Custody: ☐ No ☒ Yes Number:

22. Assigned Custodial Group (select one): ☐ PCL ☐ PDSU ☐ ENV ☐ Process

23. Sample Received By: [signature] Date: 04-28-94 Time: 1500

24. Laboratory Manager (if required): 22 Date:

BC-6700-181 (11/92)

REQUEST FOR SPECIAL ANALYSIS (RSA)

RSA No. 1894

1. Sample Origin	2. Date Submitted	4. Requester Name	6. Charge Code/Work Package
C-111	4/28-94	RK FULLER	N4C3B
	3. Submitted By: Ron Hale	5. Requester Phone/MSIN: 373-2886 / T6-31	7. Date Required: 5/28/94

8. Customer ID	Collected Date	Collected Time	9. Laboratory ID	12. Number of Samples	13. Volume of Samples
C58 HCB	(JAR# 6001)		K216	1	150mLs

14. Protocols: [X] None [ ] RCRA [ ] NQA-1 [ ] Other [ ] CERCLA

15. Sample Type: [ ] Solid [ ] Soil [ ] Slurry [ ] Gas [X] Water [ ] Waste [ ] Solution [ ] Sludge [ ] Oil [ ] Other (specify)

16. Storage Requirements: [X] None [ ] Specify

17. Process Knowledge/Known Listed Wastes: [X] Unknown [ ] Known (Please attach list) [ ] Previously submitted for this Project

18. Survey: HPT Signature [signature] Dose Rate <0.5

19. Disposition of Waste: [ ] Return to Client/Location [X] Dispose per 222-S Procedures [ ] Other

10. Determination	11. Expected Range
Direct:	
GEA, IC,	
ICP, OH^-	
pH, TA,	
TB, TIC	
TOC, DSC	
TGA.	

20. Additional Information

* Acidify sample prior to ICP ANALYSIS.
* No Blanks, duplicates, or Spikes.

Std K215

21. Chain of Custody: [X] No [ ] Yes Number:

22. Assigned Custodial Group (select one): [ ] PCL [X] PDSU [ ] ENV [ ] Process

23. Sample Received By: Sandra Cobb

Date: 04-09-94 Time: 0900

24. Laboratory Manager (if required): 33 Date:

BC-6700-181 (11/92)

REQUEST FOR SPECIAL ANALYSIS (RSA)

RSA No. 1908

1. Sample Origin	2. Date Submitted	4. Requester Name	6. Charge Code/Work Package
C-111	5-4-94	A. D. RICE	N4C33
	3. Submitted By: A. D. RICE	5. Requester Phone/MSIN: 373-5878	7. Date Required: 5-26-94

8. Customer ID	Collected Date	Collected Time	9. Laboratory ID	12. Number of Samples	13. Volume of Samples
C5951	(JAR #6004)		K218	1	1 GRAM

14. Protocols: ☐ None ☐ RCRA ☐ NQA-1 ☒ Other ☐ CERCLA — SEE TCP

15. Sample Type: ☒ Solid ☐ Soil ☐ Slurry ☐ Gas ☐ Water ☐ Waste ☐ Solution ☐ Sludge ☐ Oil ☐ Other (specify)

16. Storage Requirements: ☐ None ☒ Specify 222 S PROCEDURES FOR RAD SAMPLE STORAGE

17. Process Knowledge/Known Listed Wastes: ☒ Unknown ☐ Known (Please attach list) ☐ Previously submitted for this Project

10. Determination	11. Expected Range
DSC	
TGA	
~~GEA~~ AC 5-4-94	
FISSION	
AT	
GEA	

18. Survey: CBeiw (HPT Signature) Dose Rate: 2 rad/hr

19. Disposition of Waste: ☐ Return to Client/Location ☐ Dispose per 222-S Procedures ☒ Other INFORM A. D. RICE PRIOR TO DISPOSAL

20. Additional Information: PERFORM IN DUPLICATE. STD K217

21. Chain of Custody: ☐ No ☒ Yes Number: 94-002

22. Assigned Custodial Group (select one): ☒ PCL ☐ PDSU ☐ ENV ☐ Process

23. Sample Received By: [signature] Date: 5-6-94 Time: 0905

24. Laboratory Manager (if required): [signature] Date:

BC-6700-181 (11/92)

COMMUNICATIONS

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[3] From: David R Bratzel at ~WHC268 4/14/94 5:08PM (1057 bytes: 19 ln)
To: Brett C Simpson
cc: Cherri DeFigh-Price, Andrew D Rice at ~WHC168
Subject: C-111 Segment Recovery
---------- Message Contents ----------

Brett - 26 grams of material is sufficient to do minimal analyses - let's discuss and prioritize - Dave Bratzel
****

This is to inform you, in accordance with the C-111 Tank Characterization Procedure (WHC-SD-WM-TP-209), that the amount of material recovered from core 58 was insufficient to perform the requested analyses and permit a minimum of 10 grams archive material. Approximately 1.5" (26 grams) of sample was obtained from Core 58. As instructed, no analyses will be performed on this material unless specifically requested to do so.

AD Rice
C-111 Project Coordinator

[20] From: Andrew D Rice at ~WHC168 4/25/94 4:13PM (1052 bytes: 12 ln)
To: John L Deichman at ~WHC321, Joseph E Meacham at ~WHC129
cc: John G Kristofzski, Richard K (Keith) Fuller at ~WHC169, Ruth D Schreiber at ~WHC163, Robert J (Bob) Cash at ~WHC129
! ndrew D Rice
S ct: Core 59 Extrusion Results

---------- Message Contents ----------

The second core from Tank C-111, Core 59, was extruded this afternoon. The sampler contained about 1.7 grams of fairly dry and crustlike material, with a dirty white appearance. Only a very limited number of analyses could be performed on this sample. This material is clearly very different from the material obtained from Core 58. Please provide guidance as to how you would like the lab to proceed with this sample.

AD Rice
PC

[49] From: Andrew D Rice at ~WHC168 5/2/94 1:55PM (1217 bytes: 16 ln)
To: Robert J (Bob) Cash at ~WHC129, John L Deichman at ~WHC321, Joseph E Meacham at ~WHC129
cc: Richard K (Keith) Fuller at ~WHC169, John G Kristofzski, Ruth D Schreiber at ~WHC163
Andrew D Rice
Subject: C-111 Core 60 Extrusion Results

---------- Message Contents ----------

Core 60 of Tank C-111 was extruded this morning (5-2-94). About one inch of sample, with a mass of 19.7 grams, was obtained. The sample was dark brown, with a thick and clay-like consistency. This sample was very similar in appearance to core 58. No drainable or liner liquid was detected.

Six inches of sample were expected to be recovered in core 60. The results of this extrusion constitute insufficient segment recovery as defined in the C-111 Tank Characterization Procedure. The 222S lab therefore requests a Letter of Instruction to prioritize analyses of core 60.

AD Rice
PC

[86] From: Robert J (Bob) Cash at ~WHC129 6/28/94 11:59AM (1545 bytes: 31 ln)
To: Andrew D Rice at ~WHC168
cc: John G Kristofzski at ~WHC168, Raymond (Ray) Akita at ~WHC168,
and H Griffin at ~WHC32, Robert J (Bob) Cash, Joseph E Meacham,
D Schreiber at ~WHC163, Gary T Dukelow
Subject: C-111 Core 58 Water Digest
---------- Message Contents ----------

Gentlemen:

The Tank Characterization Plan for C-111 currently requires Gamma Energy Analysis (GEA) on both a fusion and water preparation. I am not aware of any rationale for the water prep. I commented on this for the revision to the Ferrocyanide DQO, and the water prep GEA was dropped.

The lab is ready to perform the water prep. Core 58 has a substantial dose rate, so I would like to minimize technician contact with this sample. The only analysis performed on the water digest is the GEA. I propose that the water prep GEA be dropped. The fusion should provide the information you need. If you agree, please send me a cc: to this effect.

AD Rice
PC

* **********
Andy,

We agree. Pls proceed without doing the water digest.

We have corrected this in the new DQO going out in a few weeks.

TNX,

Bob Cash

LOGBOOK

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Table of Contents

PAGE NO.	
5	Sample Shipment information
6	Chain of Custody information
7-10	Extrusion information C-111 Segment # 1 C-58
11	Homogenization C-111 C 58 Segment #1
11-13	Extrusion info C-111 C58 Seg #1
14	C 111 Core 58 Seg #1 35mm Photo
15	C 111 Core ~~59~~ 58 Seg #1 35mm Photo
16-18	C 111 Field Blank extrusion
19	Sample Information / Submitted to Lab
20-21	C-111 Core 60 Seg #1 Extrusion
22	Photography C-111 Core 60 Seg #1
23	C-111 Core 58 SEGMENT #1 ROCK
24	C-111 Core 58 Segment #1 ROCK - photograph
25	C-111 CORE 58 SEGMENT #1 ROCK
26	C-111 CORE 58 SEGMENT #1 ROCK - PHOTOGRAPH

4-14-94

1. Recieved field blank and segment #1 of Core 58 (C-111) on 4-12-94.

TANK C-111

	Shipment	Sample	Cask	Core	Segment / Riser
(1)	S94-001	NA	1005-C	NA	NA (FIELD BLANK)
(2)	S94-001	94-001	1007-C	58	1 Riser 6
(3)	S94-002	94-002	C-1029	59	1 Riser 3
(4)	S94-003	94-003	C-1028	60	1 Riser 6

A. Chain of Custody information

(1) Field blank: Radiation survey

- Over Top Dose Rate <0.5mr/hr
- Side Dose Rate <0.5mr/hr
- Bottom Dose Rate <0.5mr/hr
- Smearable Contamination <Det. Alpha
  <Det. Beta/Gamma

Work package 2E-92-01256
Cask Seal # 3762
Sample # 92-216
Expected liquid Content 100%
Expected Solid Content 0%

Field comments: Field Blank take 4/12/94

(2) C-111 Segment 1 Core 58

Radiation survey
- Over Top Dose <0.5mr/hr
- Side Dose Rate 3 mr/hr
- Bottom Dose Rate 7 mr/hr
- Smearable Cont. < Det

Work package 2E-92-01256
Cask Seal # 3761
Sample # 93-009
Expected liquid 20%
Expected Solid 80%
Dose Rate thru Drill String 60 mR
Expected Sample length 7.5" to 9.5"

Field comment: Hit a hard layer 2" Before end of stroke.

Keith Fuller

4-14-94

4/14/94

Balance Check

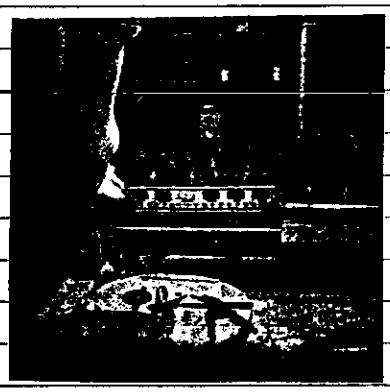
500 gram weight 499.81 grams
20 gram weight 19.97 grams

Liner Liquid Collection jug

317.4 grams ~~gross~~ tare RKF 4/14/94 weight
319.8 grams gross weight
2.4 grams

jar # 6000 TK C-111 Segment #1

246.1 grams gross weight
219.6 grams tare weight
26.5 grams net weight C-111 Segment #1



Polaroid photograph of C-111 Segment #1.

Notes on Extrusion:

(1) About 1/2 of the total recovered sample fell out of the end of sampler as the sampler was transferred to the extruder. See page ~~89~~ 100 RKF 4/14/94 for explanation.

(2) Did not note valve position prior to cutting the cables

Keith Fuller
4-14-94

8

Keith Fuller 4/14/94

TANK C-111

WHC-SD-WM-DP-079, REV. 0

EXTRUDED SEGMENT DESCRIPTION SHEET

LOGBOOK # WHC-N-742 1

SAMPLE 94-001 CORE 58
RISER 6 SEGMENT 1

GENERAL DESCRIPTION OF SAMPLE:

			(A) LINER LIQUID		(B) DRAINABLE LIQUID	
1.	JAR/VIAL #		NA		NA	
2.	TARE WEIGHT	(g)		Did not collect liner liquid		No drainable liquid
3.	GROSS WEIGHT	(g)				
4.	NET WEIGHT	(g)				
5.	TOTAL VOLUME	(mL)				
6.	DENSITY	(g/mL)				RKF

COLOR: Dark brown

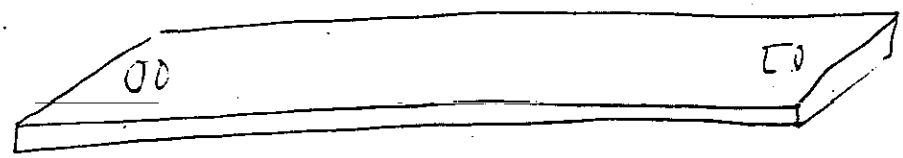
PHYSICAL APPEARANCE: Solid, homogeneous - approximately 56 grams recovered.

DIAMETER OF SAMPLER (in)	1.125 inches
APP. SEGMENT LENGTH (in)	1.5 inches
VOLUME OF SEGMENT (cm3)	24.4 cm^3

OTHER: About 2.4 grams of liner liquid was measured. Liner liquid was mostly colorless.

SKETCH

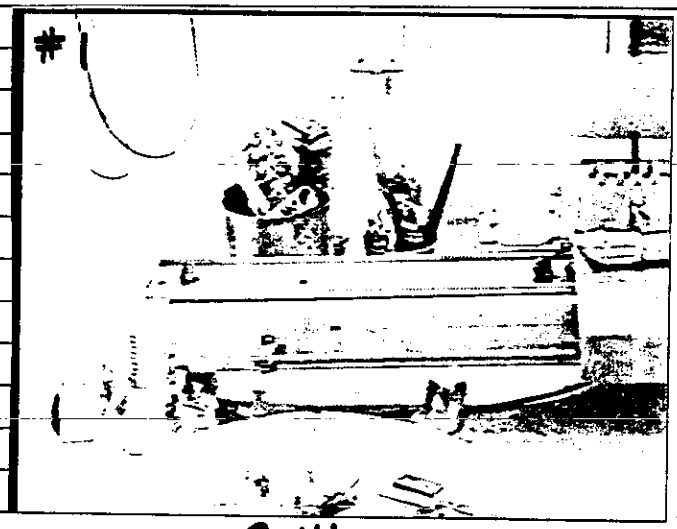
Approximately 1.5" of sample recovered. Sample was placed in jar # 6000.



HOT CELL TECNICIAN:		DATE:
COGNIZANT SCIENTIST:	Keith Fuller	DATE: 4/14/94
REVIEWED BY:		DATE:

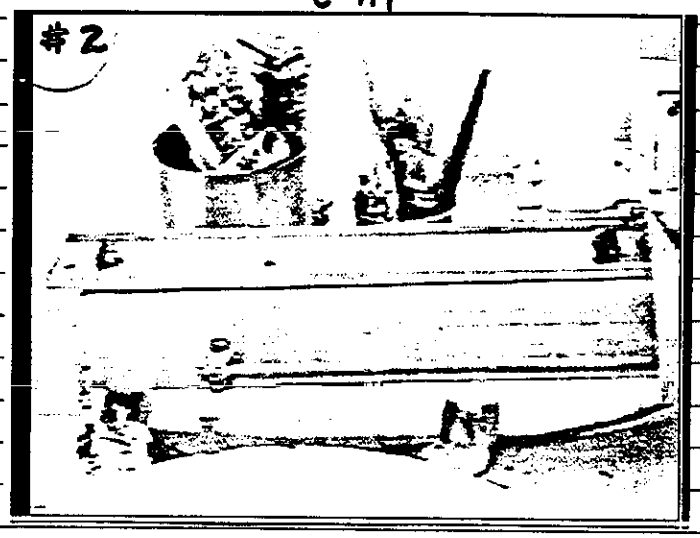
Form 1 Rev. 0 LT-549-101 Page 1 of 1

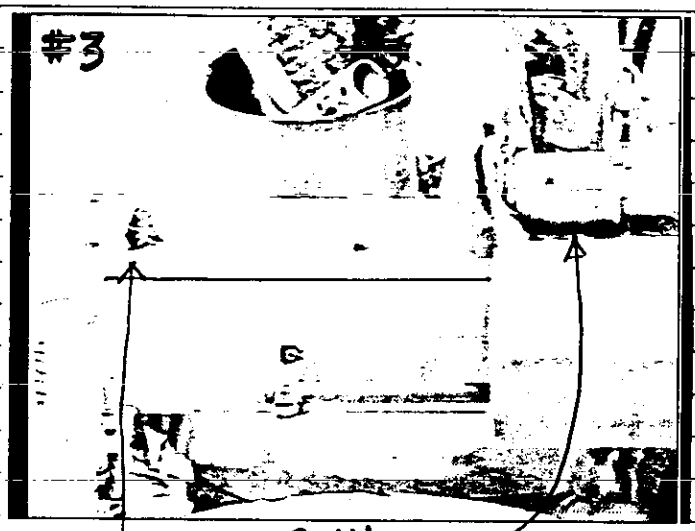
C-111 Core 58 Segment #1



C-111

C-111





C-111

C-111

This portion of C-111 segment #1 fell out of sampler when sampler was moved into position on the extruder.

Sample fell here on the extruder ~~tray~~ 4/14/94 RKF and was scooped onto the tray.

Keith Fitzner 4-14-94

4-14-94

1. Deviations from procedure LT-549-104:

page 7 steps 9, 10, and 11. These steps were done in reverse order due to problems associated with cutting the sampler valve cables while the sampler is on the extruder. Modification of procedure is required.

page 7 step 8. Did not remove rubber ring from valve end of sampler. This is due to the difference between the rotary mode sampler and push mode sampler. This procedural step is for the push mode sampler.

page 6 step 6.b. should be appendix A.

page 6 step 4 of prestart conditions. Used (reusable) 250mL I-Chem vial that was calibrated outside of Hot Cell.

Keith Fuller
4-14-94

4-25-94

1. Homogenization of sample in jar #6000 (C111 Core 58 segment #1). Sample is brown. Sample also contains a "rock hard" chunk of material that cannot be blended with softer material. The soft material (see photo on page 9) is the material closest to piston / valve end of sampler.

2. Transferred 8.72 grams from jar # 6000 to 20mL vial # 6005. Jar # 6005 will be submitted to Lab for analysis according to LOI # 7E720-94-115.

3. Reweighed jar # 6000 to determine remaining material in jar.

235.6 grams gross weight after subsampler
219.6 grams original tare weight
16.0 grams net weight of material jar # 6000

4 Homogenized sample for 10 minutes with a spatula.

5 Remaining material in jar # 6000 C111 C58 seg 1 is "rock hard" material.

4-25-94 Afternoon Balance check 499.75 g
C-111 Core 59 SEGMENT #1 20.03 g.

1.) No liner liquid collected.
2) Valve on sampler was closed before cutting cables
3.) Valve on sampler closed after cutting one cable
4) Valve on sampler closed after cutting both cables
5) Began extrusion. No material observed exiting the sampler until the very end of extrusion. A small amount of material resembling white caulk extruded just before the piston became visible

Kevin Fuller 4/25/94

4-25-94

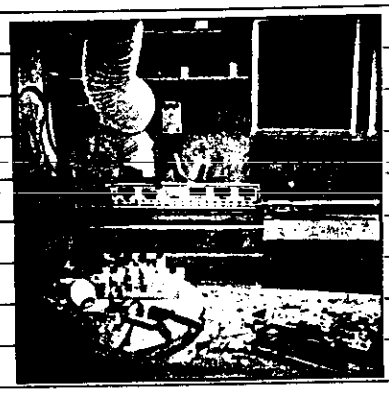
6. Photographing extrusion trap and sample.

7. No drainable liquid collected

8. 35mm camera pictures #3/#4 contain C-111 Core 59 Segment #1.

9. jar # 6004 20mL. Laboratory I.D. K218

1.76 grams of material collected (jar # 6004)



Polaroid photo: Solids only, barely visible (See next page for closer shot of solid material.

Solids: Color: White
Consistency: NA (see picture)
Homogeneity: Crust type material
Texture: see picture next page

No Liner Liquid

No Drainable Liquid

Sampler Efficiency < 1%

4/25/94 This page reserved for Photographs

C-111 Core 59 Segment #1

These pictures were taken off the video camera tape using a Sony Video Printer. C-111 core 59 Segment #1 amounted to 1.76 grams of material

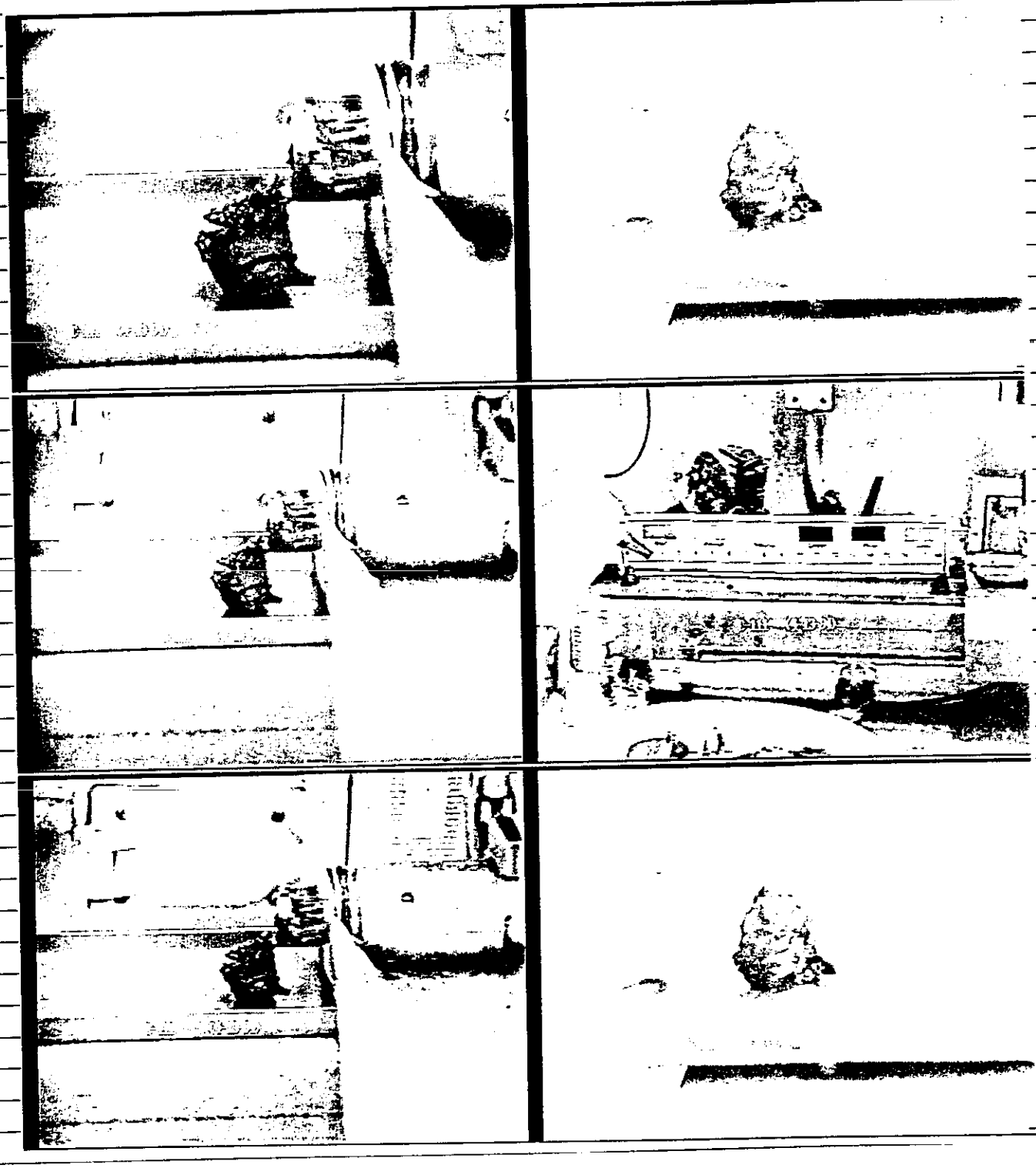
Keith Fuller 4/26/94

This page Reserved for Photograph

C111 Core 58 Segment #1

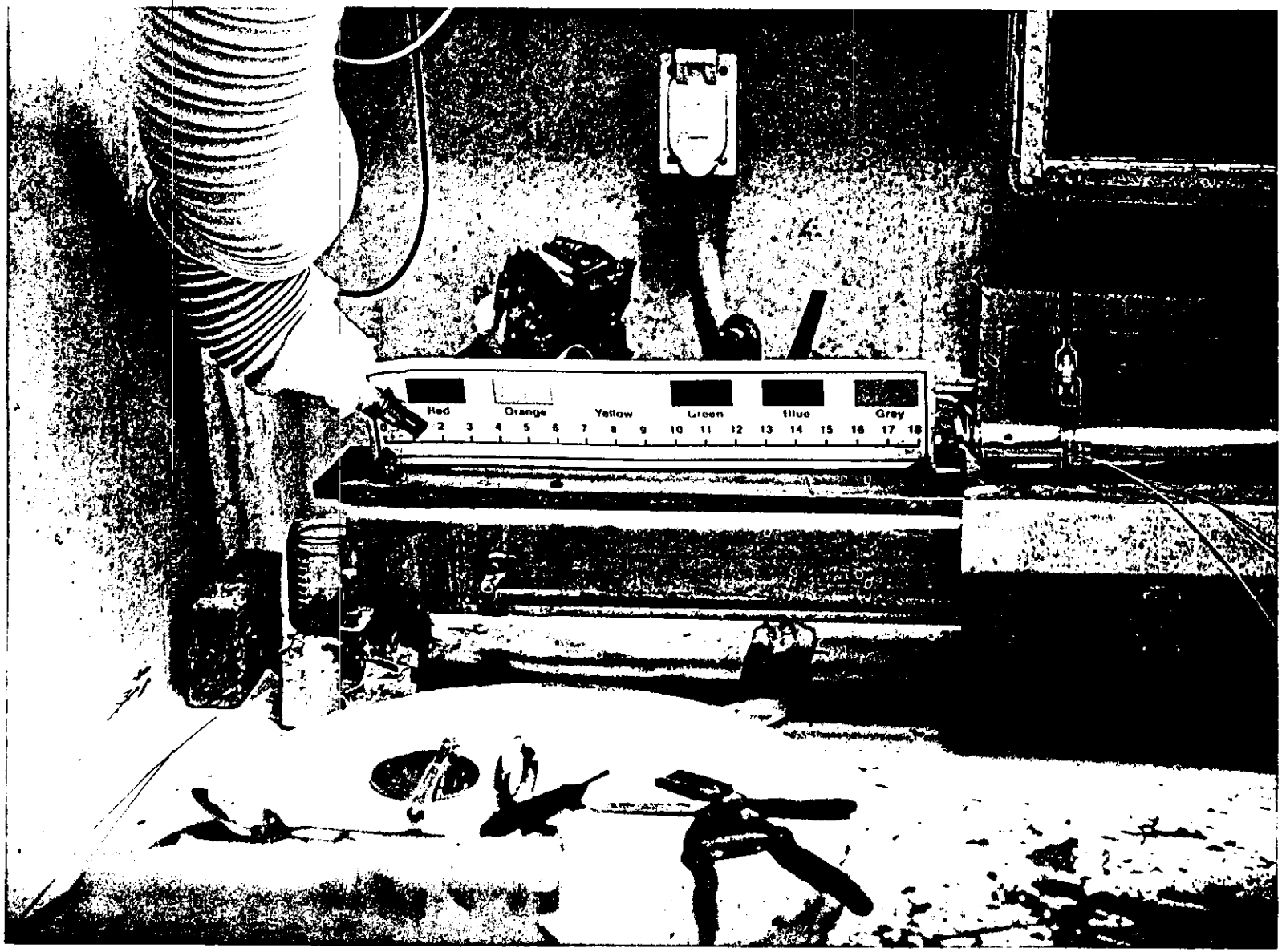
TANK C-111 CORE 58

"ROCK-LIKE" substance that Fell out of sampler.



Thus page Reserved for Photograph

TANK C-111 CORE 58 SEGMENT #1



TANK C-111 CORE 58 SEGMENT #1

Sample : Field Blank
Riser : 6
Core : 58
Segment : Field Blank

Balance check:
20 gram wt = 20.0 g
500 gram wt = 499.7 g

(1) Liner liquid: Less than 5 mls. clear, colorless.

Collection jar: 6006 C58FBLL (20mL VIAL)
Gross weight: NA
Tare weight: NA
Net weight: 7.40 grams collected
No of Phases: 1 phase, colorless, clear

~~(2)~~ RKF 4/26/94

(2) Drainable Liquid -

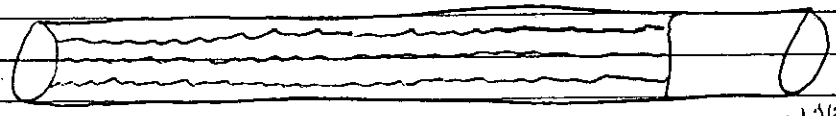
Collection jar: 6008 (250mL)
Gross Weight: 396.3 grams
Tare Weight: 225.2 grams
Net Weight: 171.1 grams
No. of Phases: 1 phase, clear, colorless

(3) Drainable liquid Density:

Total Weight: 171.1 grams
Total Volume: ~170 mLs
Density: ~1.006 g/mL 4/26/94 RKF
Turbidity: Clear, ~~slot~~ colorless
Comments: NA

(4) Sampler Efficiency - Push Mode Sampler

Volume of Sampler: 187 mLs
% Volume of Air: 9.1%
% Volume of liquid: 90.9%
% Volume of Solids: 0%
Comments:



4/26/94 Keith Fuller

Comments: 4/27/94

Physical observations: WHC-SD-WM-DP-079, REV. 0

* Liner liquid less than 5mls.
* No allen screws in sampler. Observation of sampler showed press pins. Need to modify procedure LO-160-103 to allow for extrusion of blank without removing the pins or screws that stop the piston.

Continued operation on 4/27/94: Balance check:
20.00 g wt = 20.0g
500.00 g wt = 499.9g

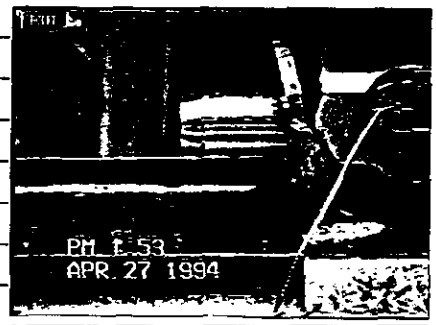
Valve orientation - closed before cutting cables
Valve orientation - closed after cutting cables

Photograph (Polaroid) C-111
Core 58 Field Blank

Drainable liquid jar collected approx 170mL.

35mm Camera used
exposures 7 & 8

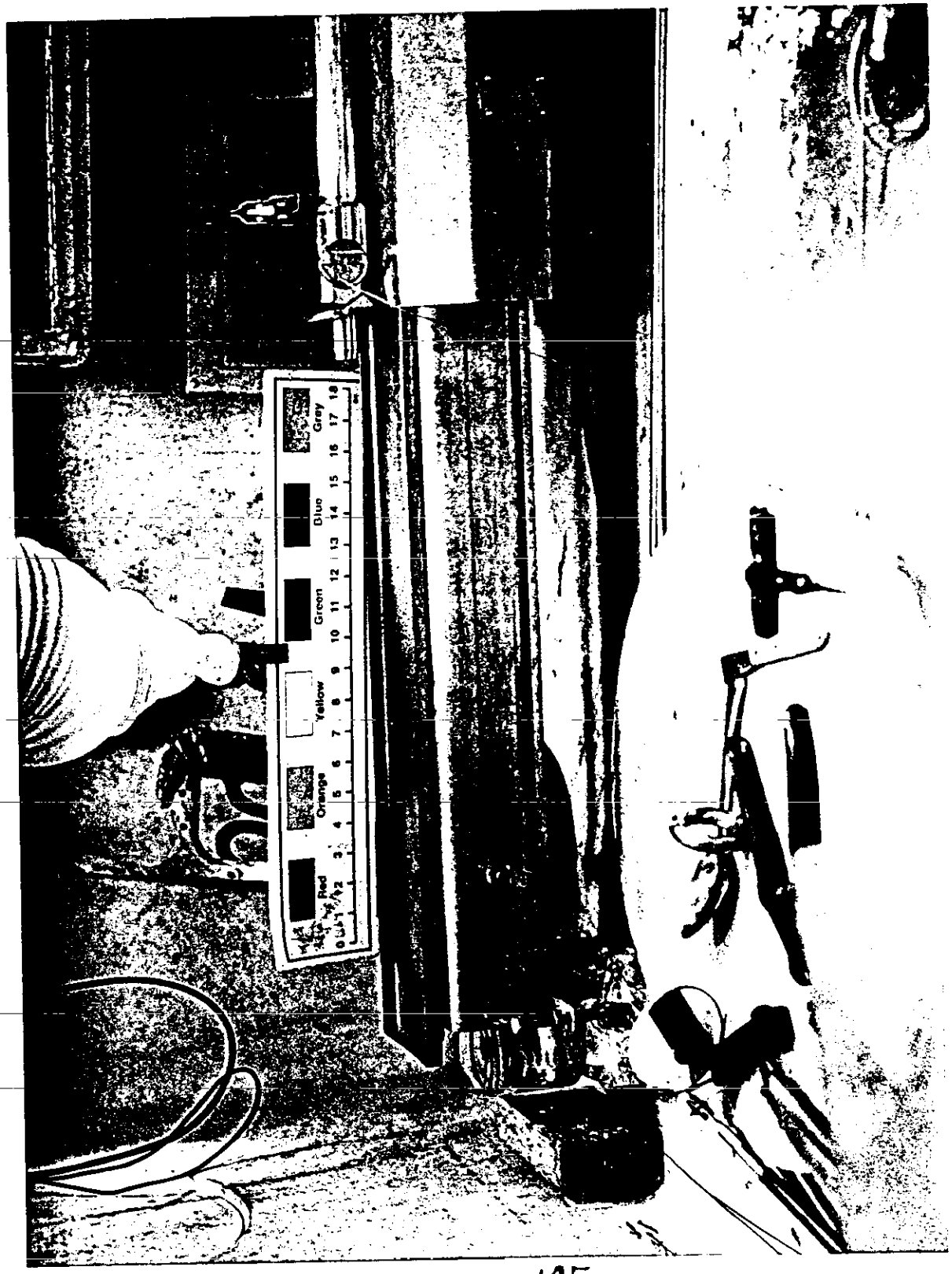
Video Photograph using Sony Video Printer



Laboratory ID K214 jar # 6008
RSA # 1892

Keith Fuller 4/27/94

C-111 FIELD BLANK



C-111 FIELD BLANK

4-27-94

Hot Cell ~~Field~~ RKF 4/27/94 Blank
C-111 Core 58 JAR # 6001

Gross Weight 410.0 grams
tare Weight 225.2 grams

Net Weight grams

Collected Hot Cell Blank in Jar #6001
Customer I.D. C58HCB

Laboratory ID K216 RSA #

4-28-94

Samples submitted to laboratory for analysis

jar #	customer ID	LAB I.D.	RSA #
6005	C58 S1	K211	1890
6008	C58 FB	K214	1892
6001	C58 HCB	K216	1894

Keith Fuller
4-28-94

20

Keith Fuller 5/2/94

WHC-SD-WM-DP-079, REV. 0

5/2/94

Dose Rate through Drill String = 110 mrem/hr

Tank 241-C-111

Extruded Segment Description Sheet

Sample 94-003 Riser 6 Core 60 Segment 1

General Description of Sample: Expected sample ~~recovery~~ RKF 5/2/94 Recovery = 6". Valve closed before cutting cables. Valve closed after cutting cables. Extruded approximately 1" of dark brown solids.

Sketch:

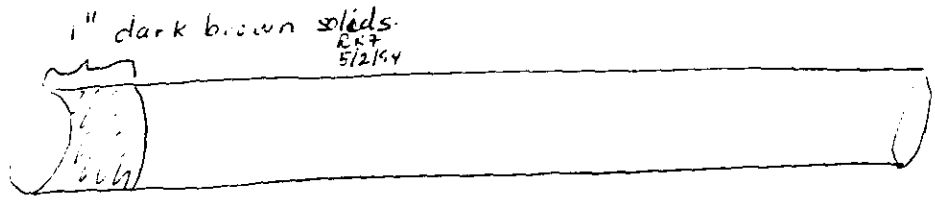


Photo	Sampler Efficiency	Drainable Liquid Density
	Volume of Sampler 309 ~~cm³~~ mLs RKF 5/2/94	Total Weight NA
	%Volume of Air 94.7%	Total Volume NA
	%Volume of Liquid 0	Density NA
	%Volume of Solids 5.3%	Turbidity NA
	Comments:	Comments: No drainable liquid

Solids	Liner Liquid	Drainable Liquid
Color Dark Brown	Collection Jar NA	Collection Jar NA
Consistency softer than peanut butter	Gross Wt. NA	Gross Wt. NA
Homogeneity Homogeneous	Tare Wt. NA	tare Wt. NA
Texture	Net Wt. NA	Net Wt. NA
Penetrometer NA	No. Phases NA	No. Phases NA

Cognizant Scientist: Keith Fuller 5/2/94

Reviewed By: [illegible] 5-3-94

5/2/94

Balance check 20.00 g = 20.00
500.00 g = 499.94 g

C-111 Core 60 Segment #1 Solids

jar # 6012 245.2 g Gross weight
225.5 g Tare weight
19.7 g

% Recovery based on expected 6".

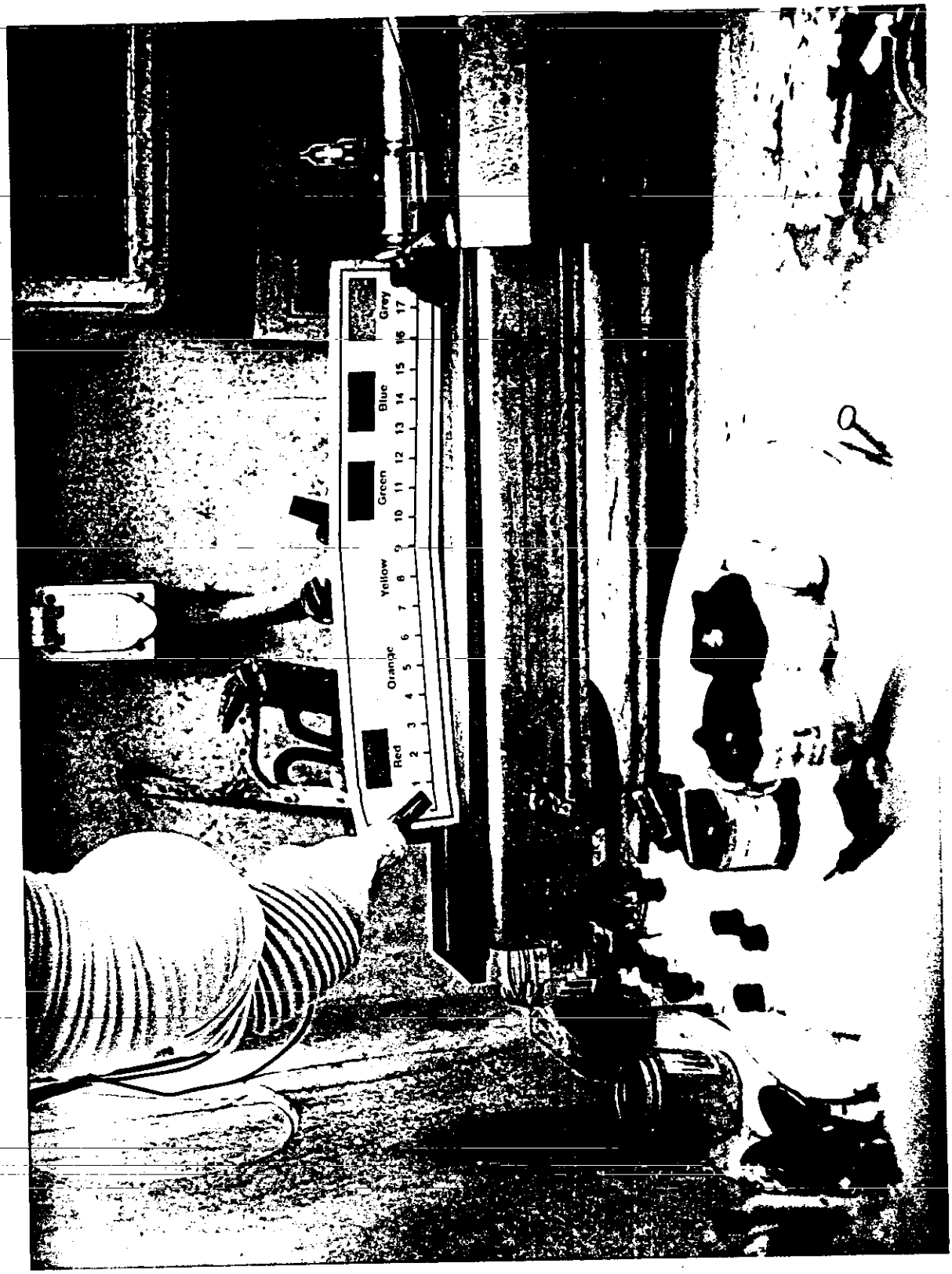
$\frac{1''}{6''} \times 100 = 16.7\%$

35 mm exposures 9 & 10.

Keith Fuller
5/2/94

Thin sections prepared for Petrographic

C-111 CORE 60 SEGMENT #1



C-111 Core 58 5/3/94

~~jar # 6000 500.18 grams gross weight~~ RKF 5/3/94

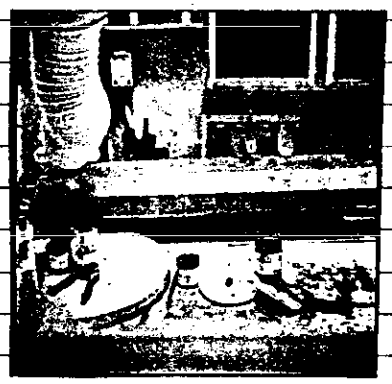
Balance check 500.00g = 500.18 grams
20.00g = 20.18 grams

jar # 6000 contains the "Rock-like" material from C-111 Core 58 segment # 1.

jar # 6000. 236.18 grams gross weight

- Remove material from jar 6000 and placed on tray for video and photography.

- jabbed material with knife, screw driver, and spatula. Only able ~~to~~ RKF 5/3/94 to flake material off the rock in small amounts.



* Polaroid of the rock-like material.

* Rocklike" material was transferred from jar #6000 to jar # 6014 (125 mL).

* Jar #6000 still contains the dry/crust material from C-111 core 58 segment #1

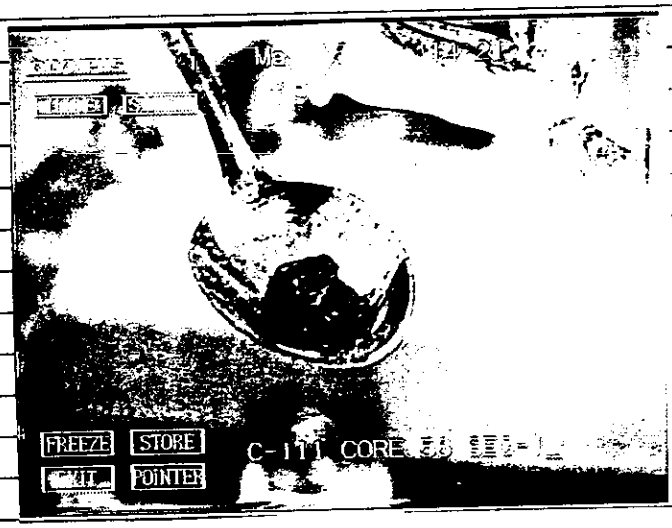
Used exposures 11 & 12 to photograph rock.

Jar # 6014 NA gross weight * see next page for Rock net weight
130.4 g tare weight
NA weight of Rock

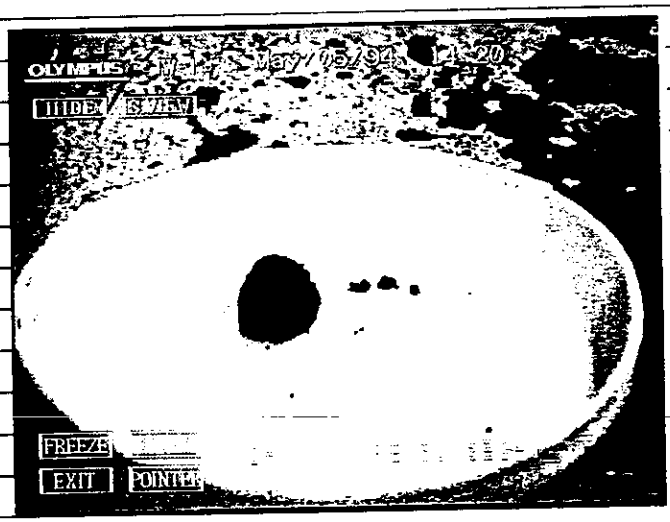
Keith Fuller
5/6/94

24 5/5/94 C111 CORE 58 Rock

Rock material in jar # ~~6014~~ 6000.



Rock after water rinse. Net weight of rock



Rock material on 10 lb. slip lid can

5/5/94 25

C-111 Core 58

jar #6014 contains the Rock like material
From C-111 Core 58 segment #1.

-Removed material from jar and placed on Tray.

-Rinsed material with DI water and jabbed with a spatula. Material has sharp edges, does not flake and resembles rock.

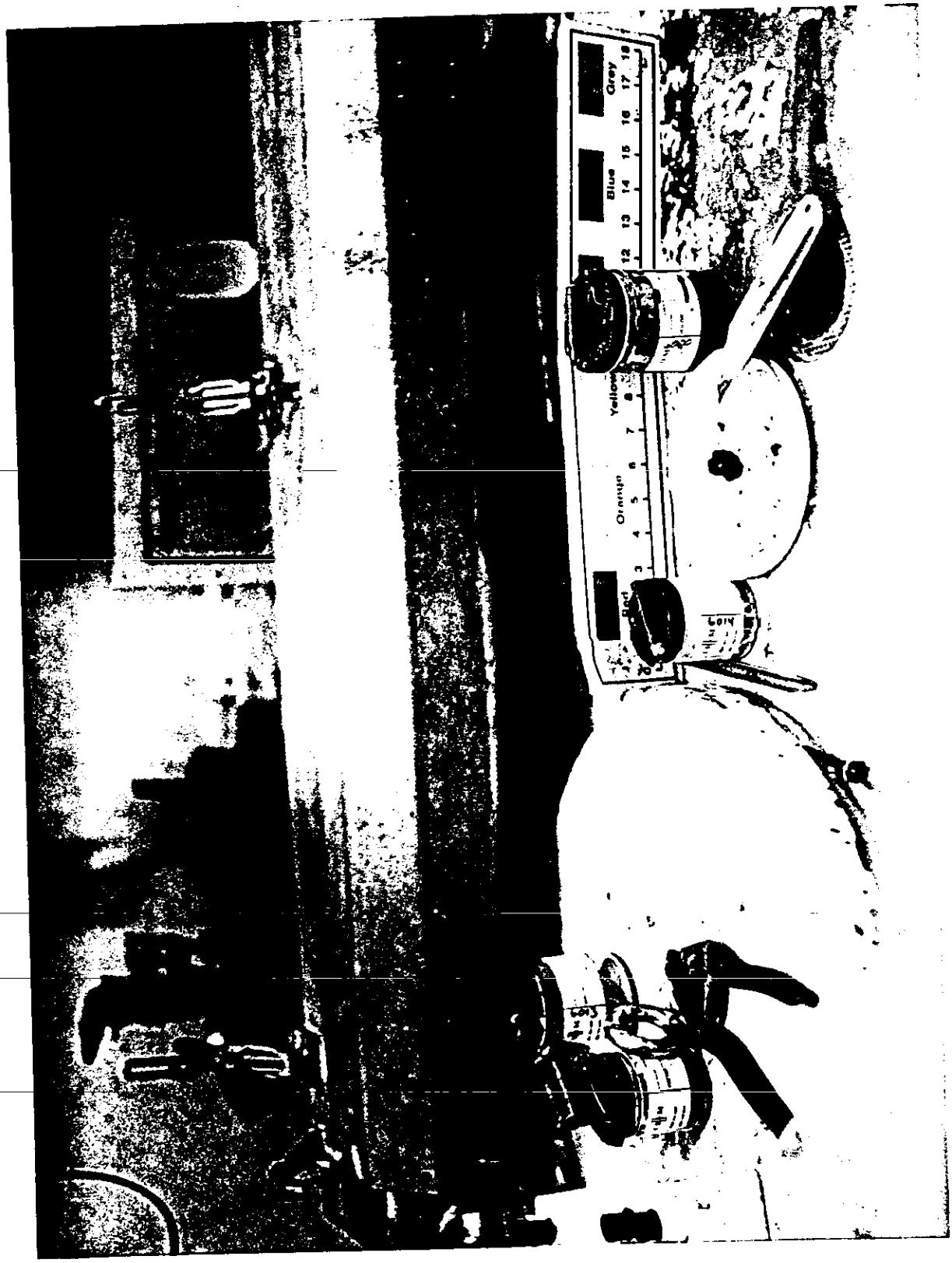
Jar #6016 132.91 grams gross weight
125.22 grams tare weight
7.69 grams net weight

Jar #6014 288.33 gross weight.

Transferred rock from jar # 6014 to jar # 6016 after water rinse.

jar # 6014 contains H_2O rinse from rock
jar # 6016 contains C-111 Core 58 segment #1 rock.

C-111 CORE 58 ROCK



C-111 CORE 58 "ROCK"

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PHOTOGRAPHS

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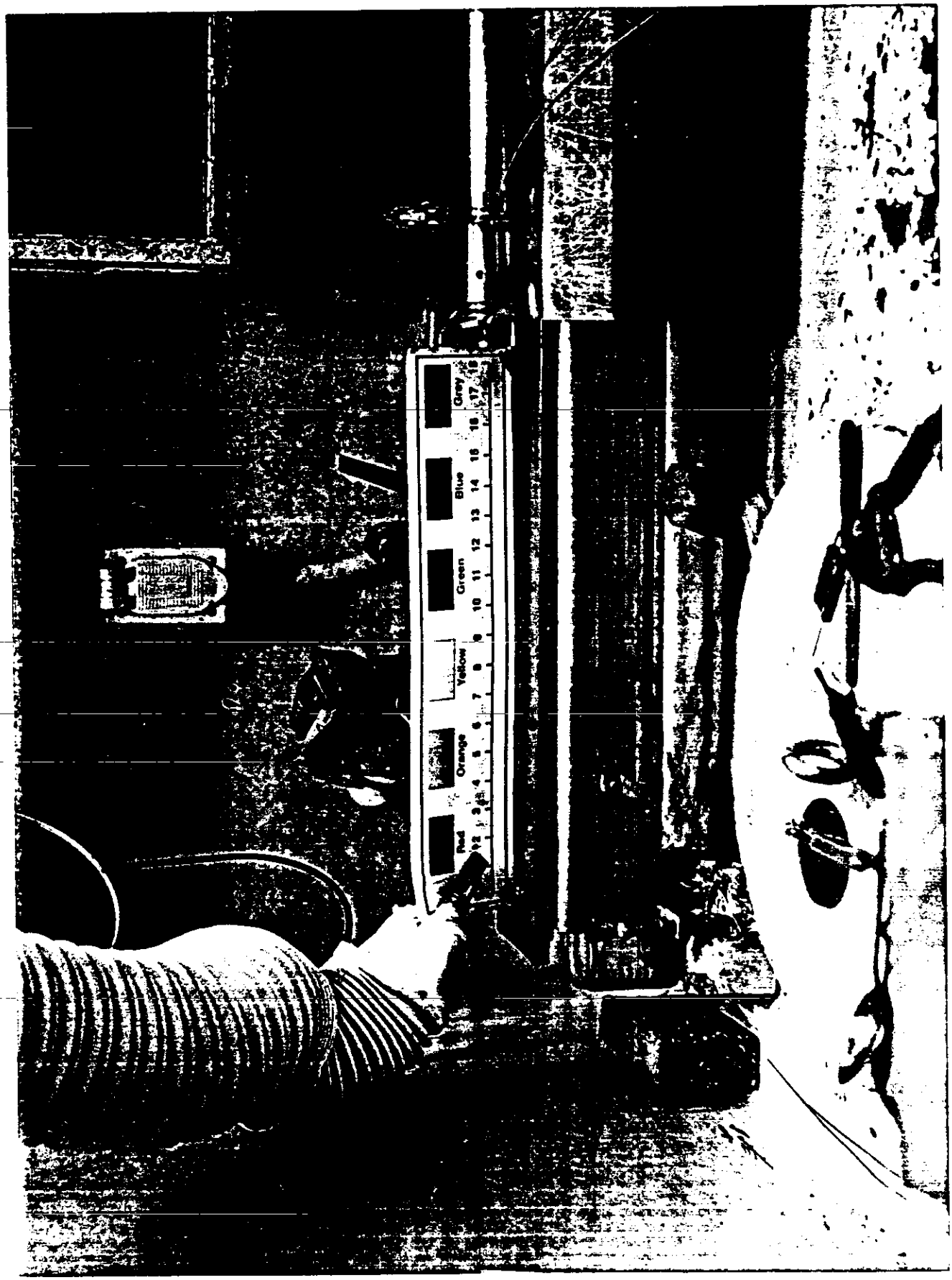
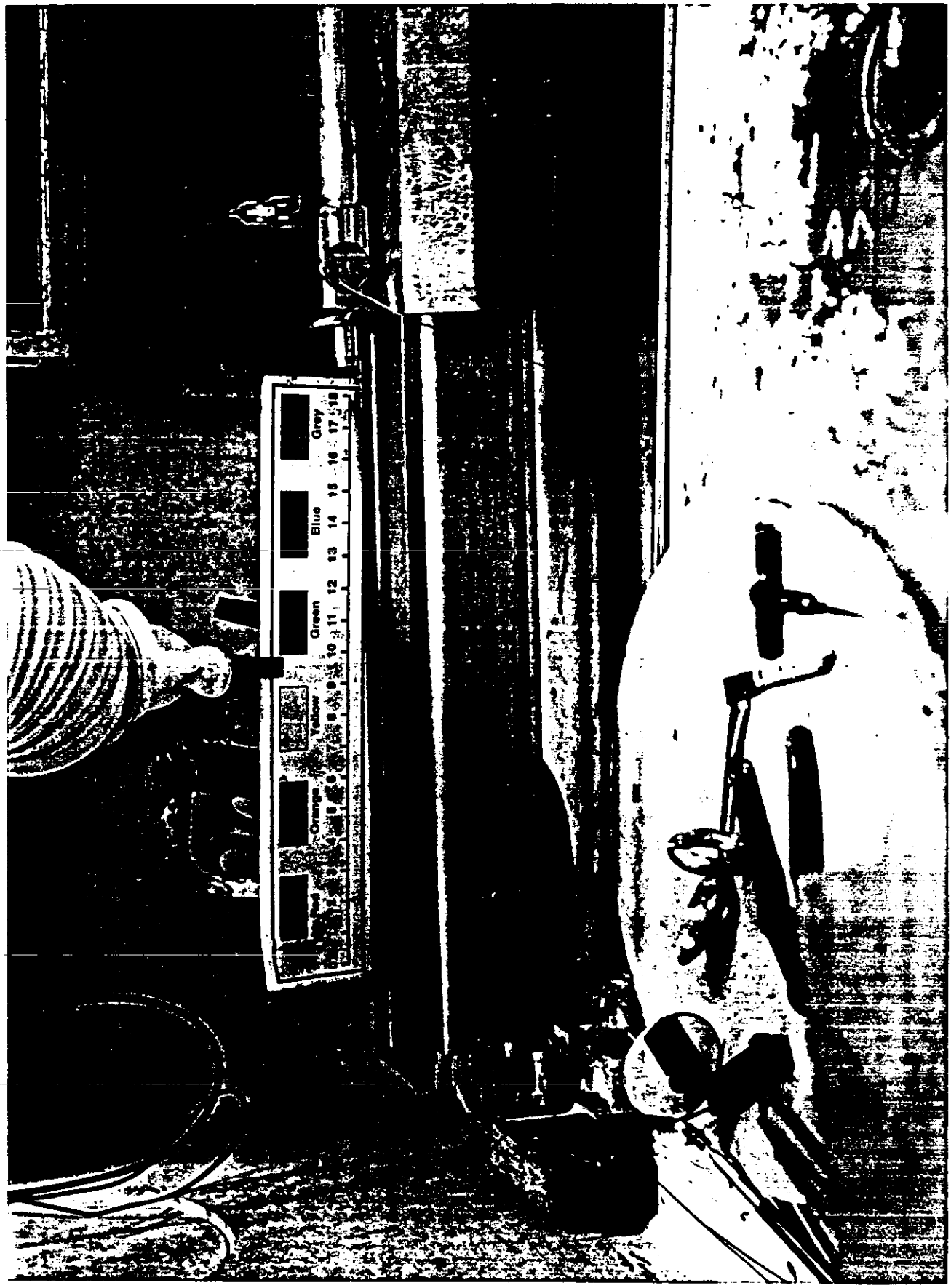
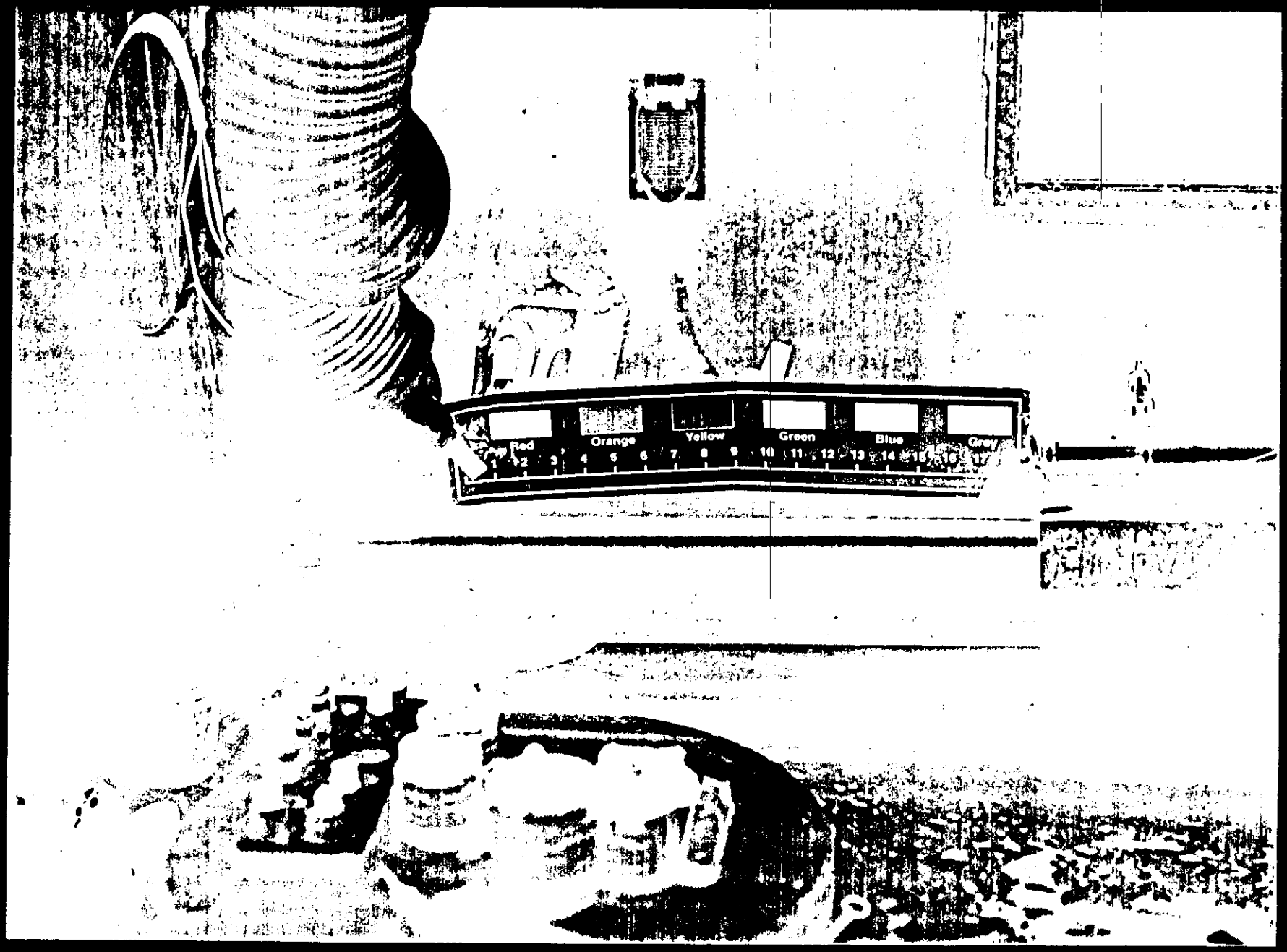

Red
Orange
Yellow
Green
Blue
Grey
C-111 Core 58 seg 1



C-111 Field Blank

C-111 CORE 59 SEGMENT #1
SOLIDS



C-111 Core 60 seg. 1

WHC-SD-WM-DP-079, REV. 0

SAMPLE PREPARATIONS

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K-211	Customer ID: C-111
Analysis: ACD PREP	Sample Prep: DIRECT

Instrument: SNF04495	Procedure/ Rev: LA-505-159/B-1
Technologist: LH STANDLEY	Date: 07/07/94
Starting Time: 0730	Temperature 95 C
Ending Time: 0830	Chemist: B. GRIFFIN

Comments: BATCH# 3820

	Description	Lab ID
1	STD	K-209 8500
2	BLK	K-210 8600
3	SAM	K-211 8700
4	DUP	K-211 8800
5	SPIKE	K-211 8900
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
WHC-1	G3MWHC1N10G2.5ml			50ml

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD	LA-505-159/B-1	RERUN# 0	ANALYSIS START DATE 7-7-94
PREPARED BY LH STANDLEY		SUMMARY DATE 7-7-94	
SAMPLE POINT	C-111	TIME START 0730	TIME COMPLETE 0830

SPL ID	SERIAL NO	RESULT #1	G OR ML ->	MLS	COMMENTS
STD	K 209 8500	DF = 20	2.5mL	50	2.5mL -> 50mL G3MWHC1N10G/WHC-1
BLK	K 210 8600	-	-	50	TOTAL VOLUME: 50mL
SAM	K 211 8700	11.0720g/l	.5536g	50	.5536g -> 50mL
DUP	K 211 8800	10.8280g/l	.5414g	50	.5414g -> 50mL
SPIKE	K 211 8900	11.2600g/l	.5630g	50	.5630g -> 50mL

Bertrand Griffin II 7-15-94

☒ NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

Batch 3820

Serial No	Sample Point	Date	Time Issued	Priority
R 209.-8800	C-111	4-25-94	14:54	23

Determination	Method Standard	Result Units	Charge Code	Returns
ACD DIGST	LA-505-159	% RECOVERY	N4C3E	0

Sample Size	Customer ID
? 2.5 ml → 50 ml	STD

Remarks Calculations Results

LMCS CHECK SAMPLE
LMCS ID G3MWHCINIOG

$D.F. = \frac{50\ ml}{2.5\ ml} = 20$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
7-7-94	0830	Bertrand Griffin II

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
R 210.-8800	C-111	4-25-94	14:55	23

Determination	Method Standard	Result Units	Charge Code	Returns
ACD DIGST	LA-505-159	G/L	N4C3E	0

Sample Size	Customer ID
? 50 ml	BLANK

Remarks Calculations Results

REAGENT BLANK

Total Volume /COMPLETE

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
7-7-94	08.30	Bertrand Griffin II

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
N 211.-6766	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Returns
ACID DIGEST	LA-505-150	G/L	N405E	0

Sample Size	Customer ID
? .5536g → 50ml	C5881

** JET WT ** REV 0 **

Remarks Calculations Results

FOR ICP
GRAMS SAMPLE 0.5536g

VOLUME ON COMPLETION .050 l

$\frac{0.5536g}{.050l}$ = 11.0720 g/l

WT 1: 0.0013
WT 2: 0.5549

NET WEIGHT:

---> 0.5536

07/07/94

* DATA REPRODUCED *
* FOR CLARITY *

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
7-7-94	0830	Bettrand Griffin II	

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
N 211.-6800	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Returns
ACID DIGEST	LA-505-150	G/L	N405E	0

Sample Size	Customer ID
? .5414g → 50ml	C5881

** JET WT ** REV 0 **

Remarks Calculations Results

INTERLABORATORY SAMPLE
FOR ICP
GRAMS SAMPLE 0.5414g

VOLUME ON COMPLETION .050 l

$\frac{0.5414G}{.050l}$ = 10.8280 g/l

WT 1: 0.0000
WT 2: 0.5414

NET WEIGHT:

---> 0.5414

07/07/94

* DATA REPRODUCED *
* FOR CLARITY *

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
7-7-94	0830	Bettrand Griffin II	

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-8900	C-111	4-25-94	14:57	20

Determination	Method Standard	Result Units	Charge Code	Reruns
ACID DIGST	IA-505-150	G/L	N408B	0

Sample Size	Customer ID
? 0.5630g → 50mL	05851

Remarks Calculations, Results

SPIKE SAMPLE
SPIKE ALIQUOT 63MWHCW10G
SPIKE VOLUME 2.5mL

$\frac{0.5630g}{.050L} = 11.2600 g/L$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
7-7-94	0830	Bert L. Griffin II

54-6800-061 (R-10-83)

```
**********************
** JET WT  **  REV 0 **
**********************

WT 1:     0.0001
WT 2:     0.5631

NET WEIGHT:

--->      0.5630

07/07/94
**********************
*   DATA REPRODUCED  *
*     FOR CLARITY    *
**********************
```

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10

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K-211	Customer ID: C5851 C111
Analysis: Fusion	Sample Prep: Direct

Instrument: 3NF04495	Procedure/ Rev: LA-549-141 C-0
Technologist: [illegible]	Date: 5-11-94
Starting Time: 0800	Temperature 450°C
Ending Time: 0920	Chemist: B. Griffin II

Comments:

	Description	Lab ID		Description	Lab ID
1	BLK	K-210-6100	11		
2	SAM	K-211-6700	12		
3	SAM Dup 5-13-94 LAD	K-211-6800	13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
—				

ANALYTICAL BATCH SUMMARY SHEET

Perkins #0 S.P. C-111

METHOD:	DATE START:	TIME START:
LA-549-141 C-0	5-11-94	0800
PREPARED BY:	**DATE COMPLETE:**	**TIME COMPLETE:**
[illegible]	5-11-94	0920

SPL NAME	SPL ID	g/L or DF RESULT	g or mL SAMPLE SIZE	mL FINAL VOL.	STD, SPL, DUP, SPK REMARKS
BLK	P-210-6600	—	—	250	Total Vol. 250mL
SAM	P-211-6700	2.9036	0.7259	250	0.7259g → 250mL
SAM	P-211-6800	2.9260	0.7315	250	0.7315g → 250mL

Bertrand Griffin II
5-12-94

NARRATIVE: [✓] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARATIONS FOR THIS BATCH:

Sample and Sample Duplicate had different appearances. Sample K-211-6700 appeared to have a rock solid chunk during step #3 (the weighing of the sample) but by step 13 it seemed to all fuse together. Sample K-211-6800 was a thick homogenous sludge.

Bertrand Griffin II
5-12-94

Batch 3253

Serial No	Sample Point	Date	Time Issued	Priority
K 210.-6600	C-111	4-25-94	14:55	23

Determination	Method Standard	Result Units	Charge Code	Reruns
FUSION	LA-549-141	G/L	N4C3B	0

Sample Size	Customer ID
250ml total volume	BLANK

Remarks Calculations Results

use zirconium crucibles

Complete

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-11-95 ~~5-9-95~~	0920	5-12-94 Bertrand Huffman II	

5-11-95

54-6800-DE1 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-6700	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Reruns
FUSION	LA-549-141	G/L	N4C3B	0

Sample Size	Customer ID
0.7259g → 250ml	C58S1

Remarks Calculations Results

JAR ID#
GRAMS SAMPLE 0.7259g

VOLUME ON COMPLETION .250l

$\frac{0.7259g}{.250l} = 2.9036g/l$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-11-95 ~~5-9-95~~	0920	5-12-94 Bertrand Huffman II	

5-11-95

54-6800-DE1 (R-10-83)

```
**********************
** JET_WT  **  REV 0 **
**********************

WT 1:     0.0000
WT 2:     0.7259

NET WEIGHT:

--->      0.7259

05/11/94
**********************
*  DATA REPRODUCED   *
*    FOR CLARITY     *
**********************
```

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Serial No	Sample Point	Date	Time Issued	Priority
K 211.-6800	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Reruns
FUSION	LA-549-141	G/L	N4C3B	0

Sample Size	Customer ID
0.7315g → 250ml	C58S1

Remarks Calculations Results

DUPLICATE SAMPLE
JAR ID#
GRAMS SAMPLE 0.7315g

VOLUME ON COMPLETION .250l

$\frac{0.7315g}{.250l} = 2.9260g/l$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-11-95		5-12-94	
5-9-95	09.20		

5-11-95

SA-6800-D61 (R-10-83)

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No.	Customer ID:
K-218	C59 S1
Analysis:	Sample Prep:
FUSION	DIRECT

Instrument: SNF04495	Procedure/ Rev: LA-549-141 C-0
Technologist: LH STANDLEY	Date: 05/23/94
Starting Time: 0800	Temperature 23 C
Ending Time: 1130	Chemist: K. FULLER

Comments: SAMPLE WAS NOT HOMOGENOUS.
K-218 LOOKED LIKE MANY SMALL ROCKS
K-218 DUP. ONE LARGE ROCK.

	Description	Lab ID		Description	Lab ID
1	BLK	K-219-6600	11		
2	SAM	K-218-6700	12		
3	DUP	K-218-6800	13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

Reruns # 0 S.P. → C-111

METHOD:	DATE START:	TIME START:
LA-549-141 C-0	5-23-94	0800
PREPARED BY:	**DATE COMPLETE:**	**TIME COMPLETE:**
[illegible]	5-23-94	1130

SPL NAME	SPL ID	g/L or DF RESULT	g or mL SAMPLE SIZE	mL FINAL VOL.	STD, SPL, DUP, SPK REMARKS
BLK	K-219-6600	--	-	250	Total Volume: 250mL
SAM	K-218-6700	3.2980	.8245	250	.8245g → 250mL
DUP	K-218-6700	3.3404	.8351	250	.8351g → 250mL

[illegible] 5-31-94

NARRATIVE: [✓] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARATIONS FOR THIS BATCH:

Serial No	Sample Point	Date	Time Issued	Priority
K 218.-6800	C-111	5- 4-94	16:38	20

Determination	Method Standard	Result Units	Charge Code	Returns
FUSION	LA-549-141	G/L	N4C3B	0

Sample Size	Customer ID
? .835/g → 250ml	C59 S1

Remarks Calculations Results

DUPLICATE SAMPLE
JAR ID#
GRAMS SAMPLE .835/g

VOLUME ON
COMPLETION .250 l

$\frac{.835\ g}{.250\ l} = 3.340\ g/l$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
5- 23 - 94	1130	Bertrand Griffin II		

54-6800-061 (R-10-83)

****
** JET_WT ** REV 0 **
****

Sequence #: 182
WT 1: 0.0002
WT 2: 0.8353

NET WEIGHT:

---> 0.8351

05/23/94
****
* DATA REPRODUCED *
* FOR CLARITY *
****

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Batch 3499

Serial No	Sample Point	Date	Time Issued	Priority
K 219.-6600	C-111	5-18-94	13:33	20

Determination	Method Standard	Result Units	Charge Code	Reruns
FUSION	LA-549-141	G/L	N4C3B	0

Sample Size	Customer ID
? 250 ml	BLANK

Remarks Calculations Results

Complete

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-23-94	1130	

54-6500-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 218.-6700	C-111	5- 4-94	16:38	20

Determination	Method Standard	Result Units	Charge Code	Reruns
FUSION	LA-549-141	G/L	N4C3B	0

Sample Size	Customer ID
? 0.8245g → 250ml	C59 S1

Remarks Calculations Results

JAR ID#
GRAMS SAMPLE 0.8245g

VOLUME ON
COMPLETION .250 l

$\frac{0.8245g}{.250l} = 3.2980 g/l$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-23-94	1130	

54-6500-061 (R-10-83)

****
** JET_WT ** REV 0 **
****

WT 1: 0.0001
WT 2: 0.8246

NET WEIGHT:

---> 0.8245

05/23/94
****
* DATA REPRODUCED *
* FOR CLARITY *
****

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WHC-SD-WM-DP-079, REV. 0

PHYSICAL ANALYSES

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-079, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. K211	Customer ID: C58S1 C111
Analysis: DSC	Sample Prep: DIRECT

Instrument: WC16134	Procedure/ Rev: LA 514-113/B-0
Technologist: R. WENDLAND	Date: 05/24/94
Starting Time: 0700	Temperature N/A
Ending Time: 1100	Chemist: J. FRYE

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	K 209-5511	11		
2	SAMPLE	K 211-5711	12		
3	DUP	K 211-5811	13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	12N14-A			

174

A-6000-881 (03/92)

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - UNDIGESTED SAMPLE

Batch 3251

Serial No	Sample Point	Date	Time Issued	Priority
K 209.-5511	C-111	4-25-94	14:54	23

Determination	Method Standard	Result Units	Charge Code	Reruns
DSC	LA-514-113	% RECOVERY	N4C3B	0

Sample Size		Customer ID
6.680 mg	12N14A	STD

Remarks, Calculations, Results

28.8 J/g

% Rec
101.2 %

Robby Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-24-94	1100	J.M. Fuge / Leslie Day

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-5711	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Reruns
DSC	LA-514-113	EXOTHERMS	N4C3B	0

Sample Size	Customer ID
23.434 mg	C58S1

Remarks, Calculations, Results

41.1 J/g exotherm at 190.3°C

Robby Wendland

Run in air

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-24-94	1100	J.M. Fuge / Leslie Day

54-6800-061 (R-10-83)

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - UNDIGESTED SAMPLE

Serial No.	Sample Point	Date	Time Issued	Priority
K 211.-5811	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Reruns
DSC	LA-514-113	EXOTHERMS	N4C3B	0

Sample Size	Customer ID
17.136mg	C58S1

Remarks, Calculations, Results

DUPLICATE SAMPLE

34.5 J/g exotherm at 198.4°C

Bobby Wendland

Run in air

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-24-94	1100	J. M. Faye Leslie Day

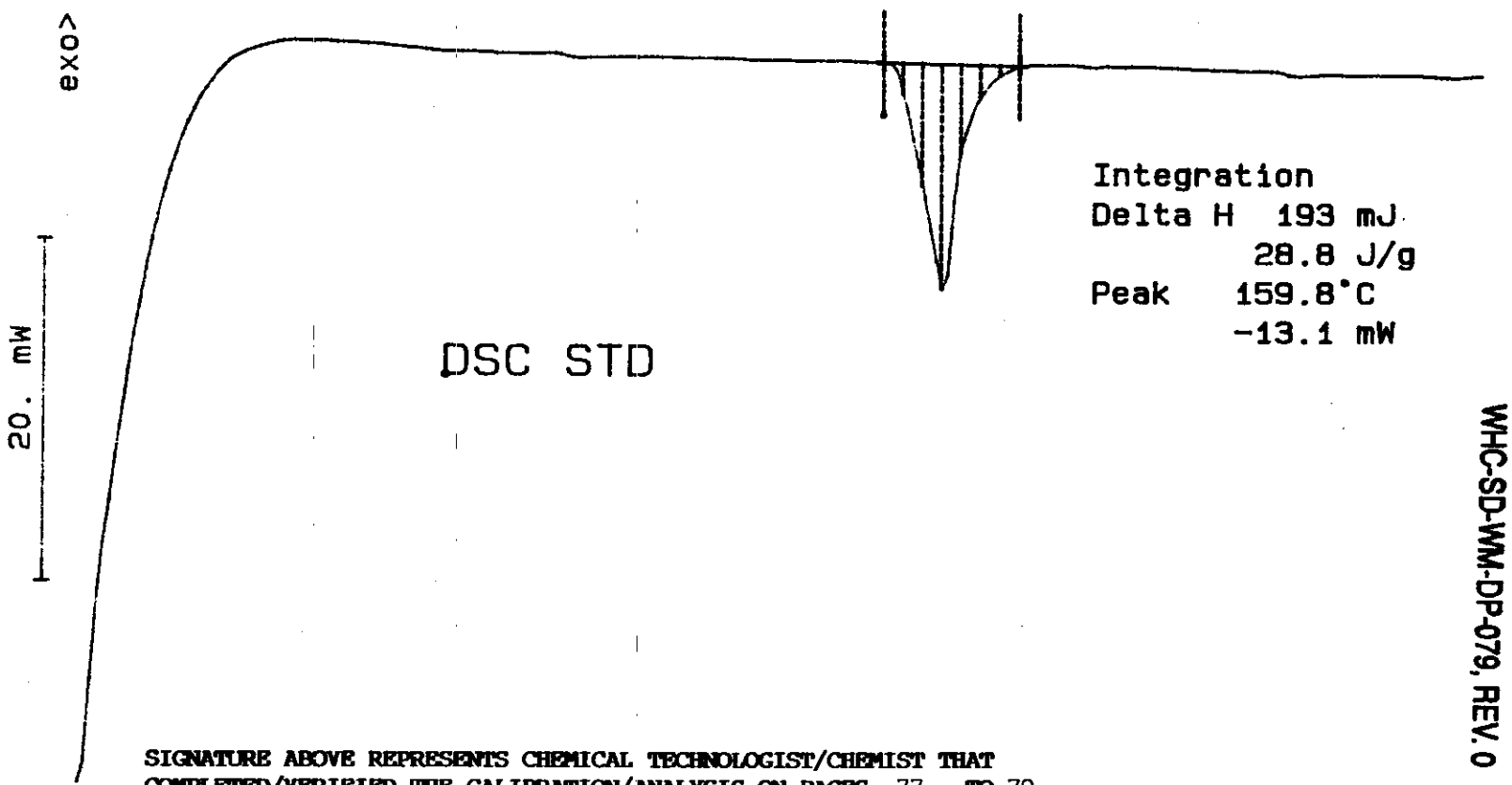
54-5800-061 (R-10-83)

James M. Fuge
5/25/94

DSCSTD
6.680 mg

Rate: 10.0 °C/min

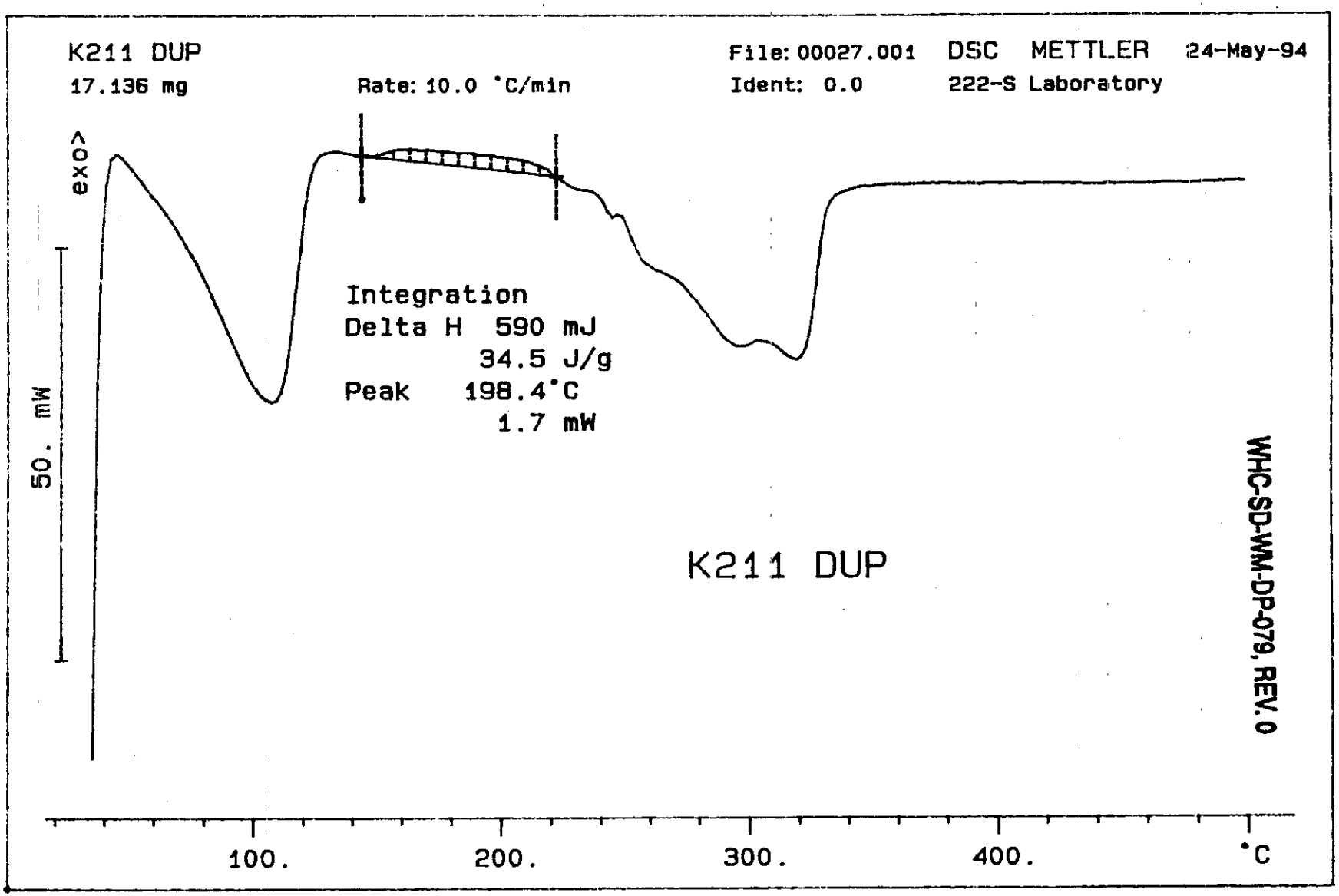
File: 00025.001 DSC METTLER 24-May-94
Ident: 0.0 222-S Laboratory



Integration
Delta H 193 mJ
28.8 J/g
Peak 159.8°C
-13.1 mW

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 77 TO 79.

WHC-SD-WM-DP-079, REV. 0



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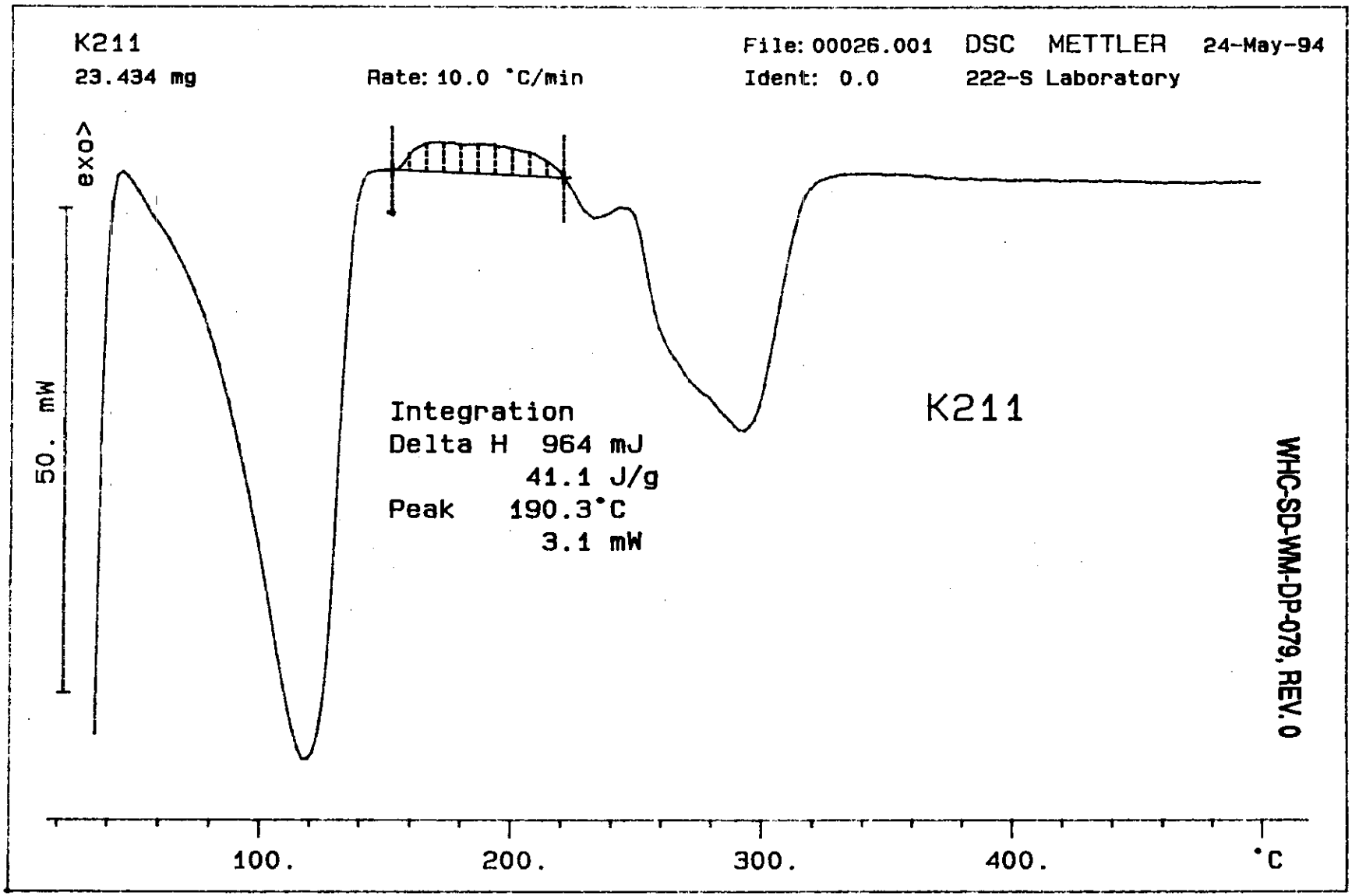


WHC-SD-WM-DP-079, REV. 0

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K218	Customer ID: C59 S1 C111
Analysis: DSC	Sample Prep: DIRECT

Instrument: WC16134	Procedure/ Rev: LA 514-113/B-0
Technologist: R. WENDLAND	Date: 05/09/94
Starting Time: 0800	Temperature N/A
Ending Time: 1200	Chemist: J. FRYE

Comments:

	Description	Lab ID
1	LMCS	K217-5511
2	SAMPLE	K218-5711
3	DUP	K218-5811
4		
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	12N14-A			

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - UNDIGESTED SAMPLE

Batch 3391

Serial No	Sample Point	Date	Time Issued	Priority
K 217.-5511	C-111	5- 4-94	16:34	20

Determination	Method Standard	Result Units	Charge Code	Returns
DSC	LA-514-113	% RECOVERY	N4C3B	0

Sample Size	Customer ID
? 6.68mg 12N14A	STD

Remarks, Calculations, Results

29.6 J/g 104.0% Rec.

Robby Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-9-94	1200	J. M. Faye	

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 218.-5711	C-111	5- 4-94	16:36	20

Determination	Method Standard	Result Units	Charge Code	Returns
DSC	LA-514-113	EXOTHERMS	N4C3B	0

Sample Size	Customer ID
? 11.623mg	C59 S1

Remarks, Calculations, Results

Run in air

No exotherm, has an endo therm at 310-320°C

Robby Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-9-94	1200	J. M. Faye	

54-6800-061 (R-10-83)

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - UNDIGESTED SAMPLE

Serial No.	Sample Point	Date	Time Issued	Priority
K 218.-5811	C-111	5- 4-94	16:36	20

Determination	Method Standard	Result Units	Charge Code	Returns
DSC	LA-514-113	EXOTHERMS	N4C3B	0

Sample Size	Customer ID
? 19.555mg	C59 S1

Remarks, Calculations, Results

DUPLICATE SAMPLE

Run in air

No exotherms, has an endotherm at 310-320°C

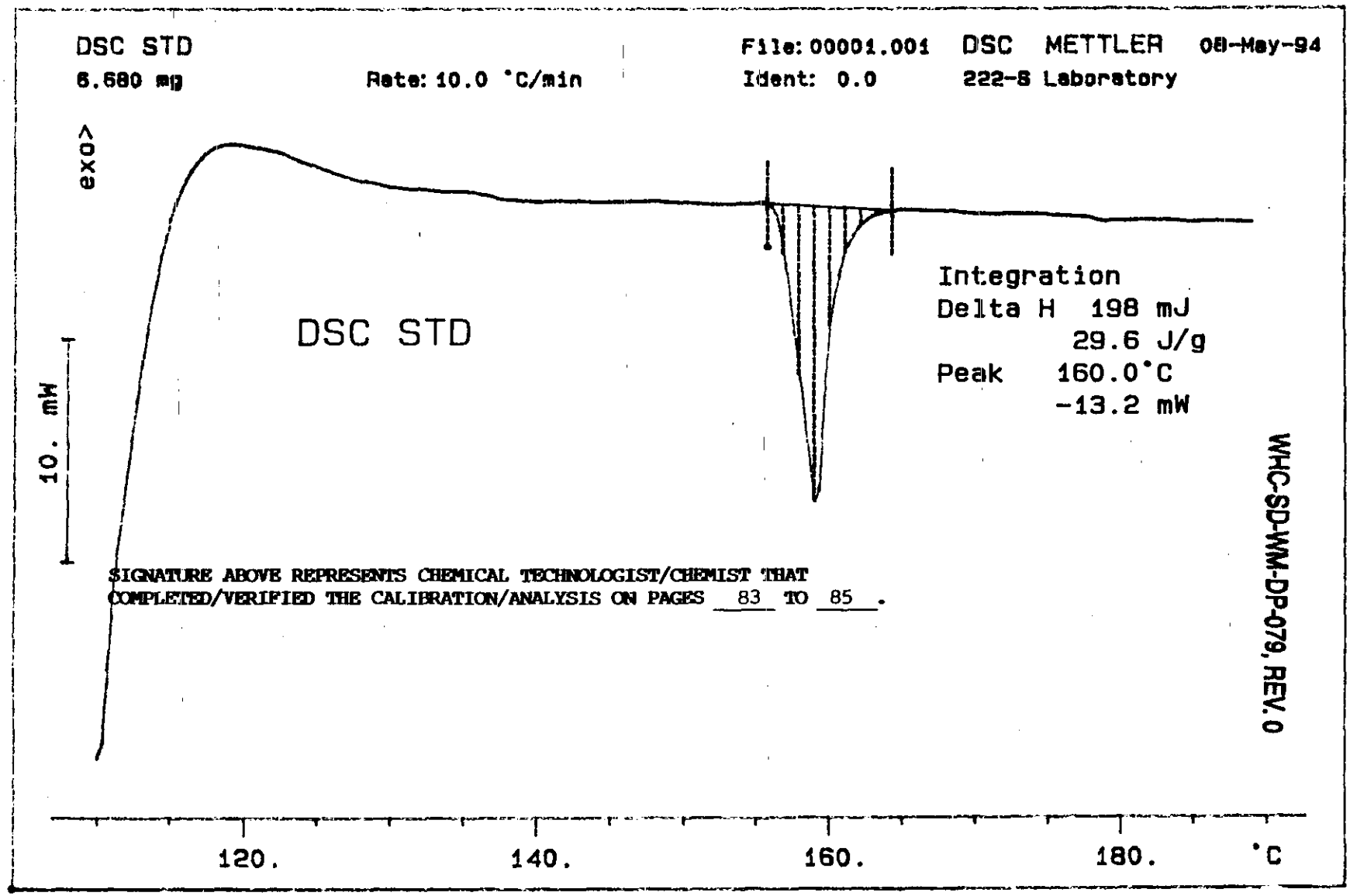
Bobby Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-9-94	1200	J.M. Fuge	

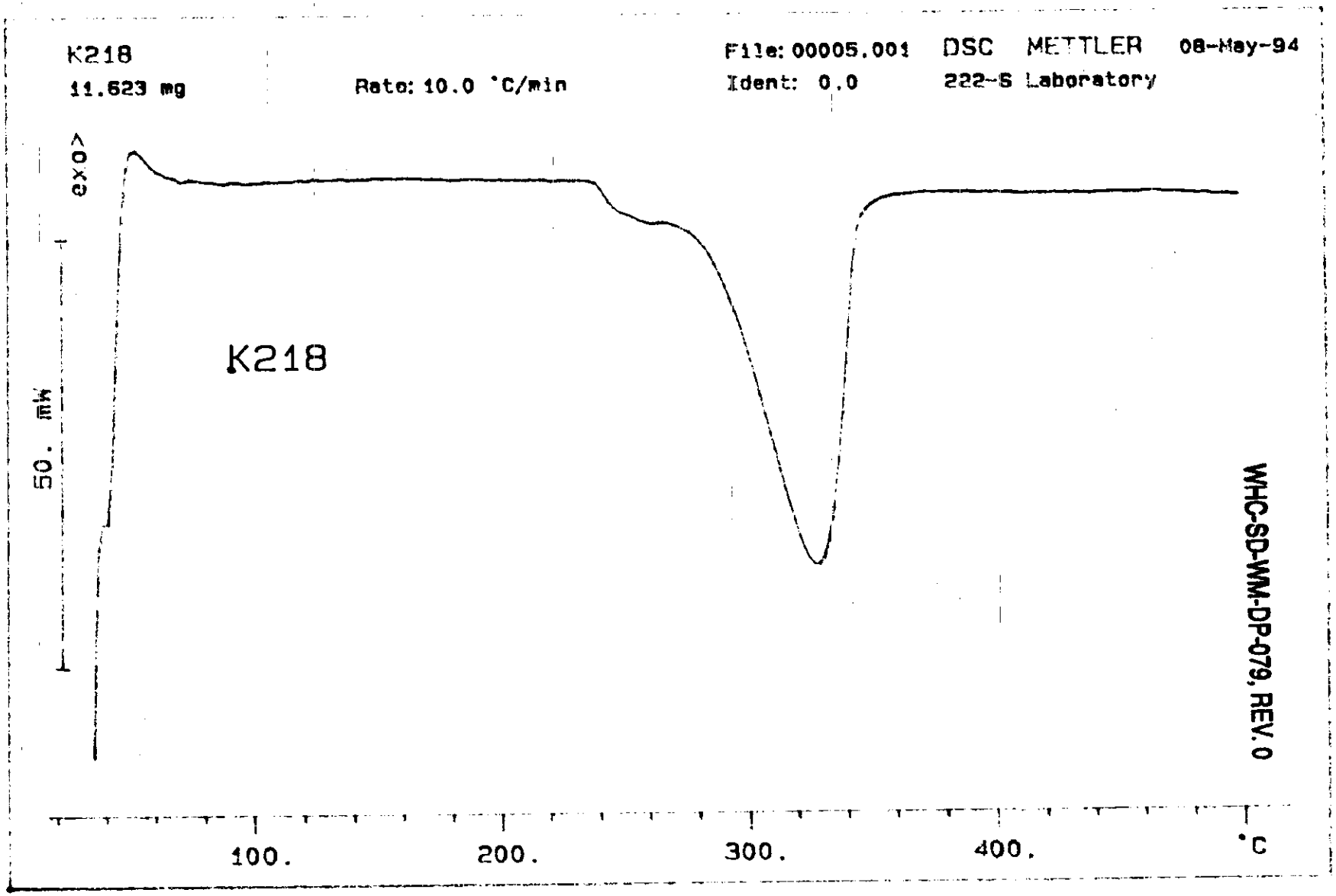
54-6800-061 (R-10-83)

Jerry M. Sage
5/25/94



SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 83 TO 85 .

WHC-SD-WM-DP-079, REV. 0



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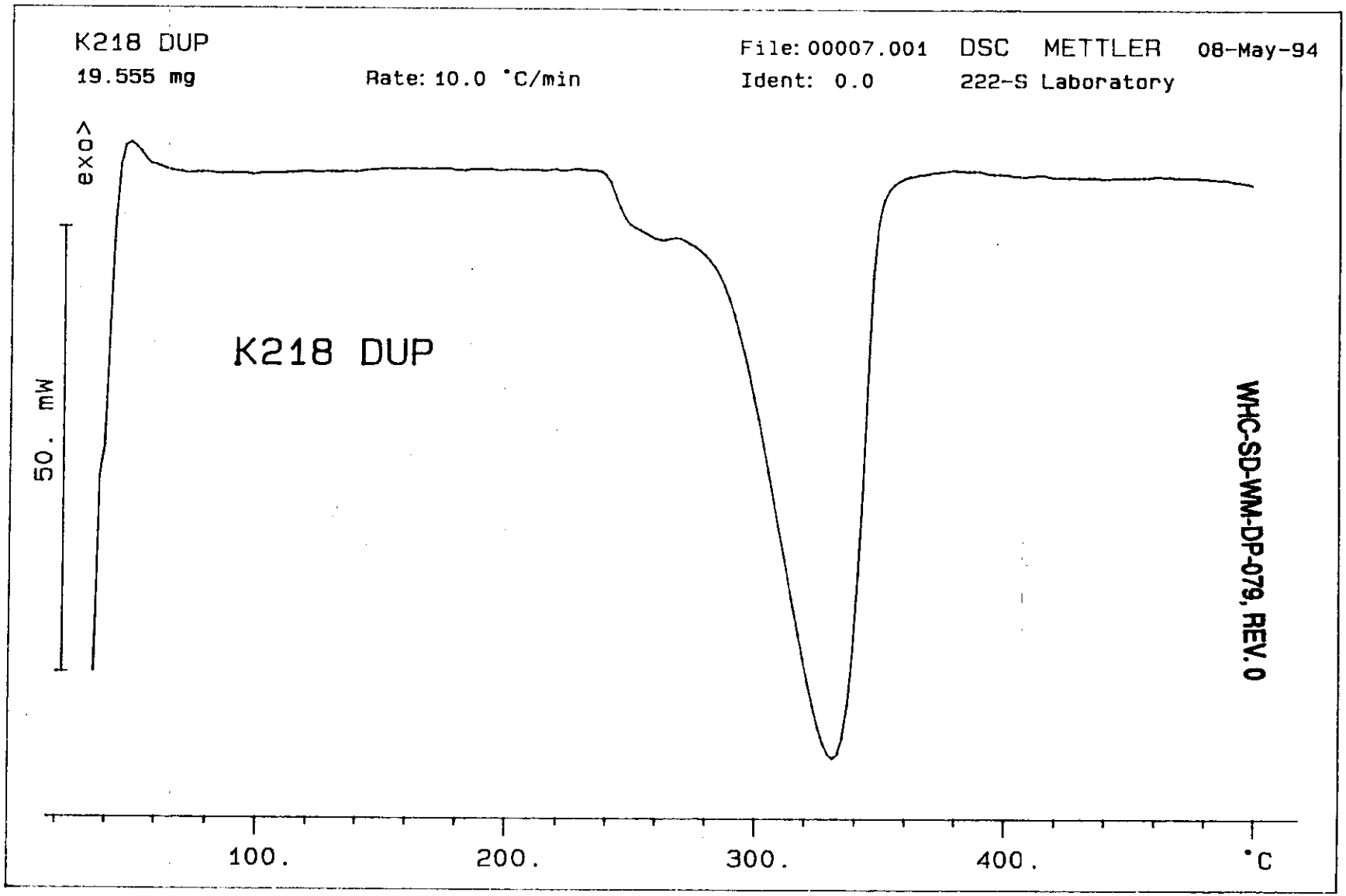


WHC-SD-WM-DP-079, REV. 0

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-079, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. K216	Customer ID: C58HCB C111
Analysis: DSC	Sample Prep: DIRECT

Instrument: WC16134	Procedure/ Rev: LA 514-113/B-0
Technologist: R. WENDLAND	Date: 05/02/94
Starting Time: 8:00	Temperature N/A
Ending Time: 12:00	Chemist: J. FRYE

Comments:

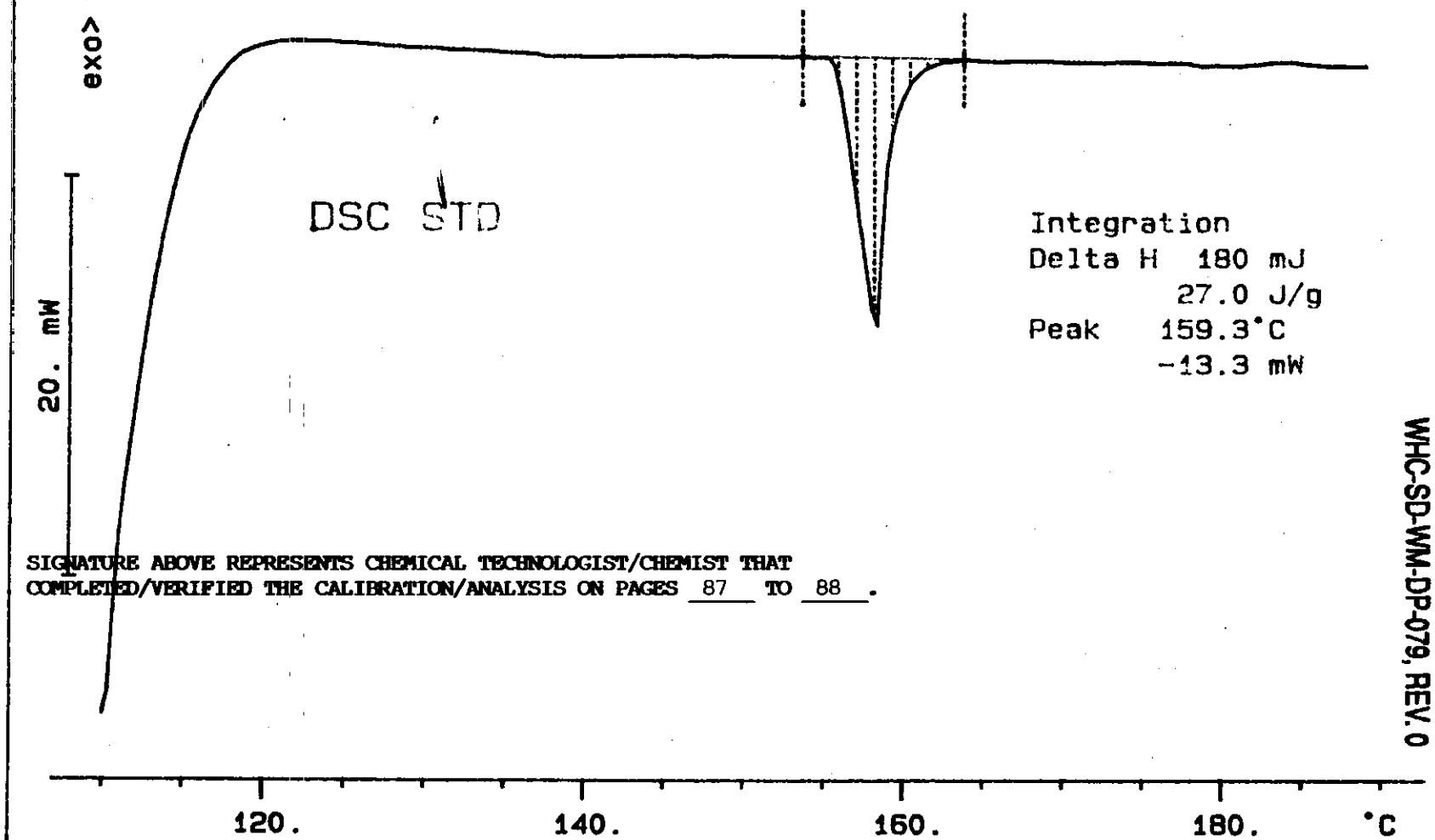
	Description	Lab ID		Description	Lab ID
1	LMCS	K215-5511	11		
2	SAMPLE	K216-5711	12		
3			13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	12N14-A			

A-6000-881 (03/92)

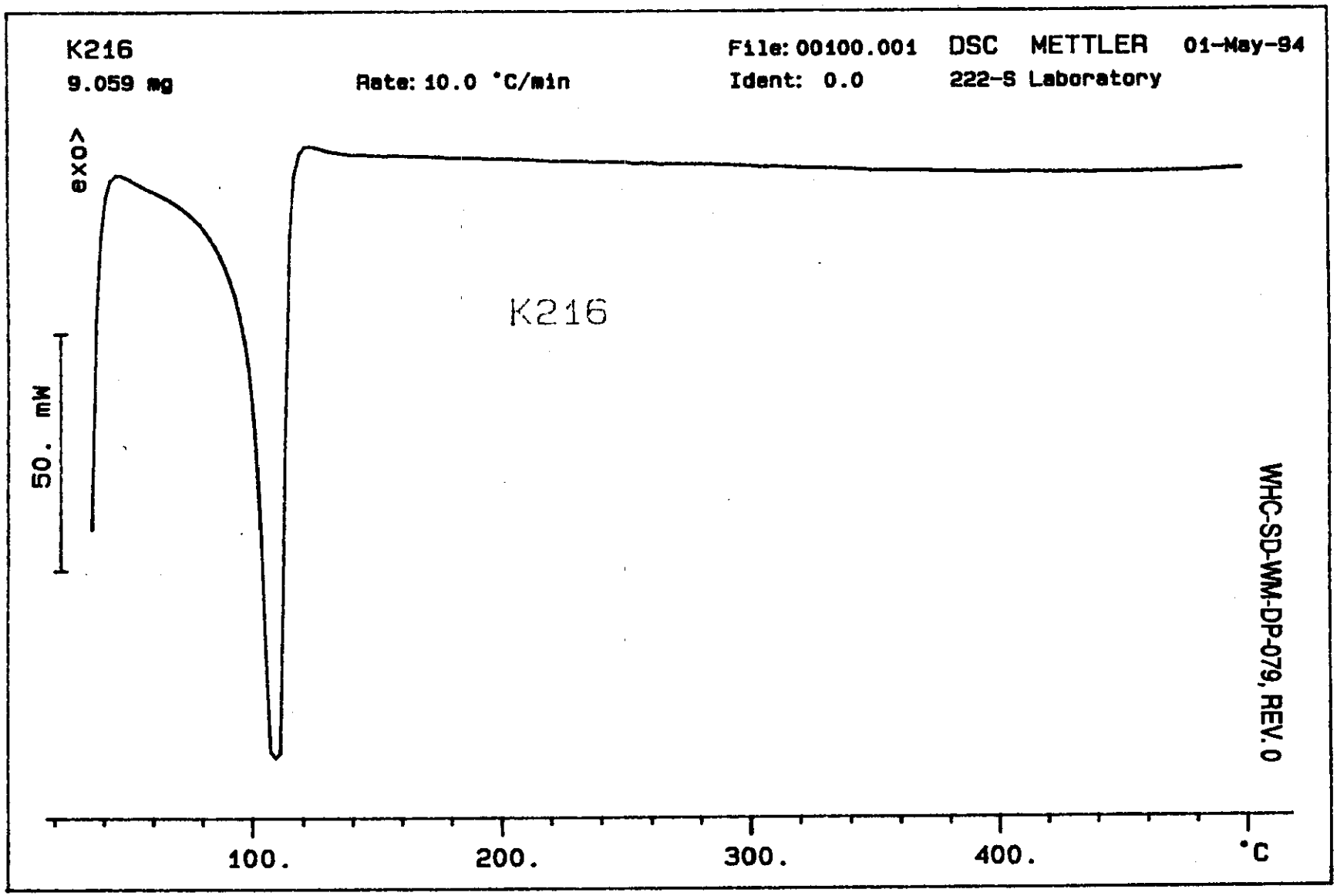
James M. Lange 5/25/94

DSC STD
6.680 mg
Rate: 10.0 °C/min
File: 00098.001
Ident: 0.0
DSC METTLER 01-May-94
222-S Laboratory



SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 87 TO 88.

WHC-SD-WM-DP-079, REV. 0



WHC-SD-WM-DP-079, REV. 0

Batch 3351

Serial No	Sample Point	Date	Time Issued	Priority
K 215.-5511	C-111	4-28-94	11:14	21

Determination	Method Standard	Result Units	Charge Code	Returns
DSC	LA-514-113	% RECOVERY	N4C3B	0

Sample Size		Customer ID
6.680mg	INAA	STD

Remarks: Calculations, Results

27.0J/g , 95% Rec.

Robby Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-2-94	1200	J. M. Fryer	

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 216.-5711	C-111	4-28-94	11:23	21

Determination	Method Standard	Result Units	Charge Code	Returns
DSC	LA-514-113	EXOTHERMS	N4C3B	0

Sample Size	Customer ID
9.059mg	C5BHCB

Remarks: Calculations, Results

no exotherm

Robby Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-2-94	1200	J. M. Fryer	

54-6800-061 (R-10-83)

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K211	Customer ID: C58S1 C///
Analysis: TGA	Sample Prep: DIRECT

Instrument: WC16130	Procedure/ Rev: LA 560-112/A-1
Technologist: R. WENDLAND	Date: 05/20/94
Starting Time: 0700	Temperature N/A
Ending Time: 1200	Chemist: J. FRYE

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	K 209-5512	11		
2	SAMPLE	K 211-5712	12		
3	DUP	K 211-5812	13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	24N8-A			

90

A-6000-881 (03/92)

THERMAL GRAVIMETRIC ANALYSIS - UNDIGESTED SAMPLE

Batch 3252

Serial No	Sample Point	Date	Time Issued	Priority
K 209.-5512	C-111	4-25-94	14:54	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
TGA	LA-560-112	% RECOVERY	N4C3B	0

Sample Size	Customer ID
15.041 mg 24N8-A	STD

Remarks, Calculations, Results

59.02% H_2O 99.6% Rec.

Robby Wendland

Air Atmosphere

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
		Robert		

Date	Time Completed	Lab Unit Mgr	
5-20-94	1200	J. M. Fuge	

84-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-5712	C-111	4-25-94	14:57	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
TGA	LA-560-112	% H2O	N4C3B	0

Sample Size	Customer ID
18.682 mg 24N8-A	C58S1

Remarks, Calculations, Results

30.85% H_2O, This sample also lost 11.27% wt. loss between 220°C & 300°C

Robby Wendland

Air Atmosphere

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
		Robert		

Date	Time Completed	Lab Unit Mgr	
5-20-94	1200	J. M. Fuge	

84-6800-061 (R-10-83)

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Serial No	Sample Point	Date	Time Issued	Priority
K 211.-5812	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Returns
TGA	LA-560-112	% H2O	N4C3B	0

Sample Size	Customer ID
29.333 mg	C58S1

Remarks Calculations, Results

DUPLICATE SAMPLE

32.54% H_2O, the sample also lost 10.31% wt. Loss between 220°C and 300°C

Robert Wendland

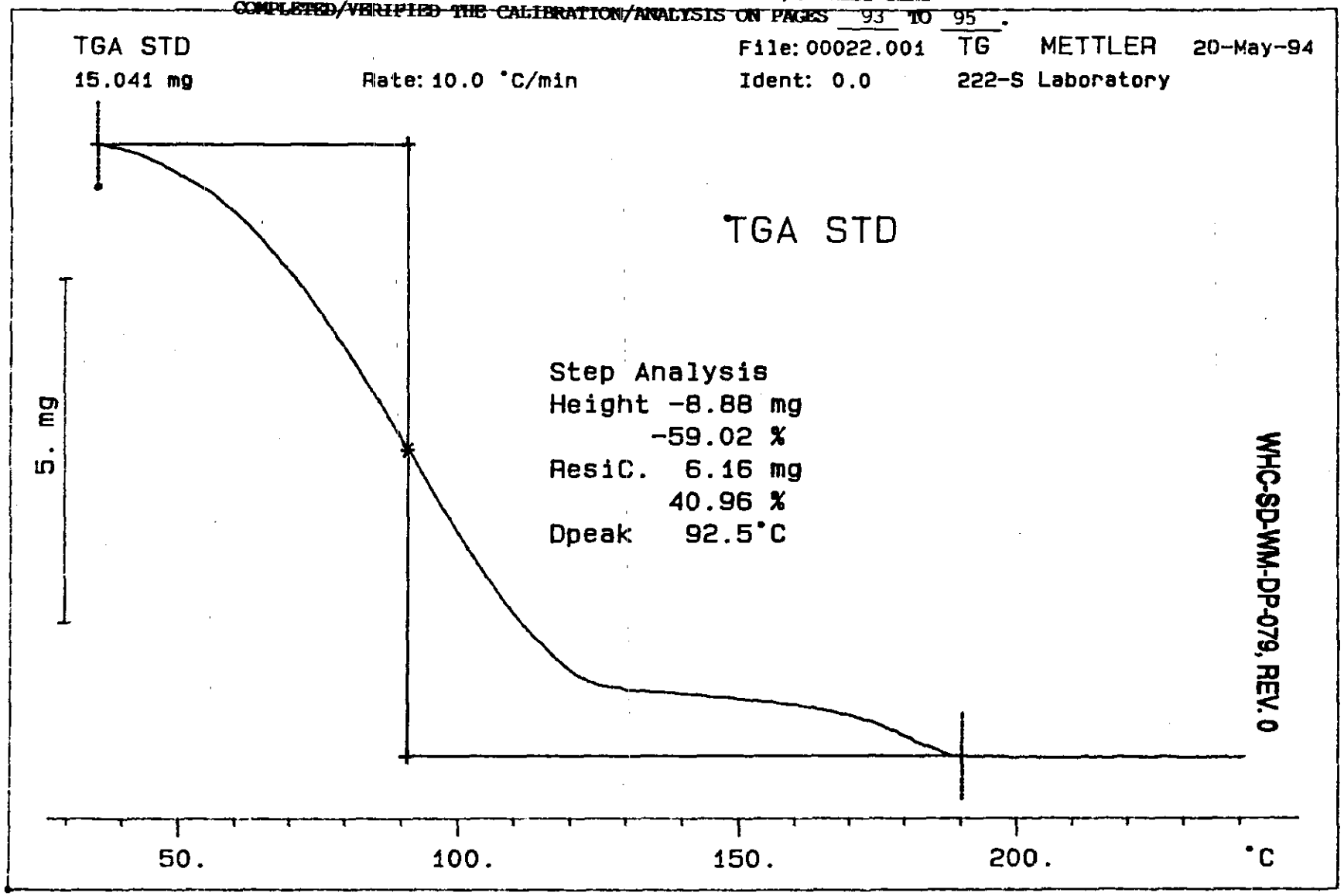
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
		Robita		

Date	Time Completed	Lab Unit Mgr.	
5-20-94	1200	J.M. Faye	

S4-6800-061 (R-10-83)

Jane M. Sage
5/25/94

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 93 TO 95.



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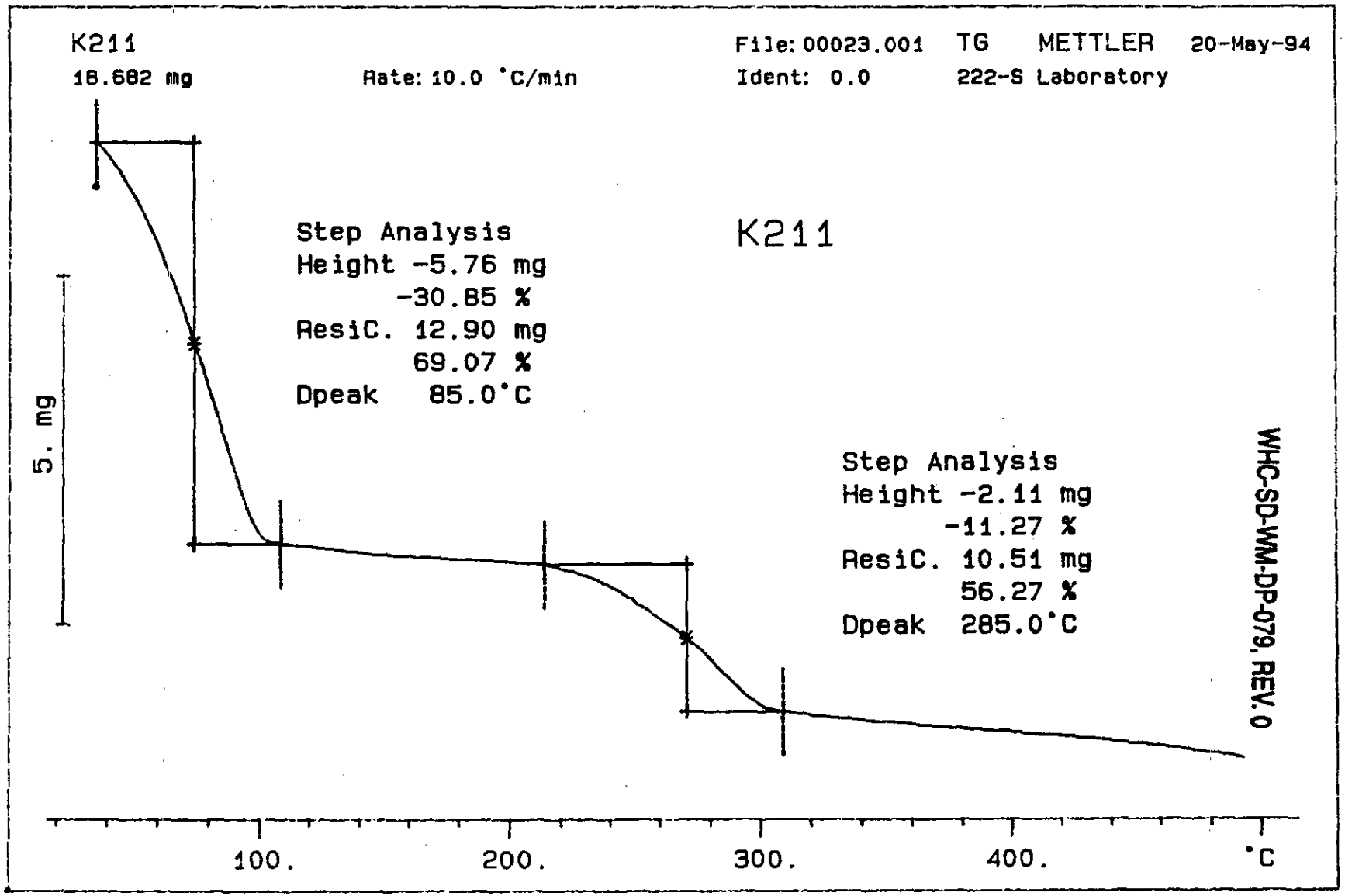

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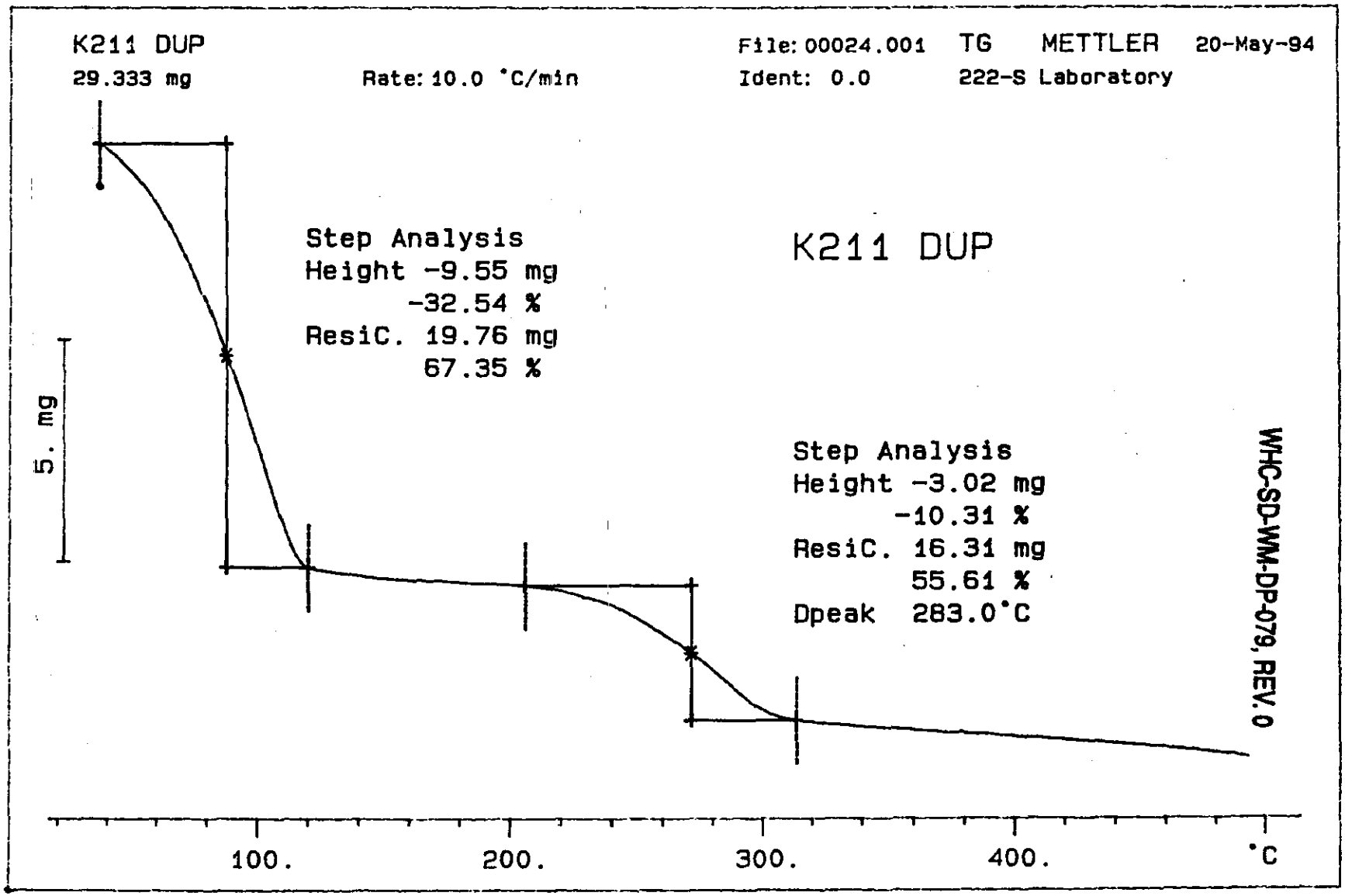


WHC-SD-WM-DP-079, REV. 0

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K214	Customer ID: C58FB C111
Analysis: TGA	Sample Prep: DIRECT

Instrument: WC16130	Procedure/ Rev: LA 560-112/A-1
Technologist: R. WENDLAND	Date: 04/28/94
Starting Time: 08:00	Temperature N/A
Ending Time: 12:00	Chemist: J. FRYE

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	K212-5512	11		
2	SAMPLE	K214-5712	12		
3	DUP	K214-5812	13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	24N8-A			
		96		

A-6000-881 (03/92)

Batch 3273

Serial No	Sample Point	Date	Time Issued	Priority
K 212.-5512	C-111	4-27-94	10: 2	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TGA	LA-560-112	% RECOVERY	N4C3B	0

Sample Size		Customer ID
18.449mg	2AN8-A	STD

Remarks, Calculations, Results

STD VAL.	% H_2O	% Recovery
59.25	58.54	98.8

Robby Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-28-94	1200	J. M. Fuge	

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5712	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TGA	LA-560-112	% H2O	N4C3B	0

Sample Size	Customer ID
9.893mg	C58FB

Remarks, Calculations, Results

99.93%

Robby Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-28-94	1200	J. M. Fuge	

54-6800-061 (R-10-83)

THERMAL GRAVIMETRIC ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-079, REV. 0

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5812	C-111	4-27-94	10:17	21

Determination	Method-Standard	Result Units	Charge Code	Reruns
TGA	LA-560-112	% H2O	N4C3B	0

Sample Size	Customer ID
9.889 mg	C58FB

Remarks, Calculations, Results

DUPLICATE SAMPLE

99.67%

RPD .26%

Robby Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
		Patrick		

Date	Time Completed	Lab Unit Mgr	
4-28-94	1200	J.M. Fuge	

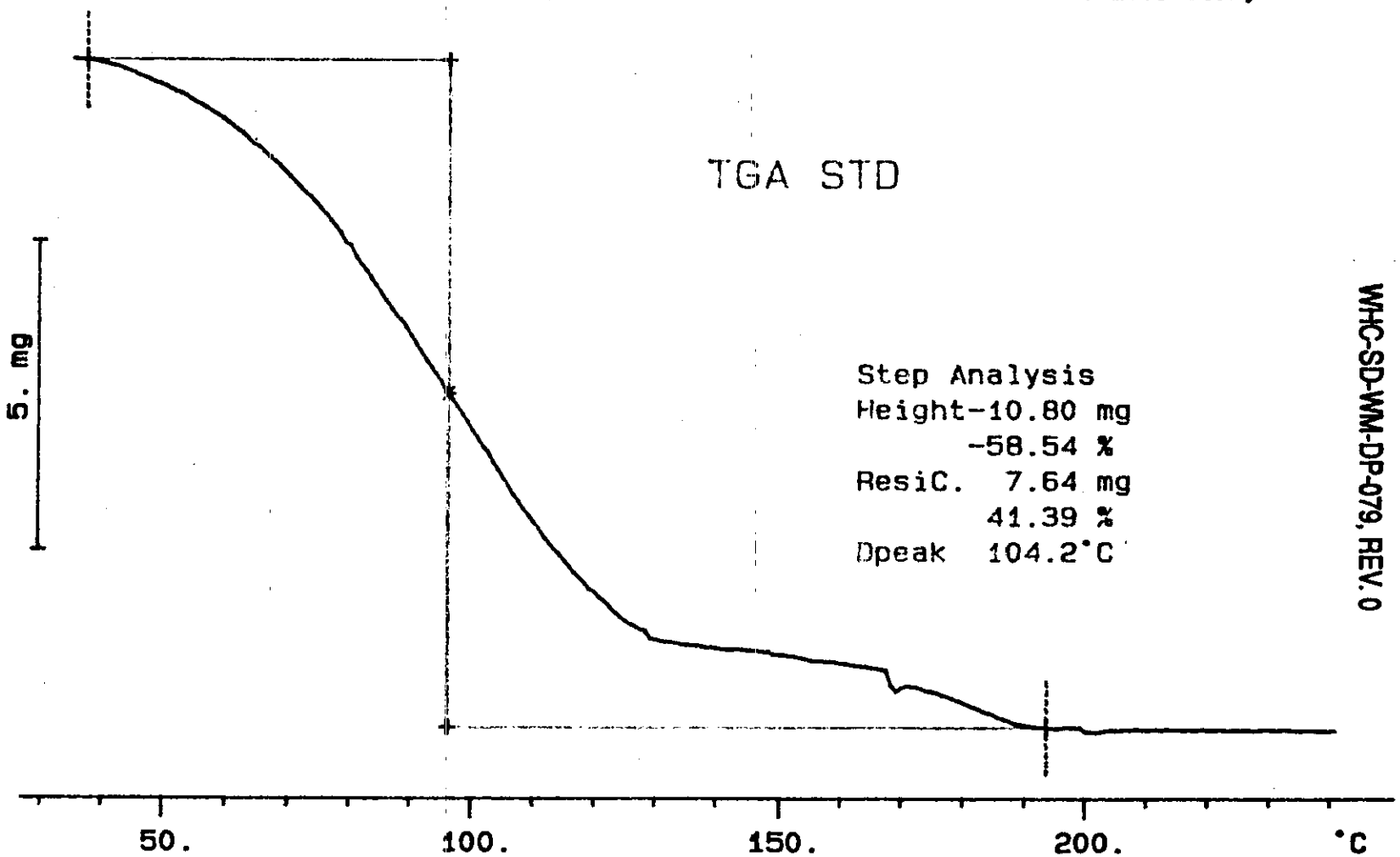
54-6800-061 (R-10-83)

Jane M. Fuge 5/25/94

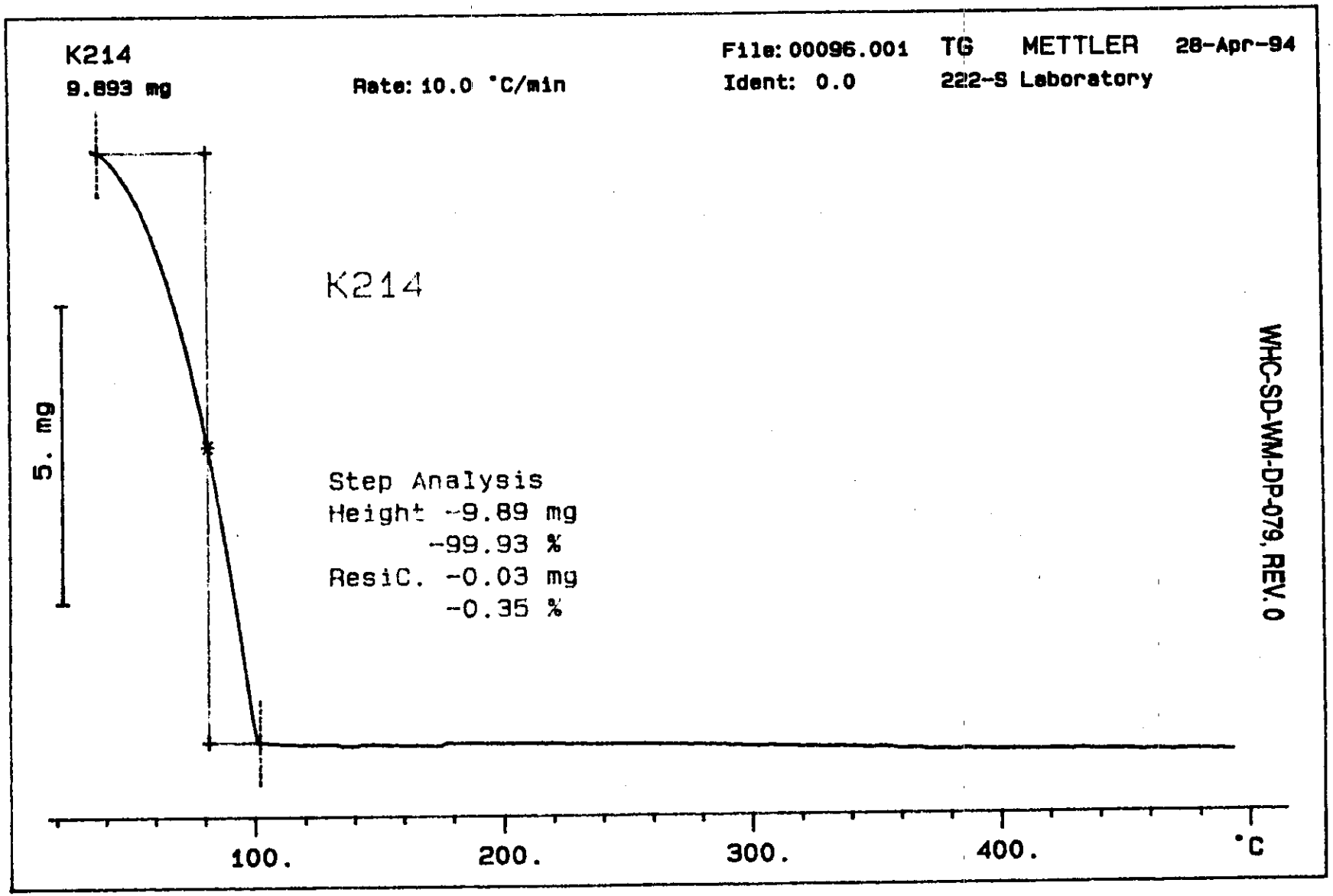
SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 99 TO 101.

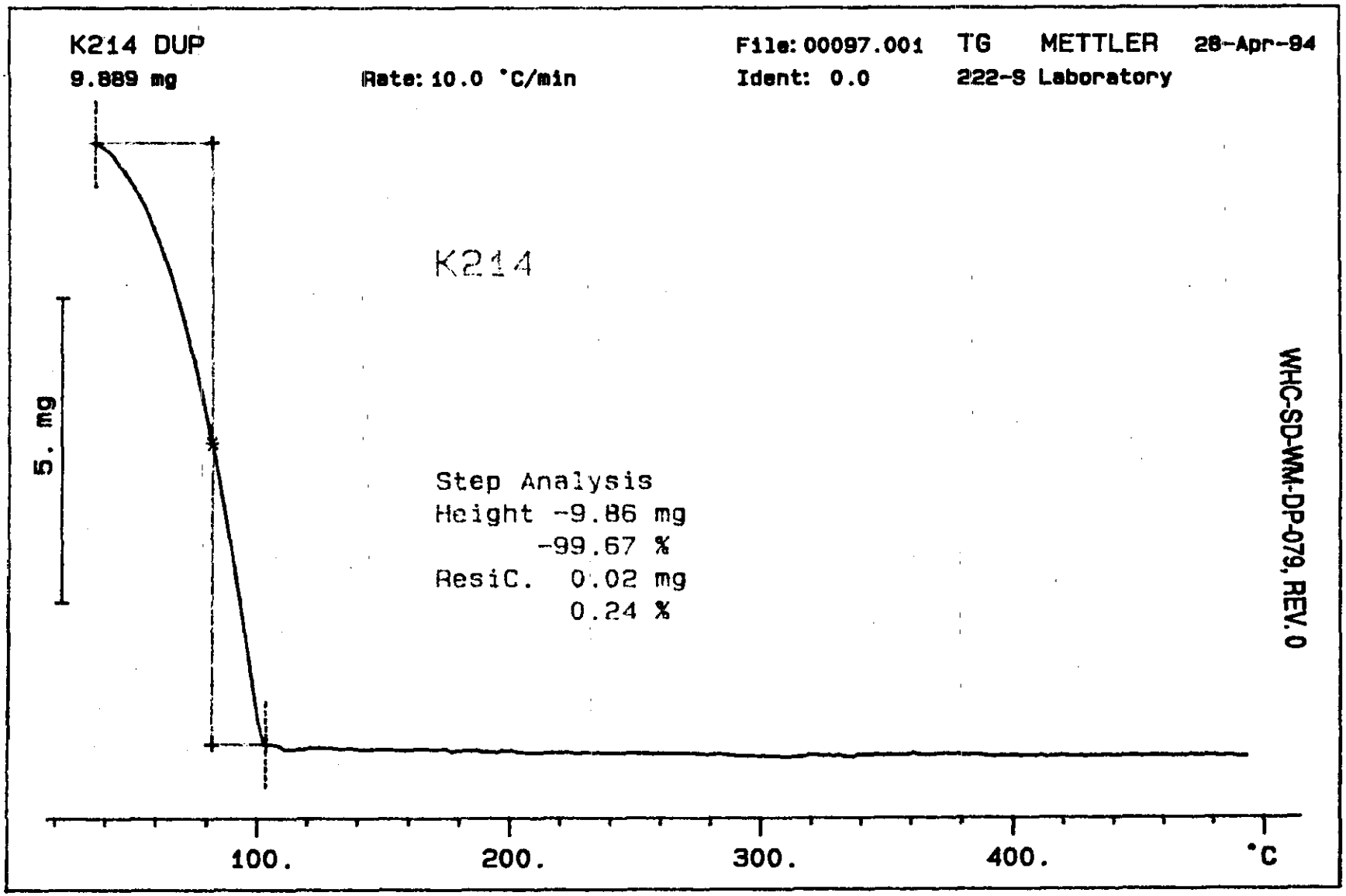
TGA STD
18.449 mg
Rate: 10.0 °C/min

File: 00095.001 TG METTLER 28-Apr-94
Ident: 0.0 222-S Laboratory



WHC-SD-WM-DP-079, REV. 0


K214
9.893 mg
Rate: 10.0 °C/min
File: 00096.001
TG
METTLER
28-Apr-94
Ident: 0.0
222-S Laboratory
K214
5. mg
Step Analysis
Height -9.89 mg
-99.93 %
ResiC. -0.03 mg
-0.35 %
100.
200.
300.
400.
°C



WHC-SD-WM-DP-079, REV. 0

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K216	Customer ID: C58HCB C111
Analysis: TGA	Sample Prep: DIRECT

Instrument: WC16130	Procedure/ Rev: LA 560-112/A-1
Technologist: R. WENDLAND	Date: 05/02/94
Starting Time: 8:00	Temperature N/A
Ending Time: 12:00	Chemist: J. FRYE

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	K215-5512	11		
2	SAMPLE	K216-5712	12		
3			13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	24N8-A			
		102		

A-6000-881 (03/92)

Bake 3350

Serial No	Sample Point	Date	Time Issued	Priority
K 215.-5512	C-111	4-28-94	11:14	21

Determination	Method/Standard	Result Units	Charge Code	Reruns
TGA	LA-560-112	% RECOVERY	N4C3B	0

Sample Size	Customer ID
16.955 mg ZAN8-A	STD

Remarks, Calculations, Results

STD VAL
59.25

58.58%, 98.9% Recovery

Robert Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
		Dakota		

Date	Time Completed	Lab Unit Mgr	
5-2-94	1200	J. M. Fuge	

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 216.-5712	C-111	4-28-94	11:23	21

Determination	Method/Standard	Result Units	Charge Code	Reruns
TGA	LA-560-112	% H2O	N4C3B	0

Sample Size	Customer ID
10.011 mg	C58HCB

Remarks, Calculations, Results

99.88% H_2O

> 99% H_2O

Robert Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
		Dakota		

Date	Time Completed	Lab Unit Mgr	
5-2-94	1200	J. M. Fuge	

54-6800-061 (R-10-83)

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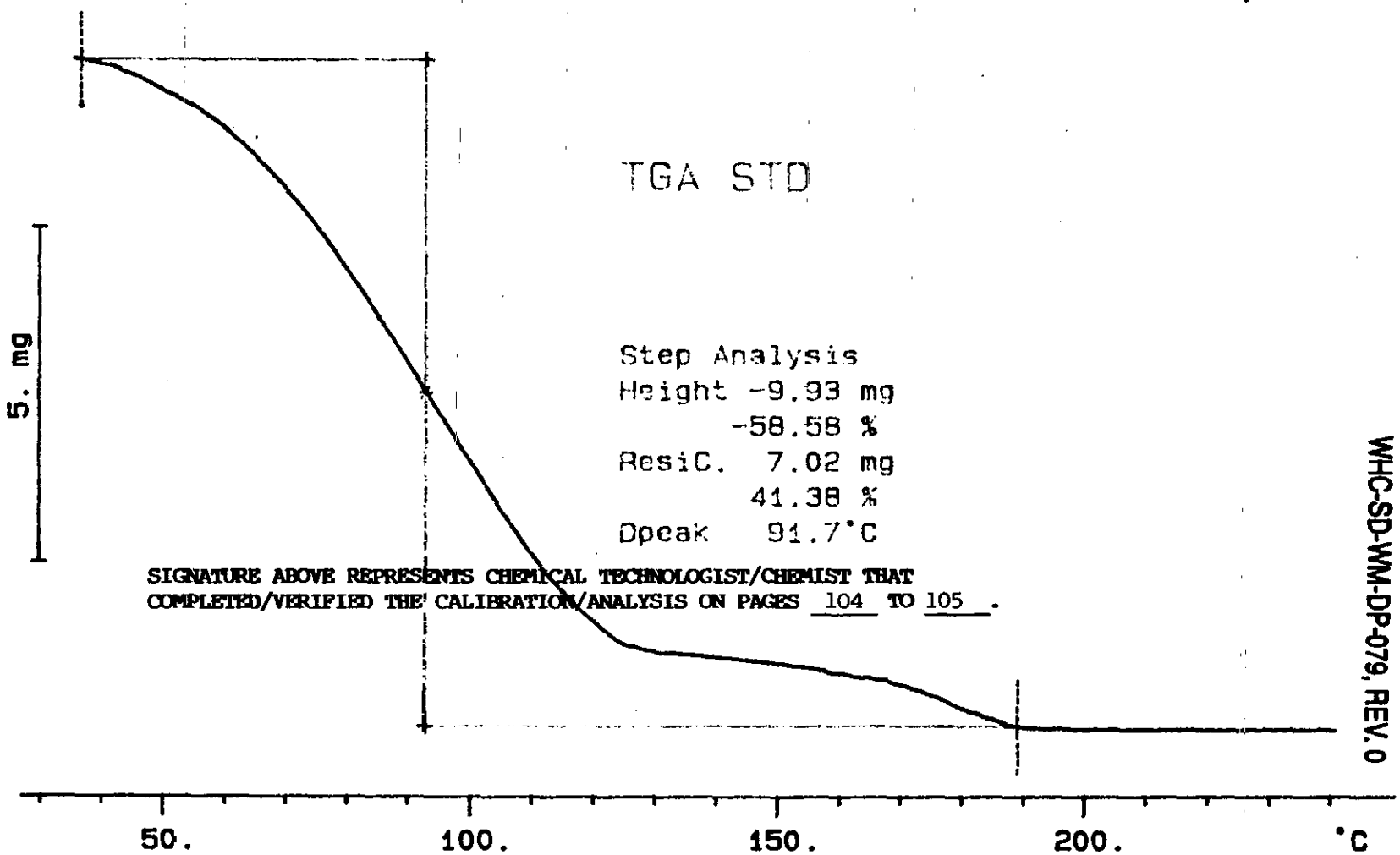
Jerry M. Fryer
5/25/94

TGA STD
16.955 mg

Rate: 10.0 °C/min

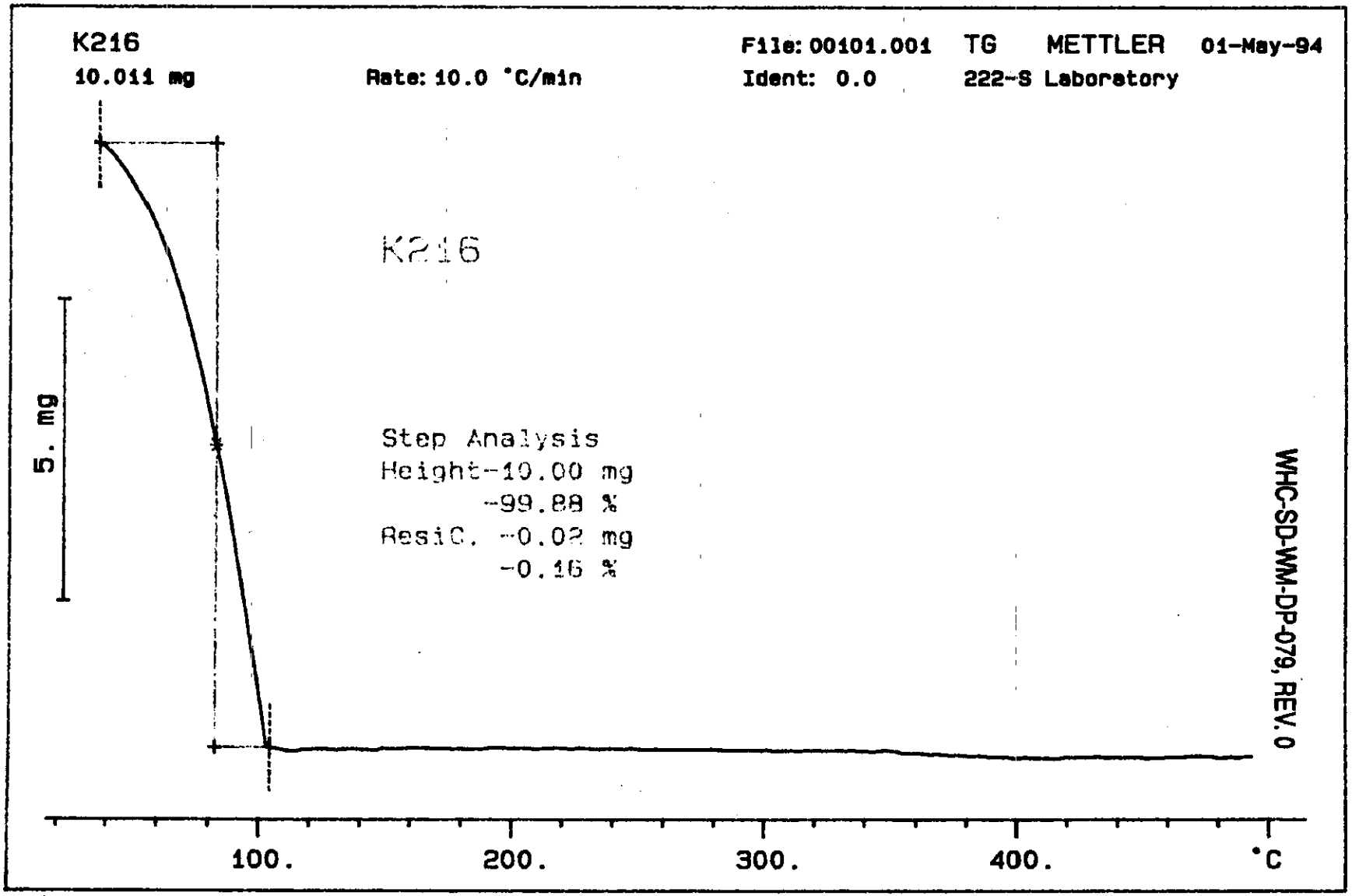
File: 00099.001 TG METTLER 01-May-94
Ident: 0.0 222-S Laboratory



Step Analysis
Height -9.93 mg
-58.58 %
ResiC. 7.02 mg
41.38 %
Dpeak 91.7°C

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 104 TO 105 .

WHC-SD-WM-DP-079, REV. 0


K216
10.011 mg
Rate: 10.0 °C/min
File: 00101.001
Ident: 0.0
TG
METTLER
01-May-94
222-S Laboratory
K216
5. mg
Step Analysis
Height-10.00 mg
-99.88 %
ResiC. -0.02 mg
-0.16 %
100.
200.
300.
400.
°C

OA 2

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K218	Customer ID: C59 S1 C111
Analysis: TGA	Sample Prep: DIRECT

Instrument: WC16130	Procedure/ Rev: LA 560-112/A-1
Technologist: R. WENDLAND	Date: 05/09/94
Starting Time: 0800	Temperature N/A
Ending Time: 1200	Chemist: J. FRYE

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	K217-5512	11		
2	SAMPLE	K218-5712	12		
3	DUP	K218-5812	13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	24N8-A			

A-6000-881 (03/92)

Batch 3390

Serial No	Sample Point	Date	Time Issued	Priority
K 217.-5512	C-111	5- 4-94	16:34	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
TGA	LA-560-112	% RECOVERY	N4C3B	0

Sample Size	Customer ID
? 16.820mg ZBN8A	STD

Remarks, Calculations, Results

58.22% H_2O 98.4% Rec

Robby Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-9-94	1200	J. M. Fuge	

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 218.-5712	C-111	5- 4-94	16:36	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
TGA	LA-560-112	% H2O	N4C3B	0

Sample Size	Customer ID
? 17.451mg	C59 S1

Remarks, Calculations, Results

Has no weight loss in the boiling range of water. The sample does loose weight begening at about 260°C to 320°C. The weight loss was 27.6%, but is not water.

Robby Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-9-94	1200	J. M. Fuge	

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

Serial No	Sample Point	Date	Time Issued	Priority
K 218.-5812	C-111	5- 4-94	16:36	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
TGA	LA-560-112	% H2O	N4C3B	0

Sample Size	Customer ID
? 23.176 mg	C59 S1

Remarks, Calculations, Results

DUPLICATE SAMPLE This sample lost no weight in the boiling range of water. However it does lose weight from 260°C to 320°C, 27.6%. But this is not water.

Robby Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-4-94	1200	J. M. Fuge	

84-6600-061 (R-10-83)

BEST AVAILABLE COPY

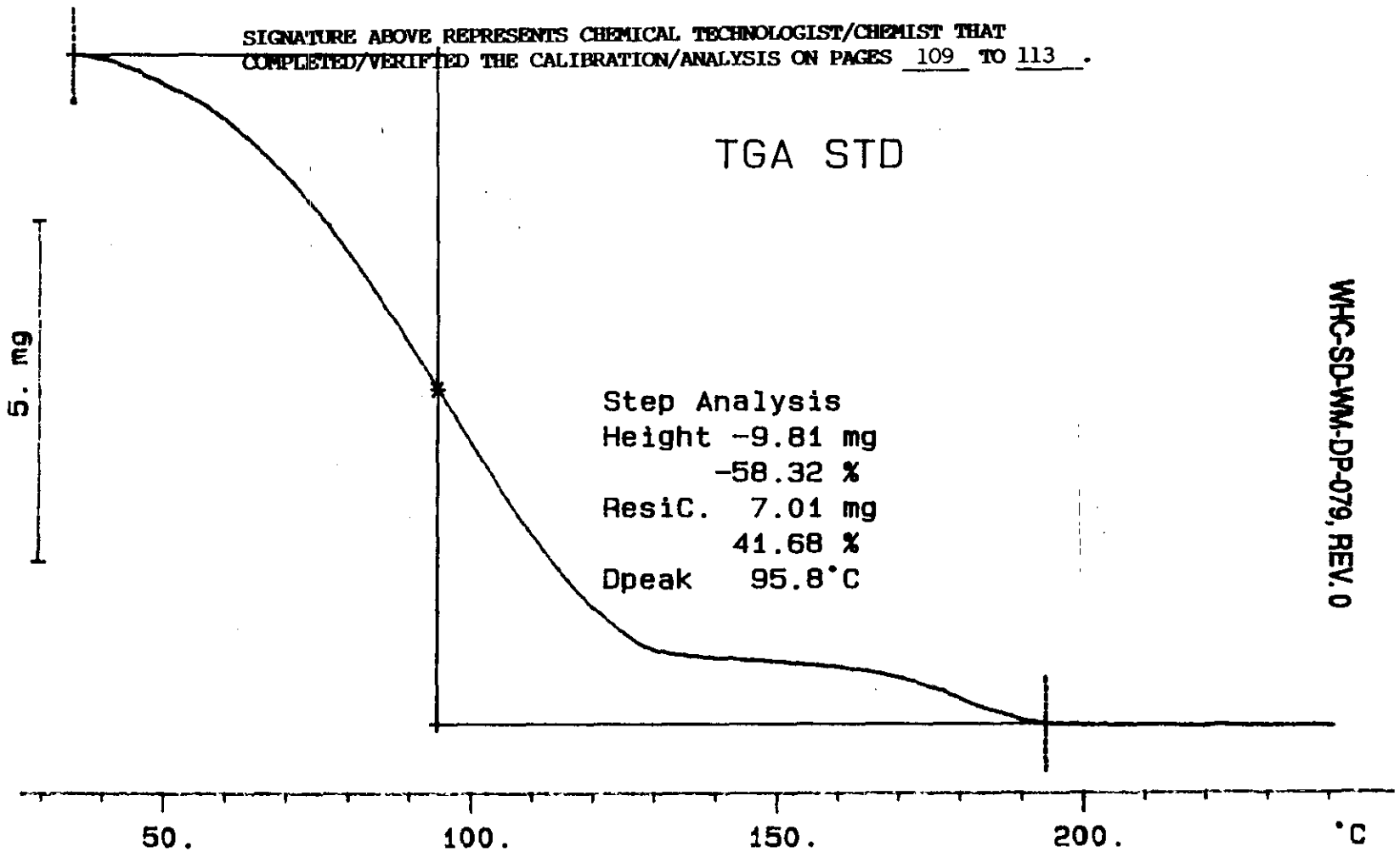
James M. Sage
5/25/94

TGA STD
16.820 mg

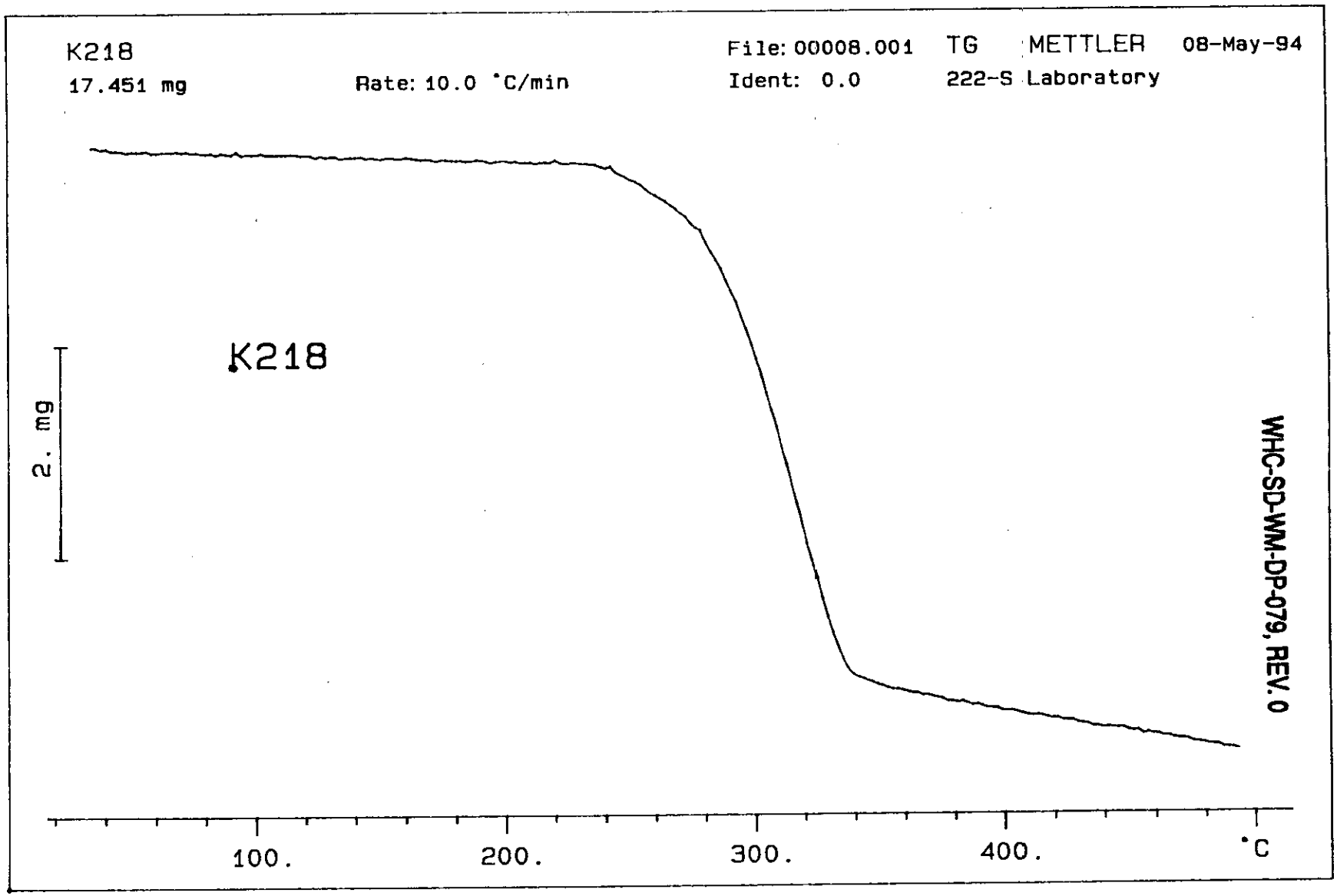
Rate: 10.0 °C/min

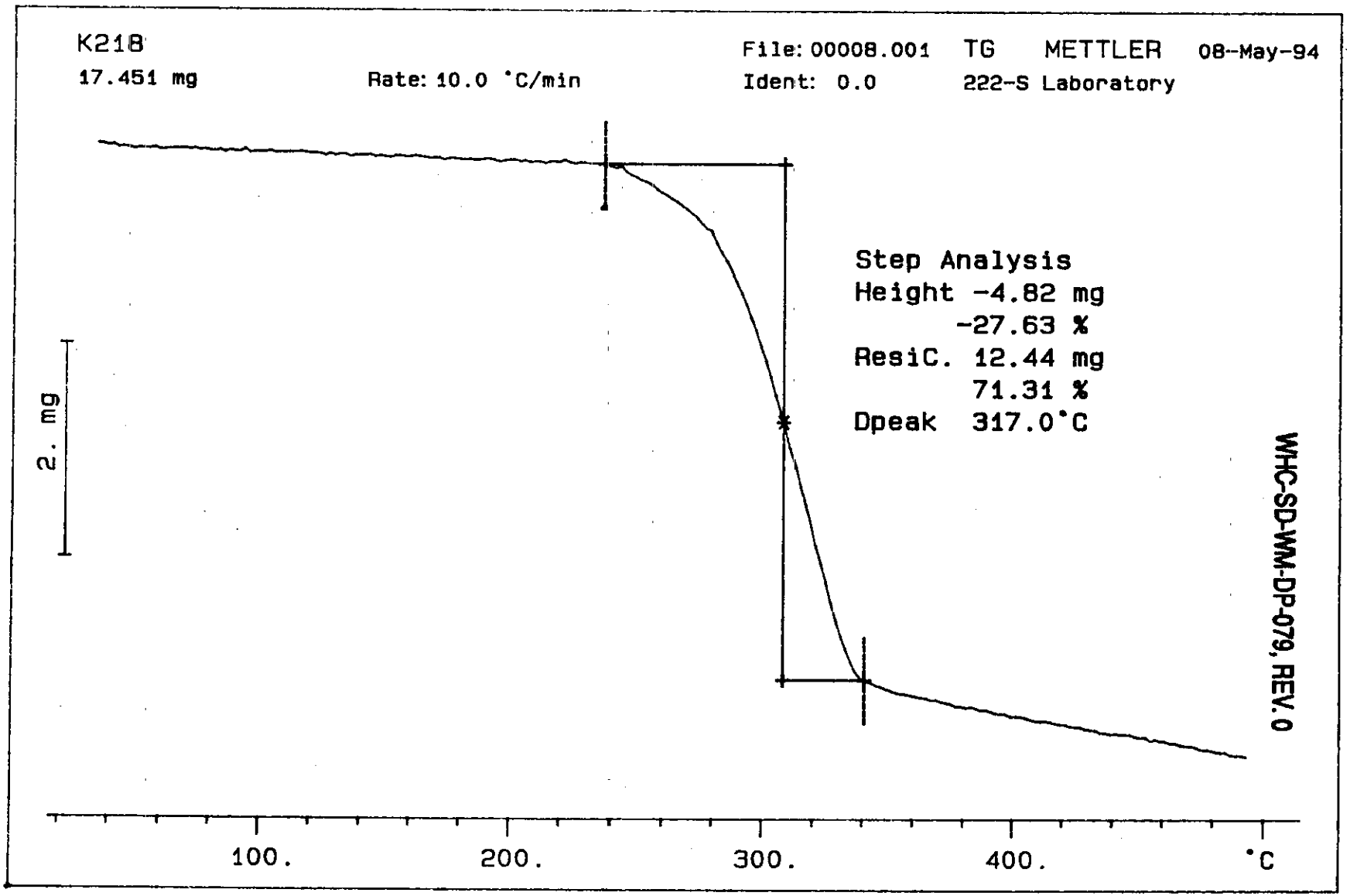
File: 00002.001 TG METTLER 08-May-94
Ident: 0.0 222-S Laboratory

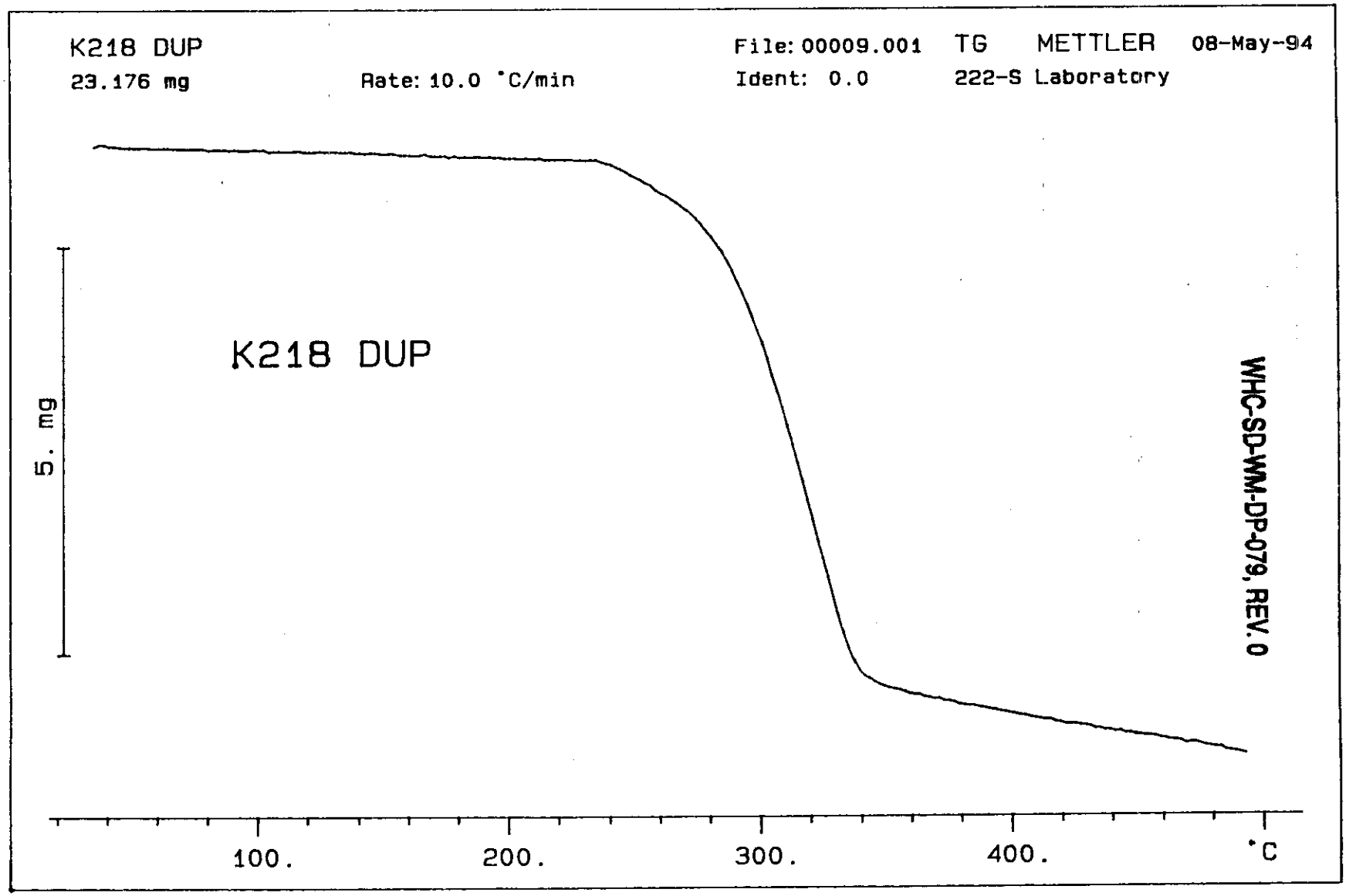
SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 109 TO 113 .

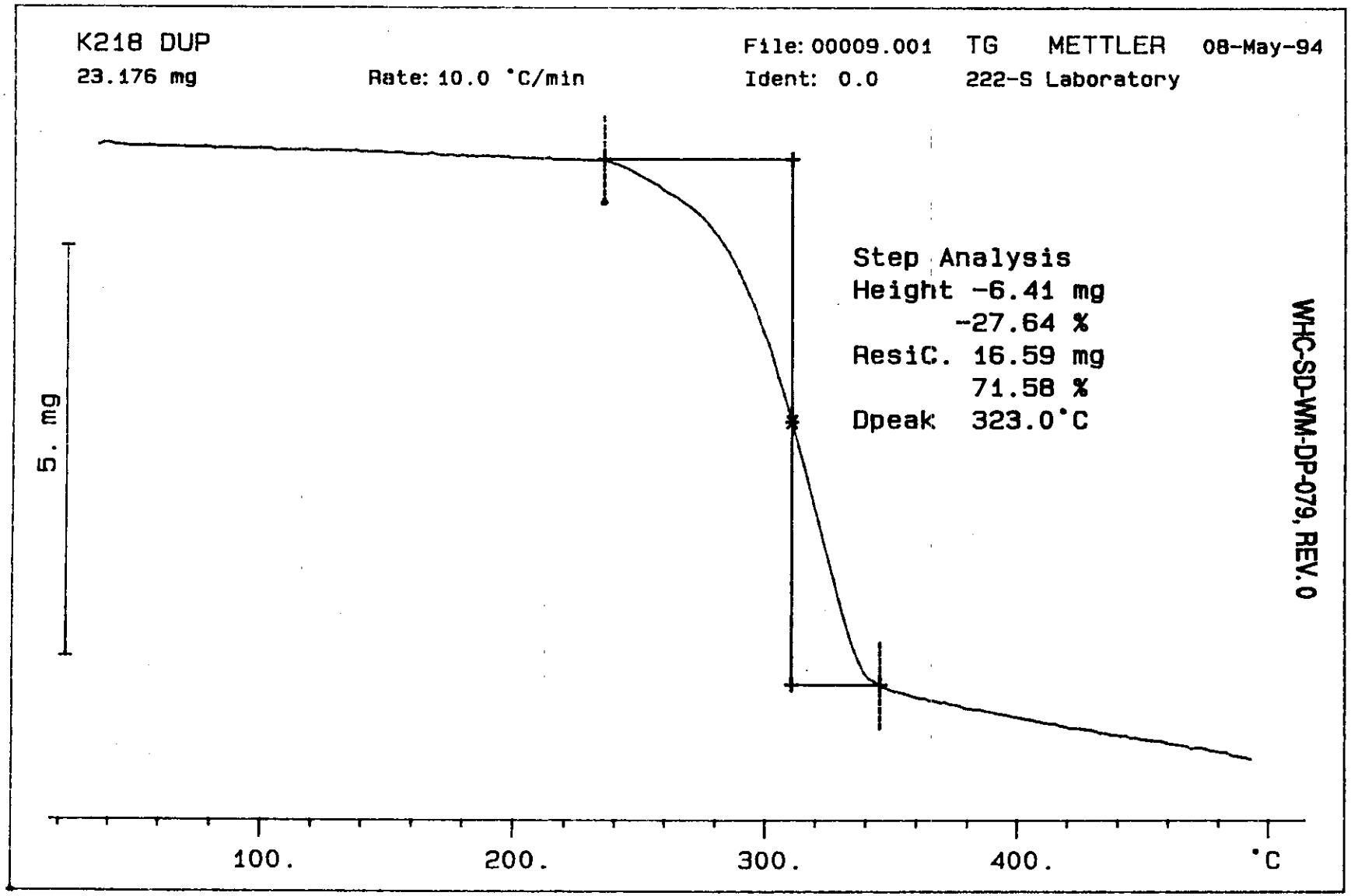


WHC-SD-WM-DP-079, REV. 0


K218
17.451 mg
Rate: 10.0 °C/min
File: 00008.001
Ident: 0.0
TG
METTLER
222-S Laboratory
08-May-94
K218
2. mg
100.
200.
300.
400.
°C


K218
17.451 mg
Rate: 10.0 °C/min
File: 00008.001
Ident: 0.0
TG
METTLER
222-S Laboratory
08-May-94
Step Analysis
Height -4.82 mg
-27.63 %
ResiC. 12.44 mg
71.31 %
Dpeak 317.0°C
2. mg
100.
200.
300.
400.
°C


K218 DUP
23.176 mg
Rate: 10.0 °C/min
File: 00009.001
Ident: 0.0
TG
METTLER
222-S Laboratory
08-May-94
K218 DUP
5. mg
100.
200.
300.
400.
°C



WHC-SD-WM-DP-079, REV. 0

INORGANIC ANALYSES

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K211	Customer ID: C58S1
Analysis: CN SOLID	Sample Prep: DIRECT

Instrument: AL 10724	Procedure/ Rev: LA-695-102 B2
Technologist: JAMES T KNIGHT JR.	Date: 08/02/94
Starting Time: 08:00	Temperature 25 CENTIGRADE
Ending Time: 15:00	Chemist: R. SCHROEDER

Comments: BATCH #3815
THE STANDARD WAS ADDED TO 10 ML VOLUME OF .125 MOLAR NaOH FOR THE INITIAL DILUTION.¶THE DILUTIONS WERE MADE WITH 5ML OF EDTA. THE SPIKE USED THE SAME DILUTION THAT WAS USED ON THE FIRST SAMPLE.

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS STANDARD	K209-5578	11		
2	REAGENT BLANK	K210-5678	12		
3	SAMPLE	K211-5777	13		
4	SAMPLE DUPLICATE	K211-5877	14		
5	SAMPLE SPIKED	K211-5977	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	31N8D 0.100 ML			
SPIKE	31N8D 0.100ML			
			115	

ANALYTICAL BATCH SUMMARY SHEET

METHOD: La-695-102 **ANALYTE:** CN **ANALYSIS START DATE** 8/02/94

PREPARED BY: Rob Schroeder **SUMMARY DATE:** 8/18/94

PROJECT C-111 **UNITS:** ug CN/g **SAMPLE PREP:** dissolution EDTA

SPL ID	SERIAL NO	RESULT #1	RESULT #2	RPD%	% REC	DET LIM	DIG WT
STD	K209-5578	9.35E+2			93.0		
Rea.Bl	K210-5678	<2.00E-2				2.00E-2	
C58S1	K211-5777	3.51E+1				1.66E+0	
C58S1	K211-5877	4.00E+1		13.0		1.61E+0	
C58S1	K211-5978				109.1		

Rob Schroeder 8-18-94

[X] NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH
Samples were prepared using the EDTA dissolution/distillation option as directed. Robert W. Schroeder 8-18-94

CYANIDE ANALYSIS - UNDIGESTED SAMPLE

Batch 3815

Serial No	Sample Point	Date	Time Issued	Priority
[illegible]	[illegible]	[illegible]	[illegible]	28

Determination	Method Standard	Result Units	Charge Code	Returns
CN	LA-[illegible]	% RECOVERY	[illegible]	C

Sample Size	Customer ID
.100ml-10ml-.500ml	[illegible]

Remarks Calculations Results

[illegible] 3WBD [illegible] 8.70 E+2 ~~8.55 E+2~~ 8-4-94

[illegible] 9.35 E+2 [illegible] ~~92.8~~ 93.0 ZH 8.8.94 CVR# 3[illegible]

$$\frac{(0.705 - \frac{0.011}{8\text{-}4\text{-}94})}{0.160059} - (0.00625) = \left(4.30\,\mu g/0.500\right) \cdot 101 = 8.70\,E{+}2$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 8-4-94	
8.2.94		RW Schroeder	

54-6800-061 (R-10-83)

580NM 0.705 A
580NM 0.011 A
580NM 0.355 A
580NM 0.416 A
580NM 0.758 A

8.18.94

Serial No	Sample Point	Date	Time Issued	Priority
I 110.-5678	C-111	4-15-94	14:00	25

Determination	Method Standard	Result Units	Charge Code	Returns
CN	LA-685-102	UG/ML	N4C5B	0

Sample Size	Customer ID
5ml EDTA solution	BLANK

Remarks Calculations Results

REAGENT BLANK

perform dissolution by EDTA

$$\frac{(0.011-0.011)-(0.00625)}{0.160059} = 0.00/5 \times 1 = 0.0$$

~~D.F.~~ D.L. = 0.1 µg/5mL = $\boxed{< 2.0E-2}$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8.2.94		8-4-94 Ruschroeder	

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
I 211.-5777	C-111	4-25-94	14:57	25

Determination	Method Standard	Result Units	Charge Code	Returns
CN SOLID	LA-685-102	UG/G	N4C5B	0

Sample Size	Customer ID
.3005grams 1ml solution	C5691

Remarks Calculations Results

$$\frac{(0.355-0.01)-(0.00625)}{0.160059} = 2.11\ E+0\ \mu g\ CN/6.01E-2 =$$

~~3.5E~~ 8-4-94

$$\frac{(0.3005 \cdot 1mL)}{5mL} = 6.01\ E-2\ g\ of\ sample$$

$\boxed{3.51\ E+1\ \mu g\ CN/g}$

D.L. = 0.1 µg CN/6.01E-2 g = 1.66 E+0 µg/g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8.2.94		8-4-94 Ruschroeder	

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-5877	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Reruns
CN 80LJD	LA-885-102	uG/G	N4C8B	0

Sample Size	Customer ID
.3112 grams	C5881

Remarks Calculations Results

aws 8-4-94

~~(0.3~~ $\frac{(0.416-0.011)-(0.00625)}{0.160059} = 2.49E+0\ \mu g\ CN / 6.22E-2 =$

$\boxed{4.00\ E+1\ \mu g\ CN/g}$

$\frac{(0.3112 \cdot 1mL)}{5mL} = 6.22\ E-2\ g\ of\ sample$

D.L. = $0.1\ \mu g\ CN / 6.22E-2 = 1.61\ E+0\ \mu g\ CN/g$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8.2.94		8-4-94 RW Schroeder	Gary Hammond

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-5878	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Reruns
CN	LA-885-102	% RECOVERY	N4C8B	0

Sample Size	Customer ID
.3005 grams 1ml solution	C5881

Remarks Calculations Results

SAMPLE BRIEF ID
BATCH ID 31N8D
SPIKE VOLUME .100ml-10ul-.250ml

mg CN in spike = $\frac{(435)(0.250)}{101} = 2.31\ mg$

$\frac{(0.758-0.011)-(0.00625)}{0.160059} = 4.63\ mg\ CN\ S+Sp$

$\frac{100 \cdot 4.63\ mg\ CN\ S+Sp - 2.11\ mg\ CN\ S}{2.31\ mg\ CN\ Sp} = \boxed{109.1\%\ Rec.}$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8.2.94		8-4-94 RW Schroeder	Gary Hammond

54-6800-061 (R-10-83)

BATCH # 3278 QA 7

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K-214	Customer ID: C58FB C111
Analysis: CYANIDE	Sample Prep: DIRECT + EDTA/EN

Instrument: AL 10724	Procedure/ Rev: LA-695-102 B-2
Technologist: E.H. COLVIN E.H. Colvin	Date: 05/13/94
Starting Time: 0630	Temperature 25 CENTIGRADE
Ending Time: 1500	Chemist: R.W. SCHROEDER

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	K-212-5578	11		
2	REAGENT BLANK	K-213-5678	12		
3	SAMPLE	K-214-5778	13		
4	SAMPLE DUPLICATE	K-214-5878	14		
5	SAMPLE + SPIKE	K-214-5978	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	19N8-E .500 ML			
CN SPIKE	19N8-E .500ML			
			120	

ANALYTICAL BATCH SUMMARY SHEET

METHOD: La-695-102 **ANALYTE:** CN **ANALYSIS START DATE** 5/13/94

PREPARED BY: Rob Schroeder **SUMMARY DATE:** 5/18/94

PROJECT C-111 **UNITS:** ug CN/mL **SAMPLE PREP:** Direct

SPL ID	SERIAL NO	RESULT #1	RESULT #2	RPD%	% REC	DET LIM	DIG WT
STD	K212-5578	9.17E+2			100.3		
Reag.Bl	K213-5678	<0.03				0.03	
C58FB	K214-5778	<0.03	<0.03	NA		0.03	
SPIKE	K214-5978				101.9		

☐ NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

Batch was run using the EDTA/en dissolution option, as requested.

Robert W. Schroeder
5-26-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3278

Serial No	Sample Point	Date	Time Issued	Priority
K 212.-5578	C-111	4-27-94	10: 2	21

Determination	Method Standard	Result Units	Charge Code	Reruns
CN	LA-695-102	% RECOVERY	N4C3B	0

Sample Size 5-13-94 EE ~~22 ML~~ .100mL-10mL-.500mL

Customer ID: STD

Remarks Calculations Results

S244 KCN

STD# 19N8E RESULT 9.17 E+2 ABS .728

STD VAL 8.99 E+2 %REC 100.3%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 5-18-94	
5-13-94	1500	RW Schroeder	

54-6600-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

CN- DETERMINATION : LA-695-102 (B-2) BLANK,LIQUID,SOLID

Type		SAMPLE	DUPLICATE
LIQUID	Sample Aliquot in mL	0.10000	
Work List	Flask Volume in mL	10.00000	
3278	Sample Aliquot Taken in mL (SS)	0.50000	
Test Code	Absorbance of Blank	0.0080	
	Absorbance of Sample	0.7280	
Matrix	Y-Intercept Value	-0.003130	-0.003130
LIQUID	Slope Value	0.157645	0.157645
Sample #	µG of Cyanide	4.59	N/A
K212-5578	µG/mL CN-	9.17E+02	N/A
Instrument Code			
	µG of Cyanide = |((Absorb. of Sample - Absorb. of Blank) - (Y-Intercept))| / Slope Value		
Analyst	µG/mL of Cyanide = µG Cyanide / SS (mL) * Dilution Factor		
COLVIN	Dilution Factor = Flask Volume (mL) / Sample Aliquot (mL)		
Date	Detection Limit = 0.1 µG Cyanide		
05/13/94			
Time	v RESULTS v		
15:00	Cyanide Concentration (µG/mL)	9.17E+02	

Data Entry by:		Date:	17-May-94
Approved by:	RW Schroeder	Date:	5-18-94

Form L1 Rev. 1.1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 213.-5678	C-111	4-27-94	10: 7	21

Determination	Method Standard	Result Units	Charge Code	Reruns
CN	LA-695-102	uG/ML	N4C3B	0

Sample Size 5-13-94 RE ~~50 ML~~ 4 ML

Customer ID: BLANK

Remarks, Calculations, Results: REAGENT BLANK

ABS .008

<.03 µg/ml

P.M. Colvin

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 5-18-94	
5-13-94	1500	RW Schroeder	

54-6800-061 (R 10-83)

WHC-SD-WM-DP-079, REV. 0

CN- DETERMINATION : LA-695-102 (B-2) BLANK,LIQUID,SOLID

Type		SAMPLE	DUPLICATE
LIQUID	Sample Aliquot in mL	4.00000	
Work List	Flask Volume in mL	0.00000	
3278	Sample Aliquot Taken in mL (SS)	4.00000	
Test Code	Absorbance of Blank	0.0080	
	Absorbance of Sample	0.0080	
Matrix	Y-Intercept Value	-0.003130	-0.003130
LIQUID	Slope Value	0.157645	0.157645
Sample #	µG of Cyanide	0.02	N/A
K213-5678	µG/mL CN-	0.00E+00	N/A
Instrument Code			
	µG of Cyanide = |((Absorb. of Sample - Absorb. of Blank) - (Y-Intercept))| / Slope Value		
Analyst	µG/mL of Cyanide = µG Cyanide / SS (mL) * Dilution Factor		
COLVIN	Dilution Factor = Flask Volume (mL) / Sample Aliquot (mL)		
Date	Detection Limit = 0.1 µG Cyanide		
05/13/94			
Time	v RESULTS v		
15:00	Cyanide Concentration (µG/mL)	<0.1 µG Cyanide	
		<0.03 µG/mL Cyanide	

Data Entry by:		Date:	17-May-94
Approved by:	RW Schroeder	Date:	5-18-94

Form L1 Rev. 1.1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5778	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
CN LIQ	LA-695-102	uG/ML	N4C3B	0

Sample Size 5-13-94 EE
~~25 ML~~ 4mL + 1mL EDTA/EN

Customer ID: C58FB

Remarks, Calculations, Results

ABS .008

< .03 uG/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 5-18-94
5-13-94	1500	RW Schroeder

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

CN- DETERMINATION : LA-695-102 (B-2) BLANK,LIQUID,SOLID

Type		SAMPLE	DUPLICATE
LIQUID	Sample Aliquot in mL	4.00000	
Work List	Flask Volume in mL	0.00000	
3278	Sample Aliquot Taken in mL (SS)	4.00000	
Test Code	Absorbance of Blank	0.0080	
	Absorbance of Sample	0.0080	
Matrix	Y-Intercept Value	-0.003130	-0.003130
LIQUID	Slope Value	0.157645	0.157645
Sample #	µG of Cyanide	0.02	N/A
K214-5778	µG/mL CN-	0.00E+00	N/A
Instrument Code			
	µG of Cyanide = [((Absorb. of Sample − Absorb. of Blank) − (Y-Intercept))] / Slope Value		
Analyst	µG/mL of Cyanide = µG Cyanide / SS (mL) * Dilution Factor		
COLVIN	Dilution Factor = Flask Volume (mL) / Sample Aliquot (mL)		
Date	Detection Limit = 0.1 µG Cyanide		
05/13/94			
Time	v RESULTS v		
15:00	Cyanide Concentration (µG/mL)	<0.1 µG Cyanide	
		<0.03 µG/mL Cyanide	

Data Entry by:		Date:	17-May-94
Approved by:	RW Schroeder	Date:	5-18-94

Form L1 Rev. 1.1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5878	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
CN LIQ	LA-695-102	uG/ML	N4C3B	0

Sample Size 5-13-94 PC
~~22 ML~~ 4 mL + 1 mL EDTA/EV

Customer ID: C58FB

Remarks, Calculations, Results
DUPLICATE SAMPLE

ABS .009

<.03 uG/ml

P.H. Colvin

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 5-18-94	
5-13-94	1500	RW Schroeder	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. C

CN- DETERMINATION : LA-695-102 (B-2) BLANK,LIQUID,SOLID

Type		SAMPLE	DUPLICATE
LIQUID	Sample Aliquot in mL	4.00000	
Work List	Flask Volume in mL	0.00000	
3278	Sample Aliquot Taken in mL (SS)	4.00000	
Test Code	Absorbance of Blank	0.0090	
	Absorbance of Sample	0.0080	
Matrix	Y-Intercept Value	-0.003130	-0.003130
LIQUID	Slope Value	0.157645	0.157645
Sample #	µG of Cyanide	0.01	N/A
K214-5878	µG/mL CN-	0.00E+00	N/A
Instrument Code			
	µG of Cyanide = [((Absorb. of Sample - Absorb. of Blank) - (Y-Intercept))] / Slope Value		
Analyst	µG/mL of Cyanide = µG Cyanide / SS (mL) * Dilution Factor		
COLVIN	Dilution Factor = Flask Volume (mL) / Sample Aliquot (mL)		
Date	Detection Limit = 0.1 µG Cyanide		
05/13/94			
Time	v RESULTS v		
15:00	Cyanide Concentration (µG/mL)	<0.1 µG Cyanide	
		<0.03 µG/mL Cyanide	

Data Entry by:		Date:	17-May-94
Approved by:	RW Schroeder	Date:	5-18-94

Form L1 Rev. 1.1 Page 1 of 1

CYANIDE ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5978	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
CN	LA-695-102	% RECOVERY	N4C3B	0

Sample Size 5-13-94 RC
~~25 ML~~ 4mL + 1mL EDTA/EN + 100mL - 10mL -

Customer ID: C58FB

Remarks Calculations Results

SAMPLE SPIKED ID
SPIKE ID 19NaE
SPIKE VOLUME
.100mL - 10mL - .500mL

mg CN⁻ in spike = $\frac{(.971)(0.500)}{100}$ = ~~4.585~~ RWS 5-17-94 4.495 RWS 5-17-94 .500mL SPIKE

ABS .727

mg CN⁻ in sample + spike = $\frac{(0.727 - 0.008) - (0.008 - 0.008)}{0.157645}$ (-0.00313) RWS 5-17-94 = 4.5807

4.5807 / ~~4.585~~ 4.495 RWS 5-17-94 × 100 = ~~99.9~~ 101.9% RWS 5-17-94 recovery

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 5-17-94	
5-13-94	1500	RW Schroedy	

54-6800-061 (R-10-83)

CYANIDE ANALYSIS REPORT

TODAYS DATE: 05/13/94

PAYROLL NO.:

WHC-SD-WM-DP-079, REV. 0

Y-INTERCEPT= -.00313
SLOPE= .157645

SAMPLE ID#: K-213 BLANK
SAMPLE SIZE: 4ML
WVL AND ABS= 580NM 0.008 A

SAMPLE ID#: K-212 19N8-E STD
SAMPLE SIZE: .100ML-10ML-.500ML
WVL AND ABS= 580NM 0.728 A

SAMPLE ID#: K-214
SAMPLE SIZE: 4ML + 1ML EDTA/EN
WVL AND ABS= 580NM 0.008 A

SAMPLE ID#: K-214 DUPLICATE
SAMPLE SIZE: 4ML + 1ML EDTA/EN
WVL AND ABS= 580NM 0.009 A

SAMPLE ID#: K-214 + SPIKE
SAMPLE SIZE: 4ML + 1ML EDTA/EN + .100ML-10ML-.500ML 19N8-E SPIKE
WVL AND ABS= 580NM 0.727 A

TECHNOLOGIST SIGNATURE: E.M. Eden

DATE SIGNED: 5-13-94

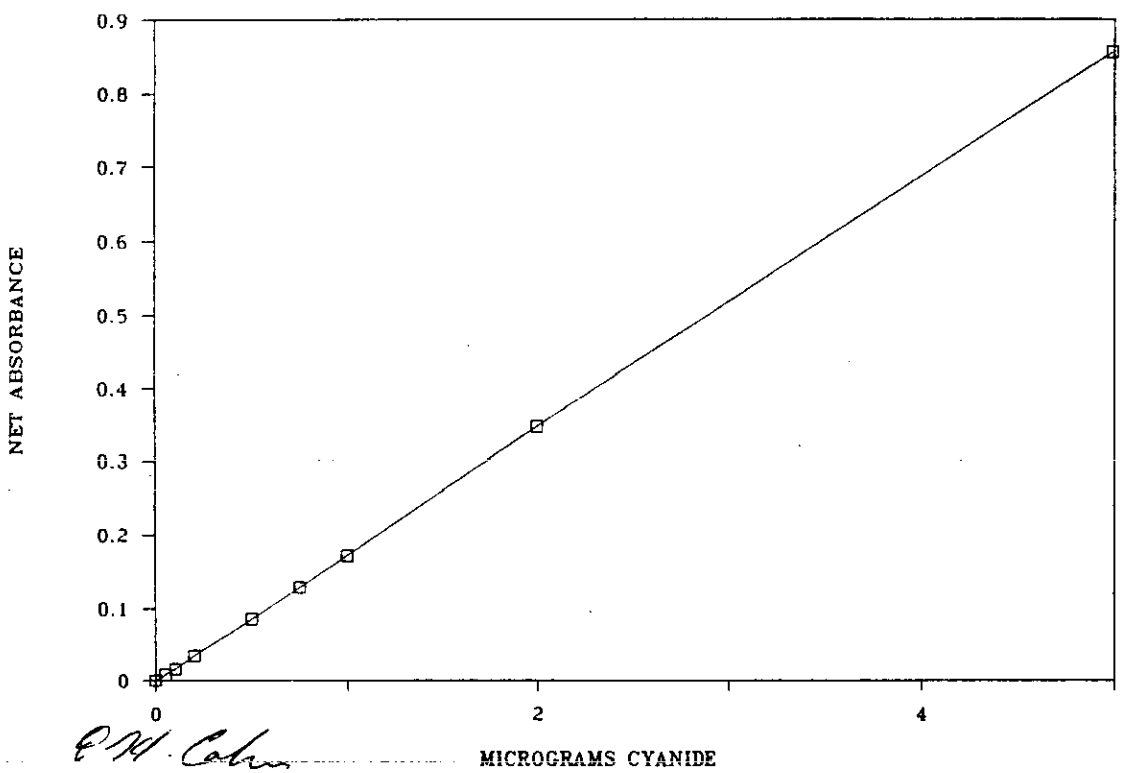
CALIBRATION CURVE LACHAT DISTILLED 25 ML
CYANIDE DEC.16, 1993
CALIBRATION STANDARD # 39N16-B 1064 UG/ML CYANIDE
DILUTION FACTOR = 10/.1 = 100. WORKING STD = 1064/100 = 10.64

PIPET SIZE	MICROGRAMS CN	TOTAL ABS	NET ABS
BLANK	0	0.009	0
0.050ML WS#2	0.0532	0.011	0.002
0.100ML WS#2	0.1064	0.02	0.011
0.200ML WS#2	0.2128	0.038	0.029
0.050ML WS#1	0.532	0.092	0.083
0.075ML WS#1	0.798	0.135	0.126
0.100ML WS#1	1.064	0.175	0.166
0.200ML WS#1	2.128	0.338	0.329
0.500ML WS#1	5.32	0.845	0.836

Regression Output:

Constant Output:	-0.00313	(Y-INTERCEPT)
Std Err of Y Est	0.002900	
R Squared	0.999898	
No. of Observations	9	
Degrees of Freedom	7	
X Coefficient(s)	0.157645	(SLOPE)
Std Err of Coef.	0.000600	

CYANIDE CALIBRATION CURVE



P.M. Cahn
5-13-94

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K 210, K 211	Customer ID: BLANK, C58S1
Analysis: TIC/TOC	Sample Prep: DIRECT

Instrument: WC 38153 , AL 11208	Procedure/ Rev: LA 342-100 A-0
Technologist: KR MONTEITH	Date: 08/03/94
Starting Time: 16:00	Temperature 25
Ending Time: 23:30	Chemist: RW SCHRODER

Comments:

	Description	Lab ID
1	LMCS	K 209-5518
2	BLANK	K 210-5618
3	SAMPLE	K 211-5718
4	SAMPLE DUP	K 211-5818
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS TIC	15N12B / 1 ML			
LMCS TOC	10N12C / .300 ML			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-342-100 **ANALYTE:** TIC/TOC **ANALYSIS START DATE** 8/02/94

PREPARED BY: Rob Schroeder **SUMMARY DATE:** 8/04/94

PROJECT C-111 **UNITS:** ug C/ g **SAMPLE PREP:** Direct Analysis

SPL ID	SERIAL NO	RESULT #1	RESULT #2	RPD%	% REC	DET LIM	DIG WT
TIC STD	K209-5518	4.90E-2M			98.0		
TOC STD	K209-5518	2.70E-0g/L			90.0		
TIC BLK	K210-5618	3.90ug C				5.0E-0	
TOC BLK	K210-5618	19.1ug C				1.25E+2	
TIC C58S1	K211-5718	3.22E+3	3.39E+3	5.14		4.00E+2	
TOC C58S1	K211-5718	7.09E+2	7.38E+2	4.01		4.00E+2	

Rob Schroeder 8-4-94

[X] NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

Robert W. Schroeder 8-4-94

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-5718	C-111	4-25-94	14:57	28

Determination	Method Standard	Result Units	Charge Code	Reruns
TIC/TOC	LA-342-100	uG C/G	N403B	0

Sample Size	Customer ID
? 0.0795g	C5881

Remarks Calculations Results

TIC VALUE 2.56 E+2 / 0.0795 = 3.22 E+3 µg/g

TOC VALUE 56.4 E+0 / 0.0795 = 7.09 E+2 µg/g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 8-4-94	
8-3-94		RW Schroeder	

54-6800-061 (R 10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-5818	C-111	4-25-94	14:57	28

Determination	Method Standard	Result Units	Charge Code	Reruns
TIC/TOC	LA-342-100	uG C/G	N403B	0

Sample Size	Customer ID
0.0843 ? ~~0.0795~~ g RWS 8-4-94	C5881

Remarks Calculations Results

TIC DUPLICATE VALUE 2.855 E+2 / ~~0.0795~~ 0.0843g = 3.39 E+3 µg/g RWS 8-4-94

TOC DUPLICATE VALUE 62.2 E+0 / 0.0843g = 7.38 E+2 µg/g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 8-4-94	
8-3-94		RW Schroeder	

54-6800-061 (R 10-83)

Batch 3816

Serial No	Sample Point	Date	Time Issued	Priority
K 209.-5518	C-111	4-25-94	14:54	23

Determination	Method Standard	Result Units	Charge Code	Reruns
TIC/TOC	LA-342-100	% RECOVERY	N4C3B	0

Sample Size	Customer ID
?	STD

Remarks, Calculations, Results

R666 TIC
STD # 15N0B RESULT 4.90 E-2
STD VAL 5.0E-2 M %REC 98.0 RWS 8-4-94
R666 TOC
STD # 16N12C RESULT 2.70 g/L
STD VAL 3.00 g/L %REC 90.0

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8-3-94		RW Schroeder 8-4-94	

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 210.-5518	C-111	4-25-94	14:55	23

Determination	Method Standard	Result Units	Charge Code	Reruns
TIC/TOC	LA-342-100	UG C/ML	N4C3B	0

Sample Size	Customer ID
?	BLANK

Remarks, Calculations, Results

TIC REAGENT BLANK 3.90 ug C
TOC REAGENT BLANK 19.1 ug C

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8-3-94		RW Schroeder 8-4-94	

54-6800-061 (R-10-83)

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: K 209-5518 Date: 08/03/94 Time: 18:48:09

Sample Size = 1000 uL
Dil Factor = 1
Blank ID # =
Blank Value = .35 ug/minute C

Analyst : KR MONTEITH
Min Readings = 22
Max Readings = 22
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.00	0.00
2	1.01	37.50	100.00
3	1.50	233.20	83.92
4	2.00	413.20	43.56
5	2.50	509.60	18.92
6	3.00	558.10	8.69
7	3.50	576.20	3.14
8	4.00	582.70	1.15
9	4.50	585.80	0.50
10	5.00	587.00	0.20
11	5.50	587.90	0.15
12	6.00	588.60	0.12
13	6.50	589.00	0.07
14	7.00	589.50	0.08
15	7.50	589.80	0.05
16	8.00	590.20	0.07
17	8.50	590.50	0.05
18	9.00	590.90	0.07
19	9.50	591.00	0.02
20	10.00	591.30	0.05
21	10.50	591.50	0.03
22	11.00	591.80	0.05

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 134 TO 140.

USER INPUT BLANK VALUE
BLANK VALUE = 3.849957 micrograms carbon
BLANK FACTOR = 3.849957 / 10.99988 = +3.5E-01 ug/min Carbon

SAMPLE RESULTS:
(591.8 - 3.850555)(1)/(1000) =
(591.8 - 3.850555)(1)/(1000)(12) =

Sample Run by:

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>>

Sample: K 210-5618 Date: 08/03/94 Time: 18:22:28

Sample Size = 1 uL
Dil Factor = 1
Blank ID # = K 210-5618
Blank Value = N/A

Analyst : KR MONTEITH
Min Readings = 22
Max Readings = 22
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.10	0.00
2	1.01	0.30	66.67
3	1.51	0.70	57.14
4	2.01	1.10	36.36
5	2.51	1.30	15.38
6	3.01	1.60	18.75
7	3.51	1.70	5.88
8	4.01	1.80	5.56
9	4.50	2.00	10.00
10	5.00	2.20	9.09
11	5.50	2.40	8.33
12	6.00	2.50	4.00
13	6.50	2.60	3.85
14	7.00	2.90	10.34
15	7.50	2.90	0.00
16	8.00	3.10	6.45
17	8.50	3.30	6.06
18	9.00	3.40	2.94
19	9.50	3.50	2.86
20	10.00	3.70	5.41
21	10.50	3.90	5.13
22	11.00	3.90	0.00

BLANK VALUE = 3.9 micrograms carbon
BLANK FACTOR = 3.9 / 10.99976 = +3.5E-01 ug/min Carbon

Sample Run By: _____
KR MONTEITH 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>>

Sample: K 210-5618 Date: 08/03/94 Time: 18:35:34

Sample Size = 1 uL
Dil Factor = 1
Blank ID # = K 210-5618
Blank Value = N/A

Analyst : KR MONTEITH
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading =====	Analysis Time =====	Coulometer =====	% Difference ==
1	0.51	0.00	0.00
2	1.01	0.00	0.00
3	1.51	0.30	100.00
4	2.00	3.70	91.89
5	2.50	8.10	54.32
6	3.00	10.90	25.69
7	3.50	12.50	12.80
8	4.00	13.50	7.41
9	4.50	14.30	5.59
10	5.00	14.90	4.03
11	5.50	15.30	2.61
12	6.00	15.80	3.16
13	6.50	16.10	1.86
14	7.00	16.50	2.42
15	7.50	16.90	2.37
16	8.00	17.10	1.17
17	8.50	17.50	2.29
18	9.00	17.80	1.69
19	9.50	18.10	1.66
20	10.00	18.30	1.09
21	10.50	18.70	2.14
22	11.00	19.10	2.09

BLANK VALUE = 19.1 micrograms carbon
BLANK FACTOR = 19.1 / 10.99988 = +1.74E+00 ug/min Carbon

<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!!>>>>

Sample Run By: KR MONTEITH 00000

TOC

Sam

			.00
			00.00
			93.79
		290.70	73.96
		547.60	46.91
	3.00	701.00	21.88
	3.50	768.20	8.75
8	4.00	798.60	3.81
9	4.50	809.90	1.40
10	5.00	815.40	0.67
11	5.50	818.70	0.40
12	6.00	820.90	0.27
13	6.50	822.30	0.17
14	7.00	823.50	0.15
15	7.50	824.40	0.11
16	8.00	825.20	0.10
17	8.50	825.90	0.08
18	9.00	826.60	0.08
19	9.50	827.20	0.07
20	10.00	827.70	0.06
21	10.50	828.20	0.06
22	11.00	828.70	0.06

BEST AVAILABLE COPY

```
USER INPUT BLANK VALUE
BLANK VALUE =  19.13979 micrograms carbon
BLANK FACTOR =  19.13979 / 10.99988  =        +1.7E+00     ug/min Carbon

SAMPLE RESULTS:
( 828.7 - 19.14106 )(1)/(300)      =                +2.699E+00  g/L Carbon
( 828.7 - 19.14106 )(1)/(300)(12) =                 +2.249E-01  Molar Carbon
<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!!>>>>
```


Sample Run By: _____

KR MONTEITH 00000

.0795g Sample

TIC--TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: K 211-5818 Date: 08/03/94 Time: 21:21:09

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = .35 ug/minute C

Analyst : KR MONTEITH
Min Readings = 22
Max Readings = 22
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.00	0.00
2	1.01	7.30	100.00
3	1.50	51.50	85.83
4	2.00	116.10	55.64
5	2.50	181.80	36.14
6	3.00	223.60	18.69
7	3.50	242.60	7.83
8	4.00	249.70	2.84
9	4.50	252.70	1.19
10	5.00	254.00	0.51
11	5.50	255.10	0.43
12	6.00	255.70	0.23
13	6.50	256.40	0.27
14	7.00	257.00	0.23
15	7.50	257.40	0.16
16	8.00	257.90	0.19
17	8.50	258.30	0.15
18	9.00	258.80	0.19
19	9.50	259.10	0.12
20	10.00	259.40	0.12
21	10.50	259.80	0.15
22	11.00	260.10	0.12

USER INPUT BLANK VALUE
BLANK VALUE = 3.849957 micrograms carbon
BLANK FACTOR = 3.849957 / 10.99988 = +3.5E-01 ug/min Carbon

SAMPLE RESULTS:
(260.1 - 3.849573)(1)/(1) = +2.563E+02 g/L Carbon
(260.1 - 3.849573)(1)/(1)(12) = +2.135E+01 Molar Carbon

Sample Run By: KR MONTEITH 00000

.0795g SAMPLE

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: K 211-5818 Date: 08/03/94 Time: 21:33:26

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = 1.74 ug/minute C

Analyst : KR MONTEITH
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading =====	Analysis Time =====	Coulometer =====	% Difference ==
1	0.51	0.00	0.00
2	1.01	5.00	100.00
3	1.51	23.40	78.63
4	2.00	39.40	40.61
5	2.50	49.40	20.24
6	3.00	54.90	10.02
7	3.50	58.70	6.47
8	4.00	61.50	4.55
9	4.50	63.40	3.00
10	5.00	64.90	2.31
11	5.50	66.20	1.96
12	6.00	67.50	1.93
13	6.50	68.60	1.60
14	7.00	69.60	1.44
15	7.50	70.60	1.42
16	8.00	71.40	1.12
17	8.50	72.20	1.11
18	9.00	72.90	0.96
19	9.50	73.50	0.82
20	10.00	74.30	1.08
21	10.50	74.90	0.80
22	11.00	75.50	0.79

USER INPUT BLANK VALUE
BLANK VALUE = 19.13979 micrograms carbon
BLANK FACTOR = 19.13979 / 10.99988 = +1.7E+00 ug/min Carbon

SAMPLE RESULTS:
(75.5 - 19.14128)(1)/(1) = +5.64E+01 g/L Carbon
(75.5 - 19.14128)(1)/(1)(12) = +4.70E+00 Molar Carbon
<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!!>>>>

Sample Run By: KR MONTEITH 00000

.0843g Sample

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: K 211 Date: 08/03/94 Time: 22:22:25

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = 1.74 ug/minute C

Analyst : KR MONTEITH
Min Readings = 22
Max Readings = 22
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.10	0.00
2	1.01	3.80	97.37
3	1.51	18.30	79.23
4	2.00	35.10	47.86
5	2.50	47.60	26.26
6	3.00	55.10	13.61
7	3.50	60.40	8.77
8	4.00	64.10	5.77
9	4.50	66.50	3.61
10	5.00	68.60	3.06
11	5.50	70.70	2.97
12	6.00	72.10	1.94
13	6.50	73.40	1.77
14	7.00	74.70	1.74
15	7.50	75.80	1.45
16	8.00	76.60	1.04
17	8.50	77.70	1.42
18	9.00	78.50	1.02
19	9.50	79.40	1.13
20	10.00	80.00	0.75
21	10.50	80.60	0.74
22	11.00	81.30	0.86

USER INPUT BLANK VALUE
BLANK VALUE = 19.13979 micrograms carbon
BLANK FACTOR = 19.13979 / 10.99988 = +1.7E+00 ug/min Carbon

SAMPLE RESULTS:
(81.3 - 19.14106)(1)/(1) = +6.22E+01 g/L Carbon
(81.3 - 19.14106)(1)/(1)(12) = +5.18E+00 Molar Carbon
<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!>>>>

Sample Run By: KR MONTEITH 00000

.0843g Sample

TIC- TC

Sa

MONTEITH

= 22
Max Readings = 22
% Difference = 10

	Time	Coulometer	Difference
1	0.51	0.00	0.00
2	1.01	[illegible]	100.00
3		124.20	74.48
4		199.90	37.87
	2.50	244.00	18.07
	3.00	265.50	8.10
7	3.50	274.30	3.21
8	4.00	278.80	1.61
9	4.50	280.90	0.75
10	5.00	281.90	0.35
11	5.50	282.80	0.32
12	6.00	283.80	0.35
13	6.50	284.30	0.18
14	7.00	285.30	0.35
15	7.50	285.70	0.14
16	8.00	286.30	0.21
17	8.50	286.80	0.17
18	9.00	287.40	0.21
19	9.50	287.90	0.17
20	10.00	288.40	0.17
21	10.50	288.80	0.14
22	11.00	289.30	0.17

USER INPUT BLANK VALUE
BLANK VALUE = 3.849957 micrograms carbon
BLANK FACTOR = 3.849957 / 10.99988 = +3.5E-01 ug/min Carbon

SAMPLE RESULTS:
(289.3 - 3.849957)(1)/(1) = +2.855E+02 g/L Carbon
(289.3 - 3.849957)(1)/(1)(12) = +2.379E+01 Molar Carbon

Sample Run By: _____
KR MONTEITH 00000

3455

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-079, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. K212, K213, K214, K214, K214	Customer ID: C58FB
Analysis: TOC	Sample Prep: DIRECT LIQUID

Instrument: MODEL 5011 WC 16130	Procedure/ Rev: LA-344-105 B-2
Technologist: BRENDA SEVERSON	Date: 5-12-94
Starting Time: 2005	Temperature NA
Ending Time: 2315	Chemist: R. SCHROEDER

Comments: RERUN - USE 2mL Sample Size + 0.200mL acid — 0.200 inject volume. Thanks, Rob S.

	Description	Lab ID		Description	Lab ID
1	STD	K212-5526	11		
2	REAGENT BLANK	K213-5626	12		
3	SAMPLE	K214-5726	13		
4	SAMPLE DUPLICATE	K214-5826	14		
5	SAMPLE + SPIKE	K214-5926	15		
6			16		
7			17		
8			18		
9			19		
10	(		20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
STD	10N12C / .200 mL			
SPIKE	11N12C / .400 mL			

141

A-6000-881 (03/92)

RERUN ~~3456~~ 3455

Serial No	Sample Point	Date	Time Issued	Priority
K 212.-5526	C-111	4-27-94	10: 5	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	% RECOVERY	N4C3B	1

Sample Size	Customer ID
.200ML-2ML-.200ML	STD

Remarks, Calculations, Results
S356 C03TOC
STD# 10N12C RESULT 2.82 g/L
STD VAL 3.00 g/L %REC 94.0%

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/12/94	2315	5-17-94 RW Schroeder	

54-6800-061 (R-10-83)

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 213.-5626	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	uG C/ML	N4C3B	1

Sample Size	Customer ID
.200 ML	BLANK

Remarks, Calculations, Results
REAGENT BLANK

OUT FOR RERUN
< 5.00 ug C/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-12-94	2315	5-17-94 RW Schroeder	

54-6800-061 (R-10-83)

TOTAL ORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5726	C-111	4-27-94	10:23	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	uG C/ML	N4C3B	1

Sample Size	Customer ID
? .200 mL - 2 mL - .200 mL	C56FB

Remarks Calculations Results

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-12-94	2315	Rakita

54-6800-061 (R-10-83)

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5826	C-111	4-27-94	10:23	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	uG C/ML	N4C3B	1

Sample Size	Customer ID
.200ML-2ML-.200ML	C56FB

Remarks Calculations Results

DUPLICATE SAMPLE

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-12-94	2315	Rakita

54-6800-061 (R-10-83)

TOTAL ORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5926	C-111	4-27-94	10:23	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	% RECOVERY	N4C3B	1

Sample Size	Customer ID
? .200mL - 2mL .5M H_2SO_4 → .400mL + .400mL SPIKE	C58FB

Remarks Calculations Results INJECT .200mL

SAMPLE SPIKED ID K214
SPIKE ID 11N12-C
SPIKE VOLUME .400mL

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-12-94	2315	

54-4600-061 (R-10-83)

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TOC-TOC REV 2.0

WHC-SD-WM-DP-079, REV. 0

Sample: STD K212 Date: 05/12/94 Time: 21:13:25

Sample Size = 200 uL
Dil Factor = 11
Blank ID # = BLK
Blank Value = .0137323 ug/minute C

Analyst : BC SEVERSON
Min Readings = 14
Max Readings = 14
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.60	0.00
2	1.01	11.20	94.64
3	1.51	32.90	65.96
4	2.01	43.80	24.89
5	2.51	48.90	10.43
6	3.00	50.90	3.93
7	3.51	51.80	1.74
8	4.01	52.60	2.08
9	4.50	53.50	1.68
10	5.00	54.30	1.92
11	5.50	54.80	0.92
12	6.00	55.40	1.08
13	6.50	56.00	1.07
14	7.00	57.00	1.8

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 145 TO 150.

BLANK VALUE = 5.7 micrograms carbon
BLANK FACTOR = 5.7 / 7.004/61 = +8.1E-01 ug/min Carbon

SAMPLE RESULTS:
(56.5 - 5.700099)(11)/(200) = +2.79E+00 g/L Carbon
(56.5 - 5.700099)(11)/(200)(12) = +2.33E-01 Molar Carbon

Sample Run By: BC SEVERSON 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>> **WHC-SD-WM-DP-079, REV. 0**

Samples: BLK Date: 05/12/94 Time: 22:06:13

Sample Size = 200 uL Analyst : BC SEVERSON
Dil Factor = 1 Min Readings = 14
Blank ID # = BLK Max Readings = 14
Blank Value = N/A % Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.00	0.00
2	1.01	0.50	100.00
3	1.51	1.20	58.33
4	2.01	2.00	40.00
5	2.51	2.60	23.08
6	3.01	2.80	7.14
7	3.51	3.30	15.15
8	4.01	4.00	17.50
9	4.51	4.40	9.09
10	5.01	4.30	2.27
11	5.51	4.80	6.25
12	6.01	5.40	11.11
13	6.50	5.40	0.00
14	7.00	5.70	5.26

BLANK VALUE = 5.7 micrograms carbon
BLANK FACTOR = 5.7 / 7.004761 = +3.1E-01 ug/min Carbon

Sample Run By: Brenda Severson
BC SEVERSON 03070

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-079, REV. 0

Sample: K213 Date: 05/12/94 Time: 22:51:41

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .8137323 ug/minute C

Analyst : BC SEVERSON
Min Readings = 14
Max Readings = 14
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.30	0.00
2	1.01	0.80	62.50
3	1.51	1.40	42.86
4	2.01	1.80	22.22
5	2.51	2.10	14.29
6	3.01	2.50	16.00
7	3.51	2.80	10.71
8	4.01	3.20	12.50
9	4.51	3.50	5.57
10	5.01	3.80	7.89
11	5.51	4.10	7.32
12	6.01	4.40	6.82
13	6.51	4.60	4.35
14	7.01	5.30	13.21

BLANK VALUE = 5.7 micrograms carbon
BLANK FACTOR = 5.7 / 7.004761 = +8.1E-01 ug/min Carbon

SAMPLE RESULTS:
(5.3 - 5.700894)(1)/(200) = < 5.00 E-3 g/L Carbon
(5.3 - 5.700894)(1)/(200)(12) = < 4.17 E-4 Molar Carbon
<<<< WARNING- PERCENT DIFFERENCE EXCEEDS 10 PERCENT >>>>

Sample Run By: Brenda Severson
BC SEVERSON 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-079, REV. 0

Sample: K214 Date: 05/12/94 Time: 22:44:10

Sample Size = 200 uL
Dil Factor = 11
Blank ID # = BLK
Blank Value = .813/323 ug/minute C

Analyst : BC SEVERSON
Min Readings = 14
Max Readings = 14
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.00	0.00
2	1.01	0.00	0.00
3	1.51	0.60	100.00
4	2.01	1.10	45.45
5	2.51	1.50	26.67
6	3.01	2.00	25.00
7	3.51	2.00	0.00
8	4.01	2.40	16.67
9	4.51	2.80	14.29
10	5.01	3.10	9.68
11	5.51	3.50	11.43
12	6.01	3.80	7.89
13	6.51	3.80	0.00
14	7.00	4.20	9.52

BLANK VALUE = 5.7 micrograms carbon
BLANK FACTOR = 5.7 / 7.004761 = +8.1E-01 ug/min Carbon

SAMPLE RESULTS:
(4.2 - 5.700099)(11)/(200) = < 5.00 E-3 g/L Carbon
(4.2 - 5.700099)(11)/(200)(12) = < 4.17 E-4 Molar Carbon

Sample Run By: BC SEVERSON

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-079, REV. 0

Sample: K214 DUP Date: 05/12/94 Time: 22:52:26

Sample Size = 200 uL
Dil Factor = 11
Blank ID # = BLK
Blank Value = .8137323 ug/minute C

Analyst : BC SEVERSON
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading =====	Analysis Time =====	Coulometer =====	% Difference ==
1	0.51	0.20	0.00
2	1.01	0.80	75.00
3	1.51	1.30	38.46
4	2.01	1.80	27.78
5	2.51	1.80	0.00
6	3.01	2.30	21.74
7	3.51	2.60	11.54
8	4.00	2.90	10.34
9	4.50	3.30	12.12
10	5.00	3.70	9.73
11	5.50	3.90	7.69
12	6.00	4.20	9.52
13	6.50	4.50	6.67
14	7.00	4.80	6.25

BLANK VALUE = 5.7 micrograms carbon
BLANK FACTOR = 5.7 / 7.004761 = +8.1E-01 ug/min Carbon

SAMPLE RESULTS:
(4.8 - 5.699404)(11)/(200) = < 5.00 E-3 g/L Carbon
(4.8 - 5.699404)(11)/(200)(12) = < 4.17 E-4 Molar Carbon

Sample Run By: BC SEVERSON 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-079, REV. 0

Sample: K214 SPIKE Date: 05/12/94 Time: 23:00:44

Sample Size = 200 uL Analyst : BC SEVERSON
Dil Factor = 22 Min Readings = 14
Blank ID # = BLK Max Readings = 14
Blank Value = .8137323 ug/minute C % Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.00	0.00
2	1.01	17.60	100.00
3	1.51	42.60	58.69
4	2.01	53.30	20.08
5	2.51	58.80	9.35
6	3.01	63.00	6.67
7	3.51	65.50	3.82
8	4.01	67.40	2.82
9	4.50	68.40	1.46
10	5.00	69.10	1.01
11	5.50	69.80	1.00
12	6.00	70.70	1.27
13	6.50	71.20	0.70
14	7.00	71.60	0.56

BLANK VALUE = 5.7 micrograms carbon
BLANK FACTOR = 5.7 / 7.004761 = +8.1E-01 ug/min Carbon

SAMPLE RESULTS:
(71.6 - 5.699305)(22)/(200) = +7.25E+00 g/L Carbon
(71.6 - 5.699305)(22)/(200)(12) = +6.04E-01 Molar Carbon

Sample Run By: BC SEVERSON 00000

Batch # 3531

QA 15

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K214	Customer ID: C58 FB C111
Analysis: TOC	Sample Prep: Direct

Instrument:	WC16130	Procedure/ Rev:	LA-344-105 /B-2
Technologist:	Rob King	Date:	5-23-94
Starting Time:	11:30	Temperature	NA
Ending Time:	5-25-94 14:30	Chemist:	R. Schroeder

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	K212-5526	11		
2	REAGENT BLANK	K213-5626	12		
3	Sample	K214-5726	13		
4	Sample Dup.	K214-5826	14		
5	Sample + spike	K214-5926	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	10n12C / .200ml			
spike	11n12-D / .400ml			
			151	

A-6000-881 (03/91)

QA

ANALYTICAL BATCH SUMMARY SHEET

METHOD: La-344-105 **ANALYTE:** TOC **ANALYSIS START DATE** 5/23/94

PREPARED BY: Rob Schroeder **SUMMARY DATE:** 5/26/94

PROJECT C-111 **UNITS:** ug C/mL **SAMPLE PREP:** Direct

SPL ID	SERIAL NO	RESULT #1	RESULT #2	RPD%	% REC	DET LIM	DIG WT
STD	K212-5526	2.85E+0			95.0		
Reag.Bl	K213-5626	<5.00E+0				5.00E+0	
C58FB	K214-5726	<5.50E+0	<5.50E+0	NA		5.50E+0	
SPIKE	K214-5926				100.3		

[X] NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

Robert W. Schroeder
5-26-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN Batch 3531

Serial No	Sample Point	Date	Time Issued	Priority
K 212.-5526	C-111	4-27-94	10: 5	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	% RECOVERY	N4C3B	2

Sample Size	Customer ID
.200ML-2ML-.200ML	STD

Remarks Calculations Results
S356 COSTOC
STD# 10n12C RESULT 2.85 g/L
STD VAL 3.0 g/L %REC 95.0

Rod King

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Leslie Dias

Date	Time Completed	Lab Unit Mgr 5-24-94	
5/23/94	11:30	Rus Schroeder	Leslie Dias

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

TOC: LA-344-105 (B-2) LIQUIDS

			STANDARD
Sample Volume in mL	(SS)		0.200
H2SO4 Volume in mL	(VR)		2.000
Volume Injected in mL	(VI)		0.200
Dilution Factor	(DF)		11 ~~1.1~~ RWS 8-18-94
Digest Dilution Factor	(DDF)		1
µg of Carbon in Sample	(C1)		55.8
µg of Carbon in Blank	(C2)		4
g of Carbon/L		= 2.85 E+0	~~2.85E-01~~ RWS 8-18-94

Type
STANDARD
Work List
3531
Test Code
Matrix
LIQUID
Sample #
K212-5526
Instrument Code
WC16130
Analyst
R.W.KING
Date
05/23/94
Time
11:30

g of Carbon/L = $\frac{(C1-C2) * DF * DDF}{VI * 1000}$

µg of Carbon/mL = g of Carbon/L * 1000000 µg/g / 1000 mL/L

Detection Level (µg/mL) = $\frac{1\ \mu g\ C * DF * DDF}{VI}$

µg Carbon/mL =	2.85E+02	DETECTION LEVEL in µg/mL
		5.50E+00

Data Entry by:	SA Olan	Date:	24-May-94
Approved by:	Rus Schroeder	Date:	5-24-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 213.-5626	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	uG C/ML	N4C3B	2

Sample Size	Customer ID
.200 ML	BLANK

Remarks Calculations Results

REAGENT BLANK

< 5.00 µg C/mL

Rob King

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 5-24-94
5/23/94	11:40	RW Schroeder

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

TOC: LA-344-105 (B-2) LIQUIDS

Type			BLANK
BLANK	Sample Volume in mL	(SS)	0.200
Work List	H2S04 Volume in mL	(VR)	0.000
3531	Volume Injected in mL	(VI)	0.200
Test Code	Dilution Factor	(DF)	1
	Digest Dilution Factor	(DDF)	1
Matrix	µg of Carbon in Sample	(C1)	5
LIQUID	µg of Carbon in Blank	(C2)	4
Sample #	g of Carbon/L	=	5.00E-03
K213-5626			
Instrument Code			
WC16130			
Analyst			
R.W.KING			
Date			
05/23/94			
Time			
11:40			

g of Carbon/L = $\frac{(C1-C2) * DF * DDF}{VI * 1000}$

µg of Carbon/mL = g of Carbon/L * 1000000 µg/g / 1000 mL/L

Detection Level (µg/mL) = $\frac{1\ \mu g\ C * DF * DDF}{VI}$

µg Carbon/mL =	5.00E+00	DETECTION LEVEL in µg/mL
		5.00E+00

Data Entry by:	SA Olan	Date:	24-May-94
Approved by:	RW Schroeder	Date:	5-24-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5726	C-111	4-27-94	10:23	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	uG C/ML	N4C3B	2

Sample Size	Customer ID
? 2 ml - .2 ml acid - .200 inject	C58FB

Remarks Calculations Results

< 5.50 ug C/mL

Not King

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 5-24-94
5/23/94	11:50	RW Schroeder Leslie Dan

54-6800-061 (R/10-83)

WHC-SD-WM-DP-079, REV. 0

TOC: LA-344-105 (B-2) LIQUIDS

			SAMPLE
Sample Volume in mL	(SS)		2.000
H2S04 Volume in mL	(VR)		0.200
Volume Injected in mL	(VI)		0.200
Dilution Factor	(DF)		1.1
Digest Dilution Factor	(DDF)		1
µg of Carbon in Sample	(C1)		4.9
µg of Carbon in Blank	(C2)		4
g of Carbon/L		= <	5.50E-03

Type
SAMPLE
Work List
3531
Test Code
Matrix
LIQUID
Sample #
K214-5726
Instrument Code
WC16130
Analyst
R.W.KING
Date
05/23/94
Time
11:50

$$\text{g of Carbon/L} = \frac{(C1-C2) * DF * DDF}{VI * 1000}$$

$$\text{µg of Carbon/mL} = \text{g of Carbon/L} * 1000000\ \text{µg/g} / 1000\ \text{mL/L}$$

$$\text{Detection Level (µg/mL)} = \frac{1\ \text{µg C} * DF * DDF}{VI}$$

NOTE: Reported Result is Below Detection Level.

µg Carbon/mL =	< 5.50E+00	DETECTION LEVEL in µg/mL
		5.50E+00

Data Entry by:	SH Olsen	Date:	24-May-94
Approved by:	RW Schroeder	Date:	5-24-94

Form 1 Rev. 1.0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5826	C-111	4-27-94	10:23	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	uG C/ML	N4C3B	2

Sample Size, 4ml 2ml - .2ml acid - .2ml inject
? ~~2ml - .2ml acid - .2 ml inject~~ RRK 5-24-94

Customer ID: C58FB

Remarks: Duplicate Results
DUPLICATE SAMPLE

<5.50 µg C/mL

Rob King

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 5-24-94
5/23/94	12:10	RW Schroeder Leslie Dry

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

TOC: LA-344-105 (B-2) LIQUIDS

Type			SAMPLE
SAMPLE	Sample Volume in mL	(SS)	2.000
	H2S04 Volume in mL	(VR)	0.200
Work List	Volume Injected in mL	(VI)	0.200
3531	Dilution Factor	(DF)	1.1
Test Code	Digest Dilution Factor	(DDF)	1
	µg of Carbon in Sample	(C1)	4.4
Matrix	µg of Carbon in Blank	(C2)	4
LIQUID	g of Carbon/L	= <	5.50E-03

Sample #
K214-5826
Instrument Code
WC16130
Analyst
R.W.KING
Date
05/23/94
Time
12:10

g of Carbon/L = $\frac{(C1-C2) * DF * DDF}{VI * 1000}$

µg of Carbon/mL = g of Carbon/L * 1000000 µg/g / 1000 mL/L

Detection Level (µg/mL) = $\frac{1\ \mu g\ C * DF * DDF}{VI}$

NOTE: Reported Result is Below Detection Level.

µg Carbon/mL =	< 5.50E+00	DETECTION LEVEL in µg/mL
		5.50E+00

Data Entry by:	SA Olan	Date:	24-May-94
Approved by:	RW Schroeder	Date:	5-24-94

Form 1 Rev. 1.0

156

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5926	C-111	4-27-94	10:23	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	% RECOVERY	N4C3B	2

Sample Size	Customer ID
~~2ml~~ .9ml + .4ml spike = .2ml acid - .2ml inject	C58FB

Results
5-25-94 EMJ
SAMPLE SPIKED ID
SPIKE ID 1IND-D
SPIKE VOLUME .400ml

100.3% recovery

Rob King

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/23/94	13:00	RW Schroeder 5-24-94	Leslie Day

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

TOC: LA-344-105 SPIKED SAMPLE

SPIKE

Type	>>>>>> Sample Vial Data <<<<<<		>>>>> Spiked Vial Data <<<<<	
SPIKE	Sample Volume in mL	2.000	Sample Size in mL (SS)	0.400
Work List: 3531	H2SO4 Volume in mL	0.200	Spike Volume in mL	0.400
Test Code:	Volume Injected in mL	0.200	H2SO4 Volume in mL	0.200
	µg of Carbon in Sample	4.9	Volume Injected in mL	0.200
Matrix: LIQUID	µg of Carbon in Blank	4	Sample Dilution Factor (DF) **	2.5
Sample #: K214-5926			Spike Value (µg/ml)	750
Instrument Code: WC16130			µg C in Sample + Spike	64.2
Analyst: R.W.KING			µg C in Blank	4
Date: 05/23/94				
Time: 13:00				

** NOTE: Sample Dilution Factor does not include amount sample is diluted in Spiked Vial.

$$\text{PERCENT SPIKE RECOVERY} = \frac{\text{µg Carbon Recovered from Spike} * 100}{\text{µg Carbon in Spike}}$$

WHERE : µg Carbon Recovered from Spike =
[(µgC in sample + spike − µgC in blank) * (Spike Correction Factor)]
− [(µgC sample − µgC blank) * (Sample Correction Factor) * (Sample Size Correction Factor)]

$$\text{Spike Correction Factor} = \frac{\text{Total volume in spiked sample vial (mL)}}{\text{Volume injected (mL)}}$$

$$\text{Sample Correction Factor} = \frac{\text{Total volume in sample vial (mL)}}{\text{Volume injected (mL)}}$$

$$\text{Sample Size Correction Factor} = \frac{\text{Sample size in (mL) in spiked vial}}{\text{Sample size (mL) in sample * Spiked Vial DF}}$$

Percent Spike Recovery = 100.3%

Data Entry by:	SA Day	Date:	24-May-94
Approved by:	RW Schroeder	Date:	5-25-94

Form 2 Rev. 1.0

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: K212-S326 Date: 05/23/94 Time: 11:38:5

Sample Size = 200 ul
Dil Factor = 11
Blank ID # = BL1
Blank value = .5/11148 ug/minute c

Analyst : RW KING
Min Readings = 10
Max Readings = 14
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.10	0.00
2	1.01	23.10	99.57
3	1.51	42.60	45.77
4	2.01	48.90	12.88
5	2.51	51.20	4.49
6	3.01	52.40	2.29
7	3.51	53.00	1.13
8	4.01	53.50	0.93
9	4.50	54.00	0.93
10	5.00	54.40	0.74
11	5.50	54.70	0.55
12	6.00	55.10	0.73
13	6.50	55.40	0.54
14	7.00	55.60	0.72

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 158 TO 163 .

BLANK VALUE = 4 micrograms carbon
BLANK FACTOR = 4 / 7.003845 = 45.7E-01 ug/min Carbon

SAMPLE RESULTS:
(55.8 - 4.000557)(11)/(.200) = 12.85E+00 g/L Carbon
(55.8 - 4.000557)(11)/(200)(12) = 42.57E-01 Molar Carbon

Sample Run By: RW KING 07648

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>> **WHC-SD-WM-DP-079, REV. 0**

Sampler BLK Date: 05/23/91 Time: 11:30:01

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = N/A

Analyst : RW LINS
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	===== Analysis Time	===== Counter	===== % Difference ==
1	0.51	0.20	0.00
2	1.01	0.70	71.43
3	1.51	1.00	30.00
4	2.01	1.30	23.08
5	2.51	1.60	18.75
6	3.01	2.00	20.00
7	3.51	2.10	4.76
8	4.01	2.50	16.00
9	4.50	2.70	7.41
10	5.00	3.00	10.00
11	5.50	3.20	6.25
12	6.00	3.60	11.11
13	6.50	3.80	5.26
14	7.00	4.00	5.00

BLANK VALUE = 4 micrograms carbon
BLANK FACTOR = 4 / 7.000547 = 45.7E-01 (grams carbon)

Sample Run By: Rob King
RW KING 05-23-91

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-079, REV. 0

Sample: E213-3626 Date: 05/23/94 Time: 11:47:48

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .5/11148 ug/minute C

Analyst = RW KING
Min Readings = 14
Max Readings = 14
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.40	0.00
2	1.01	1.10	63.64
3	1.51	1.40	21.43
4	2.01	1.80	22.22
5	2.51	2.20	18.18
6	3.01	2.50	12.00
7	3.51	2.90	13.79
8	4.00	3.30	12.12
9	4.50	3.70	10.81
10	5.00	3.70	0.00
11	5.51	4.20	11.90
12	6.01	4.50	6.67
13	6.51	4.70	4.26
14	7.00	5.00	6.00

BLANK VALUE = 4 micrograms carbon
BLANK FACTOR = 4 / 7.003345 = 5.7E-01 ug/min Carbon

SAMPLE RESULTS:
(5 - 4.000593)(1)/(200) = ~~5.00~~ E-2 g/L Carbon
(5 - 4.000593)(1)/(200)(12) = 4.17 E-4 Molar Carbon

< 5.00 RWS

Sample Run By: Rob King
RW KING 33645

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-079, REV. 0

Samples K214-572A Date: 05/23/94 Time: 11:57:29

Sample Size = 200 uL
Dil Factor = 1.1
Blank ID = ECK
Blank Value = .5711148 ug/minute C

Analyst : RW KING
Min Readings = 14
Max Readings = 14
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.20	0.00
2	1.01	0.90	77.78
3	1.51	1.40	35.71
4	2.01	1.70	17.65
5	2.51	2.00	15.00
6	3.01	2.40	16.67
7	3.51	2.70	11.11
8	4.01	3.00	10.00
9	4.51	3.30	9.09
10	5.01	3.60	8.33
11	5.51	4.00	10.00
12	6.01	4.30	6.98
13	6.51	4.60	[illegible]
14	7.00	4.90	6.12

BLANK VALUE = 4 micrograms carbon
BLANK FACTOR = 4 / 7.033845 = +0.7E-01 ug/min Carbon

SAMPLE RESULTS:
(4.5 - 4.000563)(1.1)/(200) = < 5.50 E-3 g/L Carbon
(4.9 - 4.000563)(1.1)/(200)(12) = < 4.17 E-4 Polar Carbon

<5.50 RWS 5-24-94

Sample Run By: Rob King
RW KING 8:54A

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TIC/TOC REV 2.0

WHC-SD-WM-DP-079, REV. 0

Sample: K214-5326 Date: 05/23/94 Time: 12:06:50

Sample Size = 200 uL
Dil Factor = 1.1
Blank ID # = BLK
Blank Value = .5711148 ug/minute C

Analyst : RW KING
Min Readings = 14
Max Readings = 14
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.10	0.00
2	1.01	0.70	85.71
3	1.51	1.20	41.67
4	2.01	1.40	14.29
5	2.51	1.60	12.50
6	3.01	2.00	20.00
7	3.51	2.30	13.04
8	4.01	2.60	11.54
9	4.51	3.00	13.33
10	5.01	3.30	9.09
11	5.51	3.50	5.71
12	6.01	3.90	10.26
13	6.51	4.10	4.88
14	7.00	4.40	6.82

BLANK VALUE = 4 micrograms carbon
BLANK FACTOR = 4 / 7.003645 = +5.7E-01 ug/min Carbon

SAMPLE RESULTS:
(4.4 - 4.000557)(1.1)/(200) = ~~4.00~~ <5.50 RWS 5-24-94 E-3 g/L Carbon
(4.4 - 4.000557)(1.1)/(200)(12) = < 4.17 E-4 Molar Carbon

Sample Run By: RW KING 83645

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: KZ14-5926 Date: 05/23/94 Time: 12:50:41

Sample Size = 200 uL
Dil Factor = 2.5
Blank ID # = BLK
Blank Value = .5711148 ug/minute C

Analyst : RW KING
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	===== Analysis Time	===== Coulometer	===== % Difference ==
1	0.51	0.30	0.00
2	1.01	25.50	98.82
3	1.50	49.60	48.59
4	2.00	56.20	11.74
5	2.50	59.00	4.75
6	3.00	60.20	1.99
7	3.50	61.30	1.79
8	4.00	61.90	0.97
9	4.50	62.30	0.64
10	5.00	62.60	0.80
11	5.50	63.10	0.48
12	6.00	63.50	0.63
13	6.50	63.80	0.47
14	7.00	64.20	0.62

BLANK VALUE = 4 micrograms carbon
BLANK FACTOR = 4 / 7.003845 = +5.7E-01 ug/min Carbon

SAMPLE RESULTS:
(64.2 - 3.999512)(2.5)/(200) = +7.53E-01 g/L Carbon
(64.2 - 3.999512)(2.5)/(200)(12) = +6.27E-02 Molar Carbon

Sample Run By: _____
RW KING 035643

QA 3

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K215, K216	Customer ID: C58HCB C111
Analysis: TOC	Sample Prep: Direct

Instrument: WC16130	Procedure/ Rev: LA 344-105 / B2
Technologist: D B Griffin	Date: 5-1-94
Starting Time: 1630	Temperature 69.4°F
Ending Time: 1748	Chemist: R. Schroeder

Comments: Batch # 3346

	Description	Lab ID		Description	Lab ID
1	LMCS STD	K215-5526	11		
2	Sample	K216-5726	12		
3			13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	10N12-C .200/2ml	/.200ml		

164

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA 344-105 ANALYTE: TOC ANALYSIS START DATE: 5-1-94

PREPARED BY: Rob Schroeder SUMMARY DATE: 5-12-94

PROJECT: C-111 UNITS: mg/mL SAMPLE PREP: (Direct) / Digest

SPL ID.	SERIAL No.	RESULT #1	RESULT #2	DIFF.	AVERAGE	RPD%	%REC	DET LIM
STD	K215	301 g/L					100.3	
C58HCB	K216	<5.50 E+0						5.50

[X] NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE-LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH:

Robert W. Schroeder
5-12-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3346

Serial No	Sample Point	Date	Time Issued	Priority
K 215.-5526	C-111	4-28-94	11:14	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	% RECOVERY	N4C3B	0

Sample Size	Customer ID
.200 ml + 2 ml acid - .200 inject	STD

Remarks, Calculations, Results

S356 CO3TOC

STD# 10N12-C RESULT 3.01 g/L

STD VAL 3.00 g/L %REC 100.3

Donald B Griffin

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 5-3-94	
5-1-94	1748	RW Schroeder	Gary Hammond

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

TOC: LA-344-105 (B-2) **LIQUIDS**

			STANDARD
Sample Volume in mL	(SS)		0.200
H2S04 Volume in mL	(VR)		2.000
Volume Injected in mL	(VI)		0.200
Dilution Factor	(DF)		11
Digest Dilution Factor	(DDF)		1
µg of Carbon in Sample	(C1)		58.2
µg of Carbon in Blank	(C2)		3.5
g of Carbon/L		=	3.01E+00

Type
STANDARD
Work List
3346
Test Code
TOC
Matrix
LIQUID
Sample #
K215-5526
Instrument Code
WC16130
Analyst
D GRIFFIN
Date
05/01/94
Time
17:48

$$\text{g of Carbon/L} = \frac{(C1-C2) * DF * DDF}{VI * 1000}$$

$$\text{µg of Carbon/mL} = \text{g of Carbon/L} * 1000000\ \text{µg/g} / 1000\ \text{mL/L}$$

$$\text{Detection Level (µg/mL)} = \frac{1\ \text{µg C} * DF * DDF}{VI}$$

µg Carbon/mL =	3.01E+03	DETECTION LEVEL in µg/mL
		5.50E+01

Data Entry by:	Gary Hammond	Date:	07-May-94
Approved by:	RW Schroeder	Date:	5-12-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 216.-5726	C-111	4-28-94	11:23	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	uG C/ML	N4C3B	0

Sample Size	Customer ID
2 - .200 - .200	C58HCB

Remarks Calculations Results

< 5.50 E+0 µg/mL

Donald B Griffin

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 5-3-94
5-1-94	1748	RW Schroeder

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV 0

TOC: LA-344-105 (B-2) LIQUIDS

Type	Work List	Test Code	Matrix	Sample #	Instrument Code	Analyst	Date	Time
SAMPLE	3346	TOC	LIQUID	K216-5726	WC16130	D GRIFFIN	05/01/94	17:48

			SAMPLE
Sample Volume in mL	(SS)		2.000
H2S04 Volume in mL	(VR)		0.200
Volume Injected in mL	(VI)		0.200
Dilution Factor	(DF)		1.1
Digest Dilution Factor	(DDF)		1
µg of Carbon in Sample	(C1)		4.4
µg of Carbon in Blank	(C2)		3.5
g of Carbon/L	=	<	5.50E-03

$$\text{g of Carbon/L} = \frac{(C1-C2) * DF * DDF}{VI * 1000}$$

$$\mu\text{g of Carbon/mL} = \text{g of Carbon/L} * 1000000\ \mu g/g\ /\ 1000\ mL/L$$

$$\text{Detection Level } (\mu g/mL) = \frac{1\ \mu g\ C * DF * DDF}{VI}$$

NOTE: Reported Result is Below Detection Level.

µg Carbon/mL =	< 5.50E+00	DETECTION LEVEL in µg/mL
		5.50E+00

Data Entry by:	Gary Hammett	Date:	07-May-94
Approved by:	RW Schroeder	Date:	5-12-94

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-079, REV. 0

Sample: K215 Std Date: 05/01/94 Time: 17:31:59

Sample Size = 200 uL
Dil Factor = 11
Blank ID # = BLK
Blank Value = .4997298 ug/minute C

Analyst : DG GRIFFIN
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading =====	Analysis Time =====	Coulometer =====	% Difference ==
1	0.51	0.70	0.00
2	1.01	19.30	96.37
3	1.51	38.80	50.26
4	2.01	47.20	17.80
5	2.51	50.90	7.27
6	3.01	53.50	4.86
7	3.51	55.30	3.25
8	4.01	55.80	0.90
9	4.51	56.20	0.71
10	5.01	56.70	0.88
11	5.51	57.10	0.70
12	6.01	57.50	0.70
13	6.51	57.90	0.69
14	7.01	58.20	0.52

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 168 TO 170 .

BLANK VALUE = 3.5 micrograms carbon
BLANK FACTOR = 3.5 / 7.003784 = +5.0E-01 ug/min Carbon

SAMPLE RESULTS:
(58.2 - 3.500915)(11)/(200) = +3.01E+00 g/L Carbon
(58.2 - 3.500915)(11)/(200)(12) = +2.51E-01 Molar Carbon

Sample Run By: DG Griffin
DG GRIFFIN

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>> WHC-SD-WM-DP-079, REV. 0

Sample: BLK Date: 05/01/94 Time: 17:18:33

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = N/A

Analyst : DG GRIFFIN
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading ====	Analysis Time ====	Coulometer ====	% Difference ==
1	0.51	0.20	0.00
2	1.01	0.20	0.00
3	1.50	0.40	50.00
4	2.00	0.80	50.00
5	2.50	1.00	20.00
6	3.00	1.20	16.67
7	3.50	1.50	20.00
8	4.00	1.80	16.67
9	4.50	2.50	28.00
10	5.00	2.60	3.85
11	5.50	3.10	16.13
12	6.00	3.10	0.00
13	6.50	3.50	11.43
14	7.00	3.50	0.00

BLANK VALUE = 3.5 micrograms carbon
BLANK FACTOR = 3.5 / 7.003784 = +5.0E-01 ug/min Carbon

Sample Run By: D B Griffin
DG GRIFFIN

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-079, REV. 0

Sample: K216 Date: 05/01/94 Time: 17:48:45

Sample Size = 200 uL
Dil Factor = 1.1
Blank ID # = BLK
Blank Value = .4997298 ug/minute C

Analyst : DG GRIFFIN
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading ====	Analysis Time ====	Coulometer ====	% Difference ==
1	0.51	0.20	0.00
2	1.01	0.80	75.00
3	1.51	1.50	46.67
4	2.01	1.70	11.76
5	2.51	2.00	15.00
6	3.01	2.40	16.67
7	3.51	2.80	14.29
8	4.01	2.80	0.00
9	4.51	3.10	9.68
10	5.01	3.40	8.82
11	5.51	3.60	5.56
12	6.01	3.90	7.69
13	6.50	4.10	4.88
14	7.00	4.40	6.82

BLANK VALUE = 3.5 micrograms carbon
BLANK FACTOR = 3.5 / 7.003784 = +5.0E-01 ug/min Carbon

SAMPLE RESULTS:
(4.4 - 3.500488)(1.1)/(200) = ~~< 5.60~~ < 5.50 RWS 5-3-94 E-3 g/L Carbon
(4.4 - 3.500488)(1.1)/(200)(12) = < 4.17 E-4 Molar Carbon

Sample Run By: DG Griffin
DG GRIFFIN

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-079, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. K209-211	Customer ID: CS851
Analysis: ICP	Sample Prep: FUS

Instrument: WB 39939	Procedure/ Rev: LA-505-151 /D-1
Technologist: B. GOECKE	Date: 6-28-94
Starting Time: 12:00	Temperature NA
Ending Time: 15:00	Chemist: B. WELS

Comments:

	Description	Lab ID		Description	Lab ID
1	SST4 (ICV) STD	K209-5530	11		
2	C-111, DIG. BLK CS851	K210-6650	12		
3	C-111, STD., ~~CS851~~ LAD 12-1-94	K211-6755	13		
4	C-111, DUP, CS851	K211-6855	14		
5	C-111, POST SPIKE, CS851	K211-6950	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
SST4 ICP STD	32648 DIRECT			DIRECT
SST4 POST SPIKE	32648 2mL			10 mL

171

A-6000-881 (03/92)

Batch 3817

Serial No	Sample Point	Date	Time Issued	Priority
K 210.-6650	C-111	4-23-94	14:54	23

Determination	Method Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	% RECOVERY	N408B	0

Sample Size	Customer ID
? SST4 326448 DIRECT (I.V)	STD

Remarks Calculations Results

LMSS CHECK SAMPLE

Ni 5.075 /5 (100) = 101.50% ✓

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
6-29-94	14:20	07/06/94 S. Pang	6-29-94

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 210.-6650	C-111	4-23-94	14:55	23

Determination	Method Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	mg/ML	N408B	0

Sample Size	Customer ID
? DIRECT, DIGESTED BLANK	BLANK

Remarks Calculations Results

REAGENT BLANK

Ni only

Ni .061 ✓

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
6-29-94	14:20	07/06/94 S. Pang	6-29-94

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-6786	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Returns
ICP-SOL	LA-505-151	uG/G Rec	N4C3B	0

Sample Size	Customer ID
? .7259 g in 250mL - 1mL - 9mL - 1mL - 4mL	C58S1

Remarks Calculations Results

Ni 5.867 (250)(10)/.7259 = 2.02E4 ✓

REQUESTED 10X sample Dil.

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 07/06/94	
6-28-94	14:20	S Pairing	6-29-94

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-6785	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Returns
ICP-SOL	LA-505-151	uG/G Rec	N4C3B	0

Sample Size	Customer ID
? .7315 g in 250mL - 1mL - 9mL - 1mL - 4mL	C58S1

Remarks Calculations Results

DUPLICATE SAMPLE

Ni 5.814 (250)(10)/.7315 = 1.99E4 ✓

REQUESTED 10X sup. Dil.

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 07/06/94	
6-28-94	14:20	S Pairing	6-28-94

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-6850	C-111	4-28-94	14:07	23

Determination	Method Standard	Result Units	Charge Code	Returns
ICP	LA-505-151	% RECOVERY	N4C3B	0

Sample Size	Customer ID
2 / ml sample - 9 ml	C5851

Remarks, Calculations, Results

SAMPLE SPIKED ID
SPIKE ID 228416
SPIKE VOLUME 2ml

Ni 6.907 - 5.867 = 1.04 / 1 (100) = 104.00% ✓

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[signature]				
Hrs	Hrs	Hrs	Hrs	Hrs
		[signature]		[signature]

Date	Time Completed	Lab Unit Mgr	
6-29-94	14:20	7/06/94 S. Pang	6-29-94

54-6850-001 (R-10-83)

Identity 1: wp-284 Identity 2: wp-284 12:40 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.001	0.001	0.007	0.344	0.152	0.044	0.010	0.001
S.D.	0.000	0.000	0.006	0.002	0.010	0.001	0.001	0.001
% R.S.D.	23.669	23.106	84.723	0.605	6.328	3.338	8.510	104.088

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.014	0.018	-0.001	0.030	0.025	0.006	-0.008	0.070
S.D.	0.000	0.003	0.000	0.003	0.000	0.001	0.025	0.063
% R.S.D.	1.984	16.128	2.654	11.141	1.063	14.957	317.249	90.085

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.030	-0.008	0.029	-0.002	0.100	0.001	0.026	0.116
S.D.	0.010	0.011	0.000	0.001	0.003	0.000	0.005	0.003
% R.S.D.	33.367	135.278	0.504	58.107	3.356	10.574	19.234	2.655

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.001	0.008	-0.001	0.042	-0.000	0.009	0.040	-0.001
S.D.	0.000	0.013	0.000	0.011	0.001	0.001	0.001	0.009
% R.S.D.	9.677	162.579	34.798	25.518	1176.762	7.080	2.129	844.205

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.014	0.045	0.132	0.030	0.010
S.D.	0.000	0.028	0.000	0.000	0.024
% R.S.D.	1.474	61.989	0.338	0.567	244.261

K 208-211
C-111 FUS
Ni ONLY
[illegible] 6-29-94

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 175 TO 192 .

Identity 1: icv Identity 2: 32b48b 12:45 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	5.014	5.017	5.002	4.257	4.951	5.028	5.117	5.035
S.D.	0.008	0.011	0.027	0.008	0.006	0.016	0.010	0.015
% R.S.D.	0.168	0.218	0.543	0.195	0.127	0.316	0.204	0.307

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	5.043	5.075	5.110	5.099	4.770	5.079	5.285	9.654
S.D.	0.010	0.004	0.004	0.012	0.010	0.004	0.019	0.052
% R.S.D.	0.199	0.074	0.087	0.228	0.208	0.072	0.356	0.536

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	4.994	4.973	5.053	4.192	4.663	5.044	5.016	5.017
S.D.	0.019	0.008	0.009	0.118	0.077	0.011	0.001	0.021
% R.S.D.	0.380	0.154	0.181	2.815	1.657	0.223	0.021	0.417

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	5.056	5.504	5.327	5.044	4.930	5.120	4.996	5.154
S.D.	0.022	0.030	0.004	0.014	0.010	0.008	0.013	0.036
% R.S.D.	0.435	0.547	0.067	0.273	0.207	0.158	0.253	0.698

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	5.084	4.901	5.091	5.187	5.026
S.D.	0.006	0.054	0.003	0.013	0.024
% R.S.D.	0.112	1.110	0.067	0.251	0.471

Identity 1: icb Identity 2: icb 12:48 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.001	0.001	-0.007	-0.005	0.004	-0.002	0.003	0.002
S.D.	0.001	0.000	0.007	0.001	0.008	0.000	0.001	0.001
% R.S.D.	92.781	5.793	93.559	19.653	176.751	23.589	24.290	34.084

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.001	0.001	-0.008	-0.003	0.001	0.001	0.007	-0.136
S.D.	0.000	0.001	0.002	0.001	0.000	0.001	0.016	0.064
% R.S.D.	44.034	119.799	24.545	25.745	24.358	207.289	237.018	46.990

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.004	-0.047	0.000	-0.009	-0.004	0.001	-0.005	0.032
S.D.	0.009	0.016	0.000	0.007	0.001	0.000	0.001	0.007
% R.S.D.	195.794	33.460	234.767	75.729	24.388	25.954	10.386	22.348

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.002	0.024	-0.001	0.000	0.000	0.002	0.007	-0.067
S.D.	0.000	0.013	0.000	0.008	0.000	0.001	0.001	0.013
% R.S.D.	21.473	52.485	27.042	21660.219	894.765	24.588	12.522	19.340

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.000	0.021	-0.002	0.001	-0.043
S.D.	0.000	0.015	0.001	0.000	0.029
% R.S.D.	82.280	71.613	37.273	8.983	67.425

Identity 1: icsa_i Identity 2: icsa 12:51 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.001	0.007	-0.007	0.253	193.742	0.003	-0.007	0.002
S.D.	0.000	0.000	0.004	0.005	171.470	0.000	0.000	0.000
% R.S.D.	56.518	0.356	55.096	1.936	88.504	4.149	6.223	14.546

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.017	-0.031	0.029	137.206	-1.049	0.002	1.141	0.050
S.D.	0.000	0.001	0.003	0.593	0.000	0.001	0.015	0.026
% R.S.D.	0.617	3.744	10.117	0.432	0.000	68.413	1.349	51.578

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.001	0.393	0.002	0.070	2.657	154.734	0.048	0.216
S.D.	0.004	0.009	0.000	0.001	0.018	0.080	0.003	0.002
% R.S.D.	374.992	2.232	2.066	0.944	0.673	0.051	5.635	0.821

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.003	0.030	-0.004	-0.102	0.000	-0.003	-0.012	-0.018
S.D.	0.000	0.015	0.000	0.091	0.000	0.000	0.001	0.016
% R.S.D.	12.613	49.201	6.110	89.781	75.018	14.433	11.103	86.571

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.101	0.015	-0.001	0.003	-0.046
S.D.	0.000	0.016	0.000	0.000	0.006
% R.S.D.	0.284	103.657	23.312	4.651	12.410

Identity 1: xxx Identity 2: rinse 12:58 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.002	0.000	-0.027	-0.002	0.027	-0.001	0.002	0.002
S.D.	0.000	0.000	0.018	0.003	0.003	0.001	0.000	0.000
% R.S.D.	21.070	7.206	68.580	174.069	11.246	62.291	28.804	6.184

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	-0.000	0.002	-0.003	0.006	0.030	0.001	-0.025	0.137
S.D.	0.000	0.001	0.003	0.001	0.001	0.002	0.013	0.027
% R.S.D.	388.529	53.031	134.436	18.068	4.742	323.060	50.635	19.584

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.003	0.015	0.000	-0.007	-0.001	0.013	0.005	0.006
S.D.	0.004	0.004	0.000	0.011	0.003	0.000	0.001	0.013
% R.S.D.	131.581	24.346	36.548	166.357	230.144	3.264	16.686	208.182

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.002	-0.022	0.000	-0.001	0.001	-0.000	0.001	-0.055
S.D.	0.001	0.005	0.000	0.009	0.000	0.000	0.001	0.017
% R.S.D.	26.643	20.846	443.563	1252.985	24.414	389.898	173.389	31.132

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.000	-0.011	-0.001	0.001	0.012
S.D.	0.000	0.017	0.001	0.000	0.007
% R.S.D.	343.993	158.187	50.174	35.796	61.646

Identity 1: K210 dig blk Identity 2: direct 1:02 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	4.054	0.003	0.002	0.193	0.080	-0.002	0.005	0.000
S.D.	0.032	0.000	0.010	0.006	0.022	0.002	0.002	0.002
% R.S.D.	0.791	15.350	573.516	2.961	27.262	82.787	44.866	468.623

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.010	0.061	-0.000	0.098	0.148	0.005	-0.042	1.035
S.D.	0.001	0.001	0.002	0.004	0.001	0.001	0.031	0.179
% R.S.D.	5.549	2.258	882.683	4.044	0.958	18.874	72.562	17.326

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.024	-0.014	0.020	0.003	0.021	0.034	-0.001	3.809
S.D.	0.038	0.059	0.001	0.009	0.009	0.002	0.003	0.044
% R.S.D.	159.320	419.464	4.025	270.445	44.433	6.634	334.369	1.144

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.008	-0.013	0.005	-0.003	0.004	0.000	0.001	-113.663
S.D.	0.001	0.012	0.003	0.008	0.001	0.001	0.002	0.000
% R.S.D.	13.912	91.530	60.253	242.999	25.559	252.083	207.778	0.000

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.001	0.000	0.038	0.001	-0.006
S.D.	0.000	0.021	0.002	0.000	0.042
% R.S.D.	16.521	13412.745	5.138	22.336	756.922

Identity 1: K211 .7259gin250ml Identity 2: 1ml-9ml-1ml-4ml 1:08 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.096	0.009	0.098	0.517	8.946	-0.001	0.009	0.002
S.D.	0.000	0.000	0.003	0.002	0.019	0.001	0.000	0.000
% R.S.D.	0.503	1.108	3.205	0.338	0.216	112.984	0.866	21.499

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.048	1.257	0.023	3.379	0.477	0.009	0.028	0.220
S.D.	0.000	0.008	0.002	0.013	0.001	0.002	0.011	0.070
% R.S.D.	0.330	0.640	6.640	0.395	0.293	21.427	38.703	31.799

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.038	-0.021	0.003	0.098	0.067	0.031	0.002	2.414
S.D.	0.012	0.017	0.000	0.007	0.004	0.001	0.003	0.003
% R.S.D.	30.257	83.346	7.637	7.625	6.366	2.240	139.228	0.127

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.001	0.027	0.002	0.363	0.013	0.001	-0.001	258.508
S.D.	0.001	0.015	0.001	0.007	0.001	0.000	0.001	0.545
% R.S.D.	57.824	54.530	28.751	2.055	3.896	22.366	188.019	0.211

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.011	0.016	-0.000	0.001	-0.017
S.D.	0.000	0.023	0.000	0.000	0.018
% R.S.D.	1.999	141.784	115.576	23.791	101.575

Identity 1: K211 .7315gin250ml Identity 2: 1ml-9ml-1ml-4ml 1:11 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.034	0.009	0.093	0.583	7.702	0.003	0.005	0.001
S.D.	0.001	0.000	0.006	0.002	0.023	0.000	0.000	0.001
% R.S.D.	3.052	1.463	6.674	0.407	0.299	2.999	8.725	55.852

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.011	1.202	0.026	3.414	0.533	0.005	0.031	0.444
S.D.	0.000	0.006	0.002	0.005	0.001	0.001	0.016	0.063
% R.S.D.	1.586	0.466	6.776	0.148	0.272	13.956	52.459	14.092

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.052	0.035	0.004	0.167	0.061	0.030	0.003	2.451
S.D.	0.017	0.019	0.000	0.017	0.002	0.000	0.004	0.003
% R.S.D.	33.593	52.708	7.072	10.010	4.049	0.600	156.462	0.125

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.001	0.011	0.004	0.341	0.017	0.000	-0.002	229.205
S.D.	0.001	0.010	0.000	0.005	0.000	0.000	0.001	0.576
% R.S.D.	192.143	95.505	9.888	1.341	2.311	91.049	33.273	0.251

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.011	0.048	0.000	0.000	0.061
S.D.	0.000	0.007	0.000	0.000	0.015
% R.S.D.	1.545	14.736	93.081	36.027	24.335

Identity 1: K211 sam dil Identity 2: .7259gin250ml-1-9 1:17 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.453	0.040	0.466	2.552	42.096	0.001	0.021	0.002
S.D.	0.002	0.000	0.013	0.017	0.310	0.002	0.000	0.000
% R.S.D.	0.479	0.485	2.739	0.652	0.737	238.019	0.669	20.654

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.037	5.867	0.127	15.837	2.150	0.033	0.180	1.548
S.D.	0.001	0.027	0.004	0.058	0.008	0.000	0.010	0.011
% R.S.D.	1.741	0.452	3.158	0.363	0.368	1.162	5.323	0.703

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.170	0.067	0.017	0.733	0.269	0.119	-0.001	10.997
S.D.	0.007	0.006	0.000	0.012	0.001	0.001	0.003	0.052
% R.S.D.	4.347	9.201	1.021	1.637	0.280	0.564	363.336	0.476

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.003	0.029	0.008	1.694	0.066	0.001	-0.000	1182.971
S.D.	0.001	0.006	0.000	0.008	0.001	0.000	0.001	2.533
% R.S.D.	35.304	20.274	5.629	0.498	0.959	9.098	985.687	0.214

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.049	0.006	0.008	0.001	0.007
S.D.	0.001	0.010	0.001	0.000	0.010
% R.S.D.	1.132	179.346	10.871	16.684	147.882

Identity 1: K211 dup dil Identity 2: .7315gin250ml-1-9 1:20 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.148	0.042	0.494	2.877	37.756	0.003	0.022	0.003
S.D.	0.001	0.000	0.011	0.002	0.033	0.001	0.001	0.001
% R.S.D.	0.848	0.077	2.229	0.086	0.088	31.749	3.142	29.393

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.051	5.814	0.125	16.582	2.530	0.034	0.176	1.357
S.D.	0.000	0.007	0.003	0.029	0.006	0.000	0.007	0.070
% R.S.D.	0.267	0.118	2.106	0.176	0.219	1.289	4.048	5.193

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.166	-0.016	0.016	1.008	0.301	0.134	0.002	11.924
S.D.	0.013	0.022	0.000	0.006	0.003	0.000	0.000	0.011
% R.S.D.	7.622	138.029	2.414	0.574	1.050	0.159	15.273	0.090

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.000	0.005	0.002	1.750	0.079	0.011	0.001	1073.485
S.D.	0.000	0.008	0.001	0.005	0.000	0.015	0.001	3.228
% R.S.D.	67.604	164.655	42.268	0.280	0.577	134.551	152.849	0.301

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.054	0.009	0.002	0.001	-0.039
S.D.	0.000	0.013	0.001	0.000	0.020
% R.S.D.	0.204	134.228	59.507	11.776	52.561

Identity 1: K211 post spike Identity 2: 1ml sample - 9ml 1:24 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	1.437	1.010	1.439	3.443	43.362	0.971	1.008	0.973
S.D.	0.006	0.006	0.012	0.021	0.243	0.008	0.006	0.005
% R.S.D.	0.440	0.623	0.846	0.623	0.561	0.814	0.561	0.522

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.990	6.907	1.106	16.867	3.064	1.010	1.168	3.363
S.D.	0.005	0.036	0.007	0.119	0.019	0.007	0.003	0.079
% R.S.D.	0.552	0.516	0.660	0.707	0.604	0.658	0.278	2.340

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	1.155	1.039	0.992	1.605	1.215	1.084	0.994	11.998
S.D.	0.006	0.018	0.006	0.017	0.015	0.006	0.005	0.070
% R.S.D.	0.512	1.690	0.591	1.068	1.215	0.529	0.547	0.582

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.989	1.064	1.006	2.666	1.022	0.970	0.958	1178.180
S.D.	0.006	0.016	0.004	0.007	0.006	0.004	0.003	4.923
% R.S.D.	0.557	1.536	0.438	0.272	0.608	0.430	0.274	0.418

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	1.017	0.973	0.990	1.003	0.931
S.D.	0.005	0.009	0.007	0.006	0.023
% R.S.D.	0.472	0.905	0.690	0.612	2.477

Identity 1: ccv_1 Identity 2: ccv 1:27 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	5.110	5.123	5.162	4.352	5.108	5.151	5.207	5.137
S.D.	0.021	0.028	0.008	0.015	0.024	0.019	0.024	0.030
% R.S.D.	0.416	0.538	0.156	0.335	0.463	0.374	0.457	0.588

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	5.152	5.175	5.183	5.225	4.848	5.178	5.307	9.811
S.D.	0.020	0.014	0.028	0.030	0.027	0.018	0.018	0.079
% R.S.D.	0.391	0.276	0.532	0.578	0.547	0.352	0.347	0.807

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	5.206	5.220	5.152	4.731	4.979	5.157	5.148	5.108
S.D.	0.008	0.005	0.028	0.053	0.039	0.022	0.016	0.008
% R.S.D.	0.152	0.104	0.553	1.123	0.787	0.436	0.304	0.159

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	5.194	5.602	2.694	5.159	5.039	5.225	5.085	6.795
S.D.	0.020	0.042	0.016	0.019	0.024	0.014	0.021	0.167
% R.S.D.	0.384	0.754	0.586	0.367	0.483	0.260	0.417	2.451

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	5.181	4.966	5.189	5.314	5.122
S.D.	0.017	0.042	0.023	0.026	0.026
% R.S.D.	0.334	0.848	0.434	0.498	0.509

Identity 1: ccb_1 Identity 2: ccb 1:31 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.002	0.002	-0.032	0.009	0.007	-0.000	0.002	0.003
S.D.	0.001	0.000	0.007	0.002	0.007	0.001	0.000	0.000
% R.S.D.	31.423	3.293	20.509	22.309	96.992	395.204	4.950	8.657

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.002	0.001	-0.005	-0.001	0.033	-0.000	-0.008	0.095
S.D.	0.000	0.002	0.002	0.002	0.000	0.000	0.016	0.057
% R.S.D.	7.734	252.747	44.889	129.022	0.189	187.075	201.436	60.501

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.000	0.012	0.002	0.000	0.001	0.002	0.005	0.010
S.D.	0.004	0.015	0.000	0.002	0.002	0.000	0.003	0.010
% R.S.D.	1881.862	119.792	11.593	549.999	165.425	3.132	53.189	96.438

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.002	0.011	0.367	0.007	0.002	0.002	0.005	0.498
S.D.	0.001	0.014	0.004	0.001	0.000	0.000	0.001	0.035
% R.S.D.	35.642	133.828	1.168	16.191	9.513	14.424	18.300	7.107

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.002	0.008	0.001	0.002	0.035
S.D.	0.000	0.008	0.000	0.000	0.006
% R.S.D.	16.070	97.905	13.575	3.577	18.609

Identity 1: icsa_f Identity 2: icsa 1:35 PM June 29, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.003	0.008	0.002	0.256	296.437	0.004	-0.006	0.004
S.D.	0.001	0.000	0.005	0.003	0.946	0.000	0.000	0.000
% R.S.D.	23.501	0.320	295.378	1.315	0.319	8.544	3.199	8.788

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.016	-0.036	0.024	139.003	-1.068	0.002	1.178	-0.028
S.D.	0.000	0.003	0.001	0.850	0.000	0.001	0.013	0.039
% R.S.D.	1.012	7.286	5.837	0.611	0.000	38.371	1.126	140.184

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.022	0.349	0.002	0.086	2.664	155.458	0.050	0.236
S.D.	0.004	0.008	0.000	0.012	0.064	0.103	0.005	0.005
% R.S.D.	19.348	2.401	9.297	13.732	2.399	0.066	9.269	2.259

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.002	0.012	0.016	-0.054	-0.000	-0.003	-0.014	0.377
S.D.	0.001	0.021	0.001	0.001	0.000	0.000	0.001	0.004
% R.S.D.	30.215	178.322	5.113	1.679	128.573	8.493	4.438	1.143

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.102	0.053	-0.001	0.003	-0.049
S.D.	0.000	0.010	0.001	0.000	0.019
% R.S.D.	0.473	18.499	68.048	3.444	39.033

Identity 1: icsab_f Identity 2: icsab 1:38 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.035	0.011	0.145	0.301	182.087	0.436	0.467	0.018
S.D.	0.071	0.007	0.251	0.107	162.645	0.010	0.010	0.029
% R.S.D.	205.494	64.767	173.652	35.391	89.323	2.351	2.156	167.811

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.904	0.832	0.044	131.421	-1.039	0.452	1.259	2.035
S.D.	0.042	0.021	0.042	8.226	0.000	0.011	0.226	4.094
% R.S.D.	4.657	2.576	94.913	6.259	0.000	2.336	17.993	201.198

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.386	0.852	0.461	0.130	2.568	150.334	0.048	0.370
S.D.	0.670	1.012	0.021	0.055	0.054	5.796	0.034	0.304
% R.S.D.	173.615	118.719	4.641	42.779	2.087	3.856	71.224	82.309

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.006	0.085	0.654	0.820	0.013	0.875	-0.005	1.063
S.D.	0.014	0.140	0.009	0.160	0.025	0.026	0.017	0.777
% R.S.D.	261.283	165.978	1.315	19.486	195.773	2.953	351.775	73.078

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.539	0.170	0.465	0.450	0.561
S.D.	0.031	0.147	0.011	0.030	1.222
% R.S.D.	5.770	86.962	2.320	6.638	218.031

Identity 1: xxx Identity 2: rinse 1:42 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.001	0.000	-0.019	-0.002	0.056	0.001	0.000	0.000
S.D.	0.001	0.000	0.009	0.002	0.009	0.001	0.000	0.001
% R.S.D.	78.668	15.362	49.460	103.416	16.707	66.733	288.678	290.905

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.005	0.001	-0.002	0.028	0.068	-0.001	-0.025	-0.004
S.D.	0.000	0.001	0.003	0.001	0.004	0.001	0.013	0.044
% R.S.D.	0.603	133.865	133.416	4.356	5.195	68.255	52.795	1184.343

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.000	-0.006	0.000	-0.016	-0.005	0.053	-0.003	0.016
S.D.	0.008	0.011	0.000	0.007	0.003	0.004	0.002	0.011
% R.S.D.	2725.063	176.787	461.773	43.448	56.543	7.328	79.872	65.848

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.000	0.006	0.682	-0.007	-0.000	0.001	-0.001	0.162
S.D.	0.000	0.006	0.022	0.004	0.000	0.000	0.001	0.005
% R.S.D.	952.586	96.243	3.268	52.020	286.628	23.074	79.726	3.023

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.000	-0.004	-0.001	0.001	0.007
S.D.	0.000	0.007	0.000	0.000	0.003
% R.S.D.	168.375	176.061	52.389	0.538	35.844

Identity 1: ccv_2 Identity 2: ccv 1:45 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	5.274	5.267	5.244	4.470	5.351	5.286	5.377	5.290
S.D.	0.029	0.034	0.037	0.019	0.010	0.025	0.033	0.030
% R.S.D.	0.557	0.648	0.698	0.429	0.186	0.472	0.617	0.572

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	5.307	5.339	5.365	5.449	5.058	5.345	5.579	10.273
S.D.	0.024	0.025	0.025	0.028	0.025	0.031	0.024	0.013
% R.S.D.	0.456	0.464	0.472	0.506	0.497	0.578	0.426	0.130

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	5.272	5.342	5.301	5.138	5.170	5.380	5.284	5.266
S.D.	0.018	0.028	0.035	0.131	0.079	0.018	0.034	0.023
% R.S.D.	0.337	0.518	0.652	2.558	1.520	0.325	0.649	0.442

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	5.322	5.756	3.656	5.350	5.186	5.391	5.287	5.741
S.D.	0.029	0.043	0.265	0.025	0.028	0.023	0.040	0.036
% R.S.D.	0.552	0.755	7.241	0.476	0.542	0.432	0.756	0.623

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	5.348	5.140	5.363	5.477	5.266
S.D.	0.029	0.040	0.031	0.032	0.021
% R.S.D.	0.551	0.780	0.570	0.579	0.398

Identity 1: ccb_2 Identity 2: ccb 1:49 PM June 29, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.005	0.001	-0.006	0.011	0.026	0.002	0.003	0.003
S.D.	0.002	0.000	0.007	0.003	0.004	0.001	0.001	0.001
% R.S.D.	38.171	13.871	117.545	26.443	16.447	29.896	21.826	34.850

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.020	0.003	-0.000	0.007	0.039	0.001	-0.020	0.287
S.D.	0.001	0.002	0.004	0.003	0.000	0.001	0.011	0.115
% R.S.D.	3.499	64.300	1634.606	36.187	0.868	145.307	55.726	40.025

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.047	0.073	0.002	-0.000	0.005	0.014	-0.002	0.020
S.D.	0.017	0.029	0.001	0.009	0.001	0.000	0.002	0.008
% R.S.D.	36.868	39.440	21.970	4870.410	18.456	1.488	72.944	39.687

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.002	0.014	0.797	0.000	0.003	0.002	0.005	0.150
S.D.	0.000	0.005	0.014	0.005	0.001	0.001	0.002	0.032
% R.S.D.	6.939	32.991	1.704	7313.218	29.858	25.831	40.713	21.469

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.002	0.021	0.002	0.001	0.115
S.D.	0.000	0.012	0.000	0.000	0.026
% R.S.D.	11.957	59.771	15.428	5.841	22.580

6-29-94

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-079, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. K 212-14+16	Customer ID: C58FB, C58HCB C111
Analysis: ICP	Sample Prep: NONE

Instrument: WB 35939	Procedure/ Rev: LA-505-151 / 1D-1
Technologist: B. GOECKE	Date: 5-20-94
Starting Time: 13:00	Temperature NA
Ending Time: 15:30	Chemist: S WELS

Comments:

	Description	Lab ID		Description	Lab ID
1	ICV (SST4)	K212-5550	11		
2	ICB	K213-5650	12		
3	C-111 SAM C58FB	K214-5750	13		
4	C-111 DUP C58FB	K214-5850	14		
5	C-111 SAM C58HCB	K216-5750	15		
6	POST SPIKE	K214-5950	16		
7	CCV-1	----	17		
8	CCB-1	----	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
SST4 (ICV)	30848 DIRECT			DIRECT
POST SPIKE SST4	30848 1mL			5mL

A-6000-881 (03/92)

Batch 3277

Serial No	Sample Point	Date	Time Issued	Priority
K 212.-5550	C-111	4-27-94	10: 2	21

Determination	Method Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	% RECOVERY	N4C3B	0

Sample Size	Customer ID
ICV (SST4 30848)	STD

Remarks Calculations Results

LMCS CHECK SAMPLE

Ni 4.986 = 99.72 % /

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
		Rebatch		

Date	Time Completed	Lab Unit Mgr	
5-20-94		S.M. Pang 05/24/94	6-1-94

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 213.-5650	C-111	4-27-94	10: 7	21

Determination	Method Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	uG/ML	N4C3B	0

Sample Size	Customer ID
ICB (HNO3 BLK)	BLANK

Remarks Calculations Results

REAGENT BLANK

Ni ND < 0.020 /

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
		Rebatch		

Date	Time Completed	Lab Unit Mgr	
5-20-94		S.M. Pang 05/24/94	6-1-94

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5750	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
ICP-LIQ	LA-505-151	uG/ML	N4C3B	0

Sample Size	Customer ID
DIRECT	C58FB

Remarks Calculations Results

Ni ND < 0.020

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-20-94		S.M. Pang 05/24/94	6-1-94

54-6830-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5850	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
ICP-LIQ	LA-505-151	uG/ML	N4C3B	0

Sample Size	Customer ID
DIRECT	C58FB

Remarks Calculations Results

DUPLICATE SAMPLE

Ni ND <0.020

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-20-94		S.M. Pang 05/24/94	6-1-94

54-6830-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5950	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Returns
ICP	LA-505-151	% RECOVERY	N4C3B	0

Sample Size	Customer ID
1mL sample - 4mL	C58FB

Remarks Calculations Results

SAMPLE SPIKED ID
SPIKE ID 30648
SPIKE VOLUME 1mL
Ni = 101.4 % ✓

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[signature]				
Hrs	Hrs	Hrs	Hrs	Hrs
		[signature]		

Date	Time Completed	Lab Unit Mgr	
5-20-94		S.M. Pavy 05/24/94	DK 6-1-94

54-6BDC-061 (R 10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 216.-5750	C-111	4-28-94	11:23	21

Determination	Method Standard	Result Units	Charge Code	Returns
ICP-LIQ	LA-505-151	uG/ML	N4C3B	0

Sample Size	Customer ID
DIRECT	C58HCB

Remarks Calculations Results

Ni = 7.30 E-2 ✓

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[signature]				
Hrs	Hrs	Hrs	Hrs	Hrs
		[signature]		

Date	Time Completed	Lab Unit Mgr	
5-20-94		S.M. Pavy 05/24/94	DK 6-1-94

54-6BDC-061 (R 10-83)

Identity 1: wp-284 Identity 2: wp-284 1:49 PM May 20, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.003	0.001	-0.018	0.378	0.129	0.046	0.010	0.001
S.D.	0.001	0.000	0.003	0.005	0.003	0.001	0.000	0.000
% R.S.D.	17.994	13.412	17.643	1.355	2.135	2.719	3.519	43.953

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.019	0.014	-0.005	0.029	0.036	0.005	-0.011	-0.213
S.D.	0.000	0.001	0.002	0.002	0.000	0.000	0.005	0.018
% R.S.D.	0.956	9.699	38.319	7.643	0.195	4.886	46.359	8.265

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.063	-0.049	0.027	-0.011	0.079	0.001	0.035	0.111
S.D.	0.003	0.003	0.000	0.010	0.002	0.000	0.005	0.006
% R.S.D.	4.957	6.298	0.532	91.123	3.015	4.949	14.774	5.000

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.000	0.026	-0.002	0.045	-0.000	0.011	0.039	-0.083
S.D.	0.001	0.010	0.000	0.001	0.000	0.000	0.000	0.013
% R.S.D.	348.003	38.708	12.051	1.154	199.791	4.678	0.557	15.953

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.013	-0.026	0.133	0.030	-0.069
S.D.	0.000	0.001	0.001	0.000	0.006
% R.S.D.	1.933	4.071	0.929	1.063	8.018

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 198 TO 205 .

Leslie Dias 12-1-94

Identity 1: ICV Identity 2: Quality Control 1:53 PM May 20, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	4.940	4.772	4.900	4.740	4.866	4.971	4.954	4.841
S.D.	0.002	0.008	0.025	0.003	0.008	0.005	0.004	0.005
% R.S.D.	0.045	0.171	0.518	0.074	0.173	0.110	0.076	0.109

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	5.059	4.986	4.885	4.933	4.747	4.997	5.051	9.613
S.D.	0.007	0.013	0.011	0.020	0.006	0.003	0.007	0.070
% R.S.D.	0.141	0.258	0.227	0.398	0.121	0.056	0.148	0.723

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	4.762	4.785	4.828	5.369	5.117	4.801	4.954	4.897
S.D.	0.010	0.010	0.008	0.009	0.023	0.007	0.020	0.000
% R.S.D.	0.209	0.208	0.163	0.168	0.443	0.136	0.395	0.000

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	4.955	5.373	4.926	5.012	4.826	5.025	5.025	5.032
S.D.	0.013	0.042	0.003	0.017	0.004	0.004	0.003	0.015
% R.S.D.	0.268	0.773	0.054	0.342	0.078	0.081	0.058	0.308

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	4.988	4.817	5.008	5.067	4.946
S.D.	0.003	0.033	0.001	0.004	0.011
% R.S.D.	0.059	0.685	0.017	0.070	0.217

Identity 1: ICB Identity 2: Quality Control 1:58 PM May 20, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.005	0.001	0.001	-0.012	0.002	0.001	0.001	0.002
S.D.	0.002	0.000	0.010	0.001	0.004	0.001	0.001	0.001
% R.S.D.	35.447	9.528	1175.302	5.802	229.153	127.893	172.816	32.021

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.002	-0.004	-0.004	0.001	0.003	0.002	0.018	-0.315
S.D.	0.000	0.002	0.003	0.001	0.000	0.001	0.015	0.083
% R.S.D.	8.865	55.201	64.775	126.180	4.054	33.064	82.972	26.187

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.069	-0.079	-0.001	0.028	-0.007	0.000	0.003	0.006
S.D.	0.012	0.027	0.000	0.006	0.003	0.000	0.003	0.003
% R.S.D.	17.532	34.423	20.371	22.452	35.527	17.321	101.687	50.000

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.002	0.027	-0.002	-0.004	-0.001	0.001	0.003	-0.068
S.D.	0.000	0.020	0.001	0.006	0.001	0.000	0.001	0.018
% R.S.D.	11.024	74.652	26.416	147.841	58.823	15.322	23.399	26.060

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	-0.001	-0.005	-0.002	0.000	-0.105
S.D.	0.000	0.018	0.001	0.000	0.026
% R.S.D.	14.470	368.052	68.496	2.443	24.337

Identity 1: K214 sam Identity 2: direct 2:01 PM May 20, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.005	0.007	-0.016	0.561	0.002	0.003	0.004	0.004
S.D.	0.003	0.001	0.012	0.002	0.009	0.002	0.002	0.001
% R.S.D.	53.042	17.482	71.879	0.367	543.225	61.755	44.584	33.923

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.154	0.019	0.003	0.044	0.489	0.004	-0.001	0.114
S.D.	0.003	0.001	0.002	0.001	0.010	0.002	0.014	0.112
% R.S.D.	2.059	6.599	62.734	1.580	2.023	68.416	1787.469	98.159

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.016	0.023	0.004	0.044	0.212	0.079	0.002	1.283
S.D.	0.016	0.026	0.001	0.016	0.009	0.002	0.002	0.034
% R.S.D.	99.626	111.712	31.915	35.550	4.070	2.769	72.802	2.616

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.004	0.017	0.004	-0.004	0.004	0.004	0.068	0.078
S.D.	0.002	0.008	0.002	0.004	0.002	0.001	0.002	0.034
% R.S.D.	40.397	48.024	52.709	86.922	41.433	33.402	2.644	44.186

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.037	0.017	0.004	0.003	0.026
S.D.	0.002	0.028	0.002	0.001	0.040
% R.S.D.	4.818	160.932	41.335	30.749	153.750

Identity 1: K214 dup Identity 2: direct 2:06 PM May 20, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.001	0.004	0.004	0.552	0.003	-0.001	0.002	0.001
S.D.	0.001	0.000	0.001	0.001	0.003	0.001	0.000	0.001
% R.S.D.	101.851	3.557	32.182	0.091	111.099	66.050	18.685	56.460

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.145	0.015	0.001	0.039	0.488	0.000	0.014	-0.005
S.D.	0.001	0.002	0.001	0.002	0.001	0.000	0.004	0.051
% R.S.D.	0.986	13.038	97.657	5.609	0.245	142.231	28.245	1056.923

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.010	-0.003	0.001	0.032	0.208	0.074	0.003	1.295
S.D.	0.013	0.011	0.000	0.001	0.005	0.000	0.001	0.008
% R.S.D.	131.004	358.498	21.992	4.633	2.529	0.401	49.092	0.619

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.003	0.023	-0.000	0.009	0.000	0.002	0.067	0.032
S.D.	0.000	0.002	0.000	0.010	0.001	0.000	0.002	0.028
% R.S.D.	6.667	9.040	305.572	107.859	227.564	23.727	2.419	86.951

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.033	-0.013	-0.000	0.000	0.009
S.D.	0.000	0.008	0.001	0.000	0.020
% R.S.D.	0.813	66.406	946.137	90.487	230.422

Identity 1: K216 sam Identity 2: direct 2:10 PM May 20, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.005	0.095	-0.014	1.324	-0.161	-0.010	-0.001	-0.010
S.D.	0.003	0.002	0.007	0.023	0.013	0.001	0.000	0.001
% R.S.D.	60.539	1.618	47.326	1.761	7.779	6.450	53.650	11.295

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	1.245	0.073	-0.002	-0.004	17.801	-0.014	-0.131	-0.238
S.D.	0.013	0.002	0.001	0.003	0.237	0.000	0.016	0.134
% R.S.D.	1.026	3.255	50.127	72.062	1.329	2.947	12.385	56.227

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.057	-0.031	0.034	0.003	4.677	4.479	-0.028	2.774
S.D.	0.024	0.032	0.001	0.003	0.082	0.071	0.002	0.062
% R.S.D.	41.197	102.955	2.330	79.481	1.763	1.582	6.609	2.252

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.009	-0.111	-0.003	-0.072	-0.001	-0.003	-0.007	0.730
S.D.	0.000	0.004	0.001	0.006	0.001	0.001	0.001	0.038
% R.S.D.	2.728	3.792	46.931	8.860	40.698	21.324	14.752	5.261

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.129	-0.087	-0.001	-0.001	-0.085
S.D.	0.002	0.010	0.001	0.000	0.030
% R.S.D.	1.826	11.008	66.587	11.184	35.592

Identity 1: K214 post spike Identity 2: 1ml sample - 4ml 2:15 PM May 20, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.989	0.970	0.984	1.259	0.983	1.008	1.006	0.986
S.D.	0.004	0.003	0.012	0.004	0.009	0.006	0.003	0.004
% R.S.D.	0.383	0.316	1.171	0.350	0.886	0.571	0.254	0.369

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	1.034	1.014	0.985	1.015	1.138	1.010	1.031	1.600
S.D.	0.003	0.005	0.004	0.005	0.007	0.002	0.009	0.050
% R.S.D.	0.291	0.478	0.406	0.539	0.590	0.196	0.891	3.151

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.906	0.878	0.977	1.077	1.071	1.000	0.986	1.262
S.D.	0.013	0.009	0.003	0.027	0.011	0.001	0.007	0.003
% R.S.D.	1.484	1.076	0.295	2.511	0.983	0.137	0.666	0.220

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	1.002	1.114	0.981	1.005	0.970	1.006	1.027	0.923
S.D.	0.003	0.010	0.002	0.002	0.003	0.006	0.003	0.014
% R.S.D.	0.344	0.855	0.187	0.218	0.349	0.585	0.290	1.516

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	1.015	0.932	1.003	1.023	0.881
S.D.	0.003	0.012	0.004	0.004	0.018
% R.S.D.	0.250	1.335	0.392	0.383	2.078

Identity 1: CCV Identity 2: Quality Control 2:18 PM May 20, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	5.045	4.871	4.981	4.838	4.944	5.096	5.044	4.919
S.D.	0.038	0.042	0.041	0.027	0.027	0.031	0.042	0.043
% R.S.D.	0.749	0.863	0.826	0.557	0.550	0.608	0.831	0.870

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	5.174	5.104	4.984	5.063	4.848	5.122	5.134	9.555
S.D.	0.027	0.037	0.044	0.023	0.041	0.032	0.045	0.064
% R.S.D.	0.525	0.728	0.881	0.455	0.848	0.627	0.877	0.666

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	4.848	4.824	4.921	5.576	5.284	4.922	5.047	4.983
S.D.	0.034	0.036	0.044	0.113	0.055	0.032	0.029	0.038
% R.S.D.	0.701	0.739	0.889	2.034	1.045	0.654	0.578	0.765

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	5.078	5.499	5.006	5.123	4.935	5.159	5.148	5.033
S.D.	0.036	0.012	0.032	0.035	0.038	0.030	0.041	0.016
% R.S.D.	0.718	0.213	0.647	0.692	0.775	0.588	0.804	0.320

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	5.101	4.958	5.121	5.216	4.925
S.D.	0.035	0.026	0.039	0.041	0.047
% R.S.D.	0.683	0.534	0.770	0.785	0.951

Identity 1: CCB Identity 2: Quality Control 2:22 PM May 20, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.003	0.002	-0.022	-0.010	0.020	0.002	0.004	0.003
S.D.	0.002	0.000	0.008	0.004	0.010	0.001	0.001	0.001
% R.S.D.	48.337	6.762	38.323	38.105	48.897	39.564	21.922	14.672

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.004	-0.002	-0.001	0.005	0.005	0.005	0.018	-0.329
S.D.	0.000	0.002	0.002	0.000	0.000	0.001	0.012	0.104
% R.S.D.	1.310	91.675	160.127	8.580	3.029	22.220	67.543	31.532

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.070	-0.092	0.000	0.030	-0.007	0.002	0.002	0.027
S.D.	0.017	0.021	0.000	0.015	0.005	0.000	0.005	0.009
% R.S.D.	25.035	22.466	592.043	48.849	64.924	0.000	224.661	33.254

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.005	0.050	-0.002	0.010	0.000	0.003	0.006	-0.091
S.D.	0.001	0.008	0.001	0.007	0.001	0.001	0.001	0.021
% R.S.D.	12.642	16.969	73.303	76.586	1006.664	26.511	10.665	23.395

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.001	-0.005	-0.001	0.002	-0.084
S.D.	0.000	0.013	0.001	0.000	0.033
% R.S.D.	33.920	251.901	194.326	9.825	39.902

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. C

Lab Segment Serial No. K211	Customer ID: C5851
Analysis: ICP	Sample Prep: Acid Digestion

Instrument: WB39939	Procedure/ Rev: LQ-505-151 / D-1
Technologist: B.J. Goecke	Date: 07-22-94
Starting Time: 1300	Temperature N/a
Ending Time: 1530	Chemist: B. Wells S. Parony

Comments:

	Description	Lab ID		Description	Lab ID
1	Digested Std	K209-8550	11		
2	Digested Blank	K210-8650	12		
3	Sample	K211-8755	13		
4	Duplicate Sample	K211-8855	14		
5	Spike	K211-8950	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
Lncs Check Std SST4	32648C / Direct			

1206

A-6000-881 (03/92)

Batch 3521

Serial No	Sample Point	Date	Time Issued	Priority
K 208.-6660	C-111	4-25-94	14:54	25

Determination	Method Standard	Result Units	Charge Code	Returns
ICP	IA-505-151	W FERRONERY	X4C9B	0

Sample Size	Customer ID
2.5 g in 50 ml	STD

Remarks Calculations Results

1st STD Digested STD

Ni 4.737 /5 (100) = 94.74 %

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
7-22-94	1530	7/25/94 S. Parry	7-25-94

54-6800-DEI (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 220.-5660	C-111	4-25-94	14:55	35

Determination	Method Standard	Result Units	Charge Code	Returns
ICP	IA-505-151	mg/kg	X4C9B	0

Sample Size	Customer ID
1 Jrcl	BLANK

Remarks Calculations Results

REAGENT BLANK Digested

Ni only

Ni < .02

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
7-22-94	1530	7/25/94 S. Parry	7-25-94

54-6800-DEI (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
X 221.-6656	C-111	4-21-94	14:57	28

Determination	Method Standard	Result Units	Charge Code	Returns
ICP-SOL	LA-505-151	UG/G Rec	X408E	0

Sample Size	Customer ID
0.5536 g in 50 mL - 1mL-5mL, - 1mL-4mL	05661

Remarks Calculations Results

Ni $4.715 \times \frac{50}{0.5536} \times 10 \times 5 = 2.13E4$ ug/g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
7-22-94	1530	7/25/94 S. Parry	JK 7-25-94

54-680C-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
X 221.-6656	C-111	4-21-94	14:57	28

Determination	Method Standard	Result Units	Charge Code	Returns
ICP-SOL	LA-505-151	UG/G Rec	X408E	0

Sample Size	Customer ID
0.5414 g in 50 mL - 1mL-5mL, - 1mL-4mL	05661

Remarks Calculations Results

DUPLICATE SAMPLE

Ni $4.693 \times \frac{50}{0.5414} \times 10 \times 5 = 2.17E4$ ug/g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
7-22-94	1530	7/25/94 S. Parry	JK 7-25-94

54-680C-061 (R-10-83)

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-079, REV. 0

Serial No	Sample Point	Date	Time Issued	Priority
[illegible]	C-111	4-25-94	14:57	08

Determination	Method Standard	Result Units	Charge Code	Reruns
ICP	IA-505-151	% RECOVERY	N4C5E	0

Sample Size	Customer ID
0.5430g in 50 ml - Inc-Inc	C68F1

Remarks Calculations Results

SPIKE SAMPLE
SPIKE ADD WIIC-1
SPIKE VOLUME 2.5ml

Ni $4.737 \times \frac{100}{5.0} = 94.74\ \%$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[signature]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
7-22-94	1530	7/25/94 S. Pavey	[signature] 7-25-94

54-6800-DE1 (R-10-83)

Identity 1: wp-284 Identity 2: wp-284 1:06 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.004	0.001	0.001	0.353	0.137	0.044	0.008	0.001
S.D.	0.001	0.000	0.004	0.004	0.006	0.001	0.001	0.000
% R.S.D.	16.485	17.262	259.720	1.065	4.120	1.412	8.431	23.740

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.022	0.016	-0.003	0.030	0.031	0.007	-0.007	-0.142
S.D.	0.000	0.001	0.001	0.002	0.000	0.001	0.009	0.052
% R.S.D.	1.829	5.077	55.687	8.300	1.034	9.663	119.562	36.782

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.015	-0.055	0.028	-0.007	0.084	0.001	0.032	0.112
S.D.	0.010	0.017	0.000	0.003	0.005	0.000	0.004	0.006
% R.S.D.	67.455	30.073	0.942	41.720	5.619	17.566	11.119	5.607

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.000	0.002	-0.002	0.029	-0.001	0.009	0.040	-0.488
S.D.	0.001	0.018	0.001	0.006	0.001	0.000	0.003	0.018
% R.S.D.	264.558	937.685	23.938	19.773	75.171	3.431	7.295	3.738

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.014	0.067	0.130	0.030	-0.027
S.D.	0.000	0.009	0.001	0.000	0.022
% R.S.D.	1.145	13.037	0.502	0.592	81.864

BJ Goecke
7-22-94
C-111
K209-K211

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 210 TO 229 .

Identity 1: ICV Identity 2: Quality Control 1:09 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	4.915	4.884	4.922	4.304	4.939	4.965	5.001	5.037
S.D.	0.019	0.019	0.011	0.015	0.023	0.021	0.016	0.017
% R.S.D.	0.383	0.397	0.231	0.357	0.456	0.416	0.323	0.328

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	4.973	4.863	4.942	4.930	4.895	4.921	5.095	9.693
S.D.	0.016	0.017	0.023	0.013	0.018	0.017	0.025	0.031
% R.S.D.	0.319	0.359	0.470	0.263	0.366	0.350	0.489	0.315

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	4.886	5.032	4.947	4.990	4.923	4.839	4.895	5.003
S.D.	0.015	0.016	0.019	0.050	0.018	0.018	0.016	0.015
% R.S.D.	0.304	0.325	0.393	0.998	0.376	0.372	0.318	0.296

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	4.914	5.620	4.940	4.865	4.818	4.886	4.931	4.808
S.D.	0.018	0.005	0.014	0.030	0.018	0.013	0.011	0.038
% R.S.D.	0.358	0.089	0.292	0.621	0.375	0.257	0.230	0.799

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	4.909	4.735	4.897	5.023	4.752
S.D.	0.015	0.038	0.015	0.020	0.005
% R.S.D.	0.310	0.812	0.305	0.396	0.103

Identity 1: ICB Identity 2: Quality Control 1:13 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.003	0.001	0.006	0.003	0.004	0.001	-0.000	0.001
S.D.	0.000	0.000	0.011	0.002	0.005	0.001	0.001	0.001
% R.S.D.	16.325	3.101	173.064	61.014	131.372	172.783	131.826	54.470

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.000	0.001	-0.001	0.000	0.001	0.001	0.005	-0.135
S.D.	0.000	0.001	0.002	0.001	0.000	0.001	0.001	0.034
% R.S.D.	40.124	194.247	188.609	480.108	13.887	139.755	12.619	24.797

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.008	-0.054	-0.000	-0.007	-0.020	0.001	-0.003	0.003
S.D.	0.004	0.006	0.000	0.011	0.002	0.000	0.003	0.010
% R.S.D.	48.695	11.349	95.985	156.604	10.739	8.665	118.749	305.085

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.001	-0.013	-0.000	-0.007	-0.001	0.000	0.000	-0.459
S.D.	0.000	0.006	0.000	0.004	0.000	0.001	0.002	0.028
% R.S.D.	35.715	46.037	49.939	50.805	29.602	270.612	1044.516	6.203

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.000	0.014	-0.001	0.001	-0.026
S.D.	0.000	0.012	0.001	0.000	0.023
% R.S.D.	123.367	87.597	71.130	25.183	91.267

Identity 1: icsai Identity 2: icsai 1:17 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.003	0.016	0.052	0.476	-6.503	0.002	-0.017	0.002
S.D.	0.001	0.000	0.009	0.001	0.000	0.001	0.000	0.001
% R.S.D.	25.979	0.384	17.912	0.187	0.006	32.467	1.949	23.316

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.046	-0.081	0.059	207.751	-2.382	-0.002	1.826	0.072
S.D.	0.000	0.002	0.001	0.593	0.000	0.002	0.021	0.078
% R.S.D.	0.881	1.924	2.406	0.285	0.000	93.436	1.148	108.289

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.017	0.876	0.005	0.114	6.225	-1.136	0.241	0.305
S.D.	0.014	0.026	0.000	0.012	0.044	0.000	0.006	0.002
% R.S.D.	80.284	2.996	4.430	10.375	0.708	0.000	2.598	0.593

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.004	0.065	-0.002	-0.402	-0.001	-0.006	-0.028	-0.221
S.D.	0.000	0.006	0.001	0.003	0.000	0.000	0.002	0.017
% R.S.D.	5.393	9.357	33.535	0.794	41.574	5.142	6.896	7.671

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.159	0.069	0.000	0.005	-0.053
S.D.	0.001	0.034	0.001	0.000	0.026
% R.S.D.	0.350	49.782	2144.803	2.588	48.521

Identity 1: xxx Identity 2: rinse 1:23 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.003	0.006	0.036	0.014	1.110	0.006	0.006	0.007
S.D.	0.002	0.003	0.005	0.004	0.488	0.003	0.003	0.003
% R.S.D.	55.434	45.413	13.402	31.354	43.976	40.935	50.214	36.965

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.006	0.006	0.005	0.431	1.063	0.006	0.017	-0.141
S.D.	0.003	0.003	0.002	0.191	0.459	0.003	0.000	0.013
% R.S.D.	55.628	59.180	28.883	44.255	43.172	50.857	2.747	9.116

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.028	-0.039	0.006	-0.008	0.010	1.069	0.006	0.007
S.D.	0.007	0.004	0.003	0.004	0.009	0.462	0.003	0.005
% R.S.D.	25.120	10.851	48.993	52.863	89.803	43.195	47.381	65.427

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.006	0.008	0.004	0.008	0.004	0.005	0.004	-0.452
S.D.	0.003	0.006	0.002	0.007	0.003	0.003	0.003	0.022
% R.S.D.	52.968	82.820	60.479	81.832	60.165	56.384	80.761	4.955

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.007	0.027	0.005	0.006	-0.011
S.D.	0.003	0.013	0.002	0.003	0.014
% R.S.D.	46.406	47.581	42.106	51.984	126.512

Identity 1: K210 dig blk Identity 2: direct 1:27 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.004	0.000	0.005	0.015	0.058	0.003	0.001	0.002
S.D.	0.001	0.000	0.021	0.001	0.005	0.001	0.000	0.000
% R.S.D.	19.666	15.498	420.129	7.670	8.269	34.268	26.972	24.538

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.006	-0.003	-0.003	0.029	0.062	0.003	-0.031	-0.187
S.D.	0.000	0.002	0.003	0.004	0.002	0.001	0.009	0.021
% R.S.D.	3.417	60.606	111.999	13.660	3.263	29.258	27.830	11.011

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.025	-0.049	-0.001	-0.001	0.099	0.062	0.001	0.014
S.D.	0.005	0.009	0.000	0.004	0.003	0.002	0.003	0.002
% R.S.D.	19.933	18.755	7.095	466.207	3.119	3.146	186.215	13.319

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.002	0.004	0.008	-0.013	-0.001	0.001	0.003	0.501
S.D.	0.000	0.006	0.001	0.001	0.001	0.001	0.002	0.032
% R.S.D.	9.608	153.485	14.127	10.168	113.174	115.102	50.146	6.326

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.000	0.018	-0.001	0.000	-0.039
S.D.	0.000	0.018	0.000	0.000	0.009
% R.S.D.	110.800	96.153	14.502	145.312	22.948

Identity 1: K209 dig std Identity 2: 2.5ml in 50ml 1:32 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.011	4.782	4.784	0.051	5.076	0.004	-0.002	4.969
S.D.	0.000	0.007	0.012	0.002	0.009	0.001	0.000	0.013
% R.S.D.	4.008	0.150	0.256	3.017	0.186	34.868	5.484	0.264

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.012	4.737	4.844	4.801	4.864	4.817	4.965	-1.772
S.D.	0.000	0.012	0.006	0.007	0.008	0.005	0.014	0.028
% R.S.D.	1.582	0.256	0.124	0.151	0.161	0.104	0.277	1.573

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	4.807	4.931	4.832	0.011	0.152	4.754	4.749	4.835
S.D.	0.012	0.012	0.007	0.019	0.007	0.008	0.014	0.003
% R.S.D.	0.258	0.244	0.138	176.858	4.859	0.159	0.305	0.065

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.001	5.341	4.633	4.696	-0.004	4.686	-0.005	5.787
S.D.	0.001	0.027	0.004	0.013	0.000	0.006	0.001	0.077
% R.S.D.	72.650	0.510	0.096	0.285	12.886	0.118	16.300	1.327

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	4.780	0.023	0.008	5.047	4.550
S.D.	0.006	0.029	0.000	0.011	0.006
% R.S.D.	0.124	124.751	3.365	0.226	0.138

Identity 1: K211 sam dil Identity 2: .5536gin50ml-1-9-1-4 1:36 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.002	0.034	0.462	0.256	26.868	0.002	0.016	0.003
S.D.	0.000	0.000	0.004	0.002	0.044	0.000	0.000	0.000
% R.S.D.	9.604	0.248	0.782	0.668	0.163	6.502	0.301	12.077

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.046	4.715	0.111	13.736	2.009	0.029	0.177	1.017
S.D.	0.000	0.008	0.002	0.025	0.003	0.001	0.005	0.026
% R.S.D.	0.639	0.174	1.545	0.179	0.169	3.702	2.642	2.585

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.176	-0.001	0.011	1.540	0.245	0.124	0.001	9.718
S.D.	0.005	0.012	0.000	0.004	0.001	0.004	0.001	0.020
% R.S.D.	2.577	1029.050	0.511	0.285	0.369	3.387	99.708	0.202

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.001	0.018	-0.000	1.334	0.034	0.001	0.003	0.247
S.D.	0.001	0.007	0.001	0.010	0.000	0.000	0.001	0.032
% R.S.D.	69.734	39.369	292.891	0.777	0.376	38.897	54.672	12.955

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.043	0.029	0.002	0.001	-0.045
S.D.	0.000	0.007	0.001	0.000	0.008
% R.S.D.	0.715	25.440	43.974	18.815	16.914

.5536

Identity 1: K211 sam dil Identity 2: ~~.5414~~gin50ml-1-9 1:55 PM July 22, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.013	0.166	2.210	1.282	133.660	0.008	0.078	0.006
S.D.	0.001	0.000	0.004	0.004	0.181	0.002	0.001	0.000
% R.S.D.	6.776	0.071	0.199	0.350	0.135	28.946	0.743	4.189

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.164	22.986	0.569	67.484	9.798	0.136	0.891	5.661
S.D.	0.000	0.010	0.004	0.063	0.014	0.003	0.004	0.032
% R.S.D.	0.162	0.045	0.627	0.093	0.139	2.037	0.471	0.572

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.758	0.107	0.054	7.470	1.156	0.451	0.002	48.127
S.D.	0.012	0.011	0.000	0.066	0.009	0.001	0.002	0.053
% R.S.D.	1.596	9.995	0.209	0.889	0.797	0.259	105.912	0.109

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.000	0.050	0.002	6.488	0.171	0.004	0.025	-0.010
S.D.	0.000	0.011	0.001	0.012	0.000	0.000	0.001	0.044
% R.S.D.	519.752	22.917	24.994	0.186	0.077	6.391	3.390	423.007

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.211	0.074	0.009	0.001	-0.100
S.D.	0.001	0.008	0.001	0.000	0.020
% R.S.D.	0.416	11.476	12.709	13.066	19.971

Identity 1: K211 dup dil Identity 2: .5414gin50ml-1-9-1-4 1:42 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.004	0.033	0.467	0.275	26.522	0.003	0.013	0.001
S.D.	0.001	0.000	0.025	0.002	0.078	0.001	0.001	0.001
% R.S.D.	32.976	0.288	5.310	0.787	0.294	19.184	4.549	80.451

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.032	4.693	0.112	13.655	1.980	0.029	0.162	1.229
S.D.	0.000	0.023	0.002	0.067	0.008	0.001	0.006	0.048
% R.S.D.	1.088	0.498	1.338	0.489	0.386	4.196	3.665	3.911

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.174	0.047	0.013	1.470	0.236	0.101	-0.000	9.593
S.D.	0.011	0.016	0.000	0.025	0.004	0.000	0.002	0.018
% R.S.D.	6.549	33.931	1.748	1.701	1.674	0.099	573.352	0.189

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.002	-0.008	0.001	1.325	0.034	0.001	0.002	-0.067
S.D.	0.000	0.016	0.000	0.007	0.000	0.000	0.001	0.027
% R.S.D.	9.123	202.499	13.057	0.558	0.812	9.277	43.557	40.398

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.043	0.043	0.003	0.000	0.027
S.D.	0.000	0.013	0.001	0.000	0.007
% R.S.D.	0.124	30.717	21.051	42809.835	26.551

Identity 1: K211 dup dil Identity 2: .5414gin50ml-1-9 1:58 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.018	0.161	2.191	1.344	131.230	0.005	0.067	-0.001
S.D.	0.001	0.001	0.020	0.012	0.732	0.001	0.002	0.000
% R.S.D.	5.772	0.619	0.921	0.861	0.558	23.650	2.374	30.801

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.153	22.895	0.559	66.812	9.584	0.128	0.797	5.613
S.D.	0.001	0.156	0.003	0.419	0.054	0.001	0.010	0.069
% R.S.D.	0.803	0.681	0.525	0.628	0.558	0.715	1.197	1.228

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.732	0.127	0.053	7.595	1.159	0.445	-0.024	46.951
S.D.	0.009	0.017	0.000	0.148	0.017	0.002	0.002	0.250
% R.S.D.	1.200	13.277	0.892	1.949	1.478	0.540	9.920	0.533

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.003	-0.030	0.002	6.406	0.170	0.003	0.019	0.013
S.D.	0.001	0.011	0.001	0.036	0.001	0.001	0.002	0.031
% R.S.D.	27.474	36.657	80.209	0.562	0.729	23.750	13.019	247.100

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.208	0.022	0.010	0.000	-0.045
S.D.	0.001	0.010	0.001	0.000	0.036
% R.S.D.	0.628	45.519	8.810	17.699	80.294

Identity 1: K211 dig spike Identity 2: .5630gin50ml-1-9 2:02 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.026	0.608	1.992	0.840	106.344	0.007	0.059	0.491
S.D.	0.001	0.001	0.011	0.003	0.216	0.001	0.001	0.001
% R.S.D.	4.365	0.219	0.548	0.373	0.203	21.231	1.414	0.183

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.117	20.719	0.878	49.887	7.797	0.594	1.064	4.122
S.D.	0.000	0.068	0.003	0.190	0.021	0.003	0.015	0.099
% R.S.D.	0.414	0.326	0.361	0.380	0.272	0.563	1.377	2.410

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	1.016	0.595	0.529	5.533	0.845	0.893	0.483	33.684
S.D.	0.013	0.022	0.001	0.082	0.005	0.005	0.002	0.060
% R.S.D.	1.252	3.683	0.223	1.483	0.547	0.592	0.517	0.177

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.000	0.570	0.047	6.321	0.118	0.487	0.007	0.443
S.D.	0.001	0.006	0.001	0.028	0.000	0.002	0.001	0.018
% R.S.D.	187.816	1.040	2.564	0.448	0.187	0.377	13.004	4.104

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.638	0.075	0.009	0.509	0.441
S.D.	0.002	0.018	0.000	0.002	0.018
% R.S.D.	0.260	23.587	4.431	0.326	4.022

Range .2000 .0500 .0100

Identity 1: K211 post spike Identity 2: .5536gin50ml-1-9 2:06 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	1.018	1.160	3.265	2.210	138.229	1.009	1.075	1.004
S.D.	0.003	0.004	0.028	0.007	0.450	0.005	0.002	0.003
% R.S.D.	0.335	0.326	0.870	0.294	0.325	0.520	0.226	0.273

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	1.132	24.995	1.590	71.311	11.093	1.133	1.914	7.798
S.D.	0.004	0.096	0.007	0.309	0.038	0.004	0.022	0.033
% R.S.D.	0.319	0.383	0.470	0.433	0.341	0.314	1.160	0.421

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	1.760	1.098	1.059	8.519	2.171	1.436	0.986	50.308
S.D.	0.006	0.011	0.003	0.038	0.011	0.004	0.009	0.137
% R.S.D.	0.369	0.968	0.316	0.443	0.491	0.307	0.868	0.273

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.997	1.168	0.763	7.737	1.153	0.982	1.016	0.976
S.D.	0.002	0.009	0.008	0.015	0.004	0.003	0.008	0.043
% R.S.D.	0.186	0.740	1.004	0.188	0.328	0.352	0.766	4.437

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	1.208	0.974	1.003	1.031	0.858
S.D.	0.004	0.017	0.003	0.003	0.010
% R.S.D.	0.307	1.731	0.304	0.278	1.144

Range 10.00 10.00 10.00

Identity 1: CCV Identity 2: Quality Control 2:09 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	4.972	4.894	4.962	4.313	5.044	4.962	5.036	5.014
S.D.	0.039	0.039	0.047	0.032	0.039	0.038	0.037	0.038
% R.S.D.	0.775	0.807	0.941	0.750	0.777	0.771	0.733	0.756

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	4.977	4.912	5.007	5.039	4.944	4.959	5.224	9.906
S.D.	0.038	0.035	0.039	0.033	0.037	0.039	0.032	0.057
% R.S.D.	0.761	0.709	0.769	0.663	0.747	0.789	0.614	0.571

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	4.811	4.930	4.968	4.799	4.799	4.837	4.895	4.994
S.D.	0.030	0.042	0.040	0.084	0.060	0.037	0.052	0.030
% R.S.D.	0.623	0.854	0.813	1.757	1.249	0.769	1.064	0.610

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	4.890	5.601	3.939	4.934	4.830	4.935	5.004	4.810
S.D.	0.044	0.060	0.068	0.036	0.040	0.037	0.027	0.086
% R.S.D.	0.890	1.071	1.721	0.731	0.836	0.740	0.538	1.788

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	4.958	4.702	4.942	5.053	4.824
S.D.	0.042	0.049	0.042	0.043	0.015
% R.S.D.	0.852	1.046	0.849	0.858	0.312

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Identity 1: CCB Identity 2: Quality Control 2:13 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.003	0.001	0.004	-0.001	-0.004	0.001	-0.000	0.002
S.D.	0.002	0.000	0.015	0.002	0.009	0.001	0.001	0.001
% R.S.D.	53.712	23.372	396.582	217.182	205.523	109.766	271.315	70.611

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.001	0.001	0.002	0.005	0.002	0.002	-0.022	-0.302
S.D.	0.000	0.002	0.002	0.001	0.000	0.001	0.005	0.089
% R.S.D.	39.892	127.623	95.543	13.552	14.886	37.888	25.172	29.420

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.018	-0.082	-0.000	-0.020	-0.011	0.002	0.004	0.000
S.D.	0.015	0.021	0.000	0.015	0.001	0.000	0.002	0.005
% R.S.D.	81.415	24.979	380.867	76.393	11.000	21.223	40.791	101065.629

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.001	-0.021	0.459	-0.019	-0.001	0.001	0.002	-0.647
S.D.	0.001	0.011	0.024	0.009	0.001	0.001	0.001	0.022
% R.S.D.	70.239	54.643	5.236	49.346	62.383	128.029	42.131	3.467

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.001	0.043	-0.001	0.001	-0.076
S.D.	0.000	0.016	0.002	0.000	0.024
% R.S.D.	43.175	37.828	237.270	36.968	32.199

Identity 1: icsaf Identity 2: icsaf 2:17 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.005	0.016	0.040	0.471	-6.419	-0.000	-0.017	0.003
S.D.	0.001	0.000	0.004	0.013	0.000	0.001	0.000	0.001
% R.S.D.	31.111	0.296	10.461	2.838	0.005	23243.278	2.023	25.751

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.047	-0.075	0.060	205.695	-2.373	0.001	1.802	-0.079
S.D.	0.000	0.004	0.002	1.511	0.000	0.003	0.021	0.064
% R.S.D.	0.622	5.444	3.997	0.735	0.000	285.713	1.146	81.404

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.010	0.830	0.004	0.142	6.168	-1.103	0.241	0.316
S.D.	0.010	0.018	0.000	0.021	0.080	0.000	0.011	0.013
% R.S.D.	97.079	2.117	10.028	14.563	1.289	0.000	4.554	3.973

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.002	0.083	0.100	-0.381	-0.001	-0.005	-0.024	-0.295
S.D.	0.001	0.009	0.022	0.004	0.000	0.000	0.003	0.049
% R.S.D.	60.446	10.870	21.890	1.006	29.369	4.947	12.542	16.724

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.158	0.118	-0.002	0.005	-0.074
S.D.	0.000	0.011	0.000	0.000	0.013
% R.S.D.	0.309	9.150	20.442	2.576	17.027

Identity 1: icsabf Identity 2: icsabf 2:19 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.004	0.015	0.038	0.430	-6.035	0.446	0.471	0.003
S.D.	0.001	0.000	0.002	0.002	0.000	0.002	0.002	0.000
% R.S.D.	14.130	0.264	5.662	0.445	0.002	0.463	0.446	3.132

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.980	0.802	0.050	181.815	-2.055	0.454	1.720	-0.002
S.D.	0.005	0.005	0.002	0.521	0.000	0.000	0.019	0.019
% R.S.D.	0.528	0.671	3.972	0.287	0.000	0.088	1.094	790.917

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.002	0.744	0.493	0.133	5.564	-0.997	0.222	0.276
S.D.	0.003	0.018	0.001	0.011	0.010	0.000	0.007	0.005
% R.S.D.	192.087	2.421	0.284	8.010	0.188	0.000	2.965	1.736

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.005	0.065	0.970	0.509	-0.000	0.875	-0.023	-0.099
S.D.	0.001	0.006	0.002	0.009	0.000	0.003	0.000	0.023
% R.S.D.	17.960	9.328	0.206	1.854	68.410	0.322	2.098	23.447

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.610	0.101	0.476	0.482	-0.078
S.D.	0.002	0.029	0.001	0.002	0.001
% R.S.D.	0.364	28.536	0.130	0.393	1.855

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Identity 1: xxx Identity 2: rinse 2:26 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.000	0.001	0.027	0.010	0.162	0.001	-0.000	0.001
S.D.	0.001	0.000	0.004	0.002	0.029	0.000	0.000	0.000
% R.S.D.	552.213	13.212	16.327	20.076	18.167	30.357	115.455	34.075

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.001	0.005	0.002	0.061	0.120	-0.001	-0.003	0.059
S.D.	0.000	0.002	0.001	0.012	0.023	0.001	0.008	0.014
% R.S.D.	46.611	32.466	49.271	19.838	19.317	194.566	279.419	24.119

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.009	0.003	0.001	0.003	-0.005	0.123	-0.007	0.018
S.D.	0.006	0.001	0.000	0.006	0.002	0.024	0.002	0.003
% R.S.D.	64.378	32.145	14.394	197.243	47.609	19.450	30.919	17.643

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.000	0.003	0.002	-0.002	0.001	0.000	-0.002	-0.354
S.D.	0.002	0.011	0.000	0.011	0.000	0.000	0.000	0.002
% R.S.D.	420.118	351.969	24.866	497.345	32.535	45.618	28.825	0.487

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.001	0.050	0.001	0.000	0.029
S.D.	0.000	0.008	0.000	0.000	0.003
% R.S.D.	23.904	15.602	28.052	37.880	11.794

Identity 1: CCV Identity 2: Quality Control 2:29 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	5.024	4.967	5.019	4.395	5.125	5.116	5.067	5.050
S.D.	0.033	0.036	0.020	0.024	0.022	0.032	0.030	0.035
% R.S.D.	0.657	0.715	0.397	0.550	0.435	0.634	0.596	0.688

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	5.083	5.014	5.045	5.123	4.979	5.059	5.145	10.071
S.D.	0.027	0.026	0.024	0.045	0.035	0.024	0.035	0.085
% R.S.D.	0.537	0.522	0.469	0.884	0.713	0.471	0.679	0.848

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	4.997	5.127	5.022	5.058	5.009	4.988	5.045	5.037
S.D.	0.022	0.015	0.036	0.079	0.052	0.031	0.013	0.026
% R.S.D.	0.435	0.297	0.722	1.564	1.037	0.617	0.264	0.507

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	5.055	5.756	4.962	5.001	4.922	5.066	5.021	5.123
S.D.	0.037	0.031	0.027	0.036	0.032	0.022	0.026	0.014
% R.S.D.	0.726	0.545	0.552	0.713	0.659	0.439	0.516	0.269

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	5.032	4.777	5.014	5.182	4.932
S.D.	0.023	0.047	0.029	0.033	0.021
% R.S.D.	0.463	0.975	0.575	0.644	0.434

Identity 1: CCB Identity 2: Quality Control 2:31 PM July 22, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-079, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.001	0.002	0.025	0.004	0.034	0.002	0.001	0.002
S.D.	0.001	0.000	0.002	0.001	0.003	0.001	0.001	0.001
% R.S.D.	48.034	14.705	7.529	33.079	8.844	44.018	97.617	37.467

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.002	0.002	0.001	0.023	0.037	0.002	-0.001	0.010
S.D.	0.000	0.002	0.003	0.002	0.001	0.001	0.009	0.054
% R.S.D.	17.289	64.193	215.257	8.174	3.034	36.676	646.077	543.039

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.008	-0.019	0.002	-0.016	-0.000	0.037	-0.003	0.004
S.D.	0.014	0.018	0.000	0.013	0.003	0.001	0.002	0.010
% R.S.D.	179.705	95.544	21.545	79.878	788.862	3.292	57.660	240.864

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.003	-0.009	0.006	-0.008	0.001	0.003	0.006	-0.291
S.D.	0.000	0.005	0.001	0.005	0.000	0.000	0.001	0.038
% R.S.D.	12.298	54.397	9.531	70.460	30.750	12.059	16.677	12.992

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.002	0.032	0.001	0.002	-0.009
S.D.	0.000	0.008	0.001	0.000	0.019
% R.S.D.	7.445	24.126	119.095	18.479	206.553

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K209-K211

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WHC-SD-WM-DP-079, REV. 0

RADIOCHEMICAL ANALYSES

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Segment Serial No. K211	Customer ID: C58S1 C111
Analysis: AT	Sample Prep: FUSION

Instrument: WB27810	Procedure/ Rev: LA-508-101 D-0
Technologist: Patrick J. McCown PATRICK J. McCOWN	Date: 5/12/94
Starting Time: 5/12/94 18:00	Temperature NA
Ending Time: 23:30	Chemist: S. FITZGEALD

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	K209-5525	11		
2	REAGENT BLANK	K210-6625	12		
3	SAMPLE	K211-6725	13		
4	SAMPLE DUPLICATE	K211-6825	14		
5	SAMPLE SPIKED	K211-6925	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	142B51 / 10mL			
SPIKE	142B51 / 10mL			

1231

A-6000-881 (03/92)

QA

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-079, REV. 0

METHOD: LA-508-101

DATE START: MAY 12, 1994

PREPARED BY: S.L. FITZGERALD

DATE COMPLETE: MAY 17, 1994

	UNITS:	uCi/g							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD 142B51	K 209	ALPHA	8.48E-03				81.6	2.18E-07	5.5
BLANK	K 210	ALPHA	<1.93E-01					3.02E-01	196
C-111	K 211	ALPHA	2.59E+00	2.30E+00	2.45E+00	11.9		3.02E-01	12.4
								3.00E-01	13.1
C-111	K 211/SP	ALPHA					89.9		

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

1-2 Batch 3254

Serial No	Sample Point	Date	Time Issued	Priority
K 209.-5525	C-111	4-25-94	14:54	23

Determination	Method Standard	Result Units	Charge Code	Returns
AT	LA-508-101	% RECOVERY	N4C3B	0

Sample Size	Customer ID
10 ML	STD

Remarks Calculations Results

S510 EV-CRB

STD# 142851 RESULT 8.48 E-3

STD VAL 1.0397 E-2 %REC 81.6 %

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 5-13-94	Hrs	Hrs

Date	Time Completed	Lab Area Mgr
5/12/94	23:30	

54-88X-261 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) LIQUIDS

			STD	REPLICATE
Type	DETECTOR NUMBER		13	13
STD	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	1310	1344
3254	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.5	0.5
AT	SAMPLE SIZE in mL	(SS)	10.000	10
Test Code	DILUTION FACTOR	(DF)	1	1
	DIGEST DILUTION FACTOR	(DDF)	1	1
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
LIQUID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		43.167	44.300
Sample #	SAMPLE CONCENTRATION in µCi/L		8.37E-03	8.59E-03
K209-5525	AVG. µCi/L in SAMPLE and REPLICATE =			8.4839E-03

Instrument Code	
WB27810	Rs (Sample Count Rate) = (TC / CT) - BKG
Analyst	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
MCCOWN	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Date	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100
05/12/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
Time	
23:30	

v RESULTS v

ALPHA TOTAL	in µCi/L	(AVERAGE) =	8.48E-03	DETECTION LEVEL 2.18E-07 µCi/mL
ALPHA TOTAL	in µCi/mL	(AVERAGE) =	8.48E-06	
RELATIVE COUNTING ERROR		=	5.5%	

Data Entry by:		Date:	17-May-94
Approved by:		Date:	17-May-94

Form L1 Rev. 2.1

B/2 5-13-94 AJ DF 1 55 10ml

K209-5525

1310/30 --5

Alpha Calculation (CEPC_CAL 2.0)
By: AL JOHANSEN, .. 4, on 05-13-1994 at 06:49:26
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 10 mL Dilution : 1

Sample # K209-5525 Mount # 1

1344/30

$$\frac{1310}{30} \cdot 0.5 = 8.3740E\text{-}03 \text{ uCi/L alpha}$$

Sample # K209-5525 Mount # 2

$$\frac{1344}{30} \cdot 0.5 = 8.5933E\text{-}03 \text{ uCi/L alpha}$$

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

5-6

Serial No	Sample Point	Date	Time Issued	Priority
K ~~211~~-6725	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	N4C3B	0

Sample Size	Customer ID
.050ML- 10ML- .500ML	C58S1

Remarks Calculations Results:
COUNT AS uCI/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 5-13-94	Hrs	Hrs

Date	Time Completed	Lab Lab Mgr	
5/12/94	23:30		

WHC-SD-WM-DP-078, REV. 0

AT: LA-508-101 (D-0) SOLIDS

Type			SAM	REPLICATE
SAM	DETECTOR NUMBER		13	13
Work List	DISH SIZE 1, 2, or 5	(MS)	2	2
3254	TOTAL COUNTS	(TC)	316	282
AT or TB ?	COUNT TIME in MINUTES	(CT)	30	30
AT	BACKGROUND in cpm	(BKG)	0.5	0.5
Test Code	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	201	201
	DIGEST GRAMS of SOLIDS/LITER	(D g/L)	2.9036	2.9036
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
SOLID	Lc, Pmax, or Rs (Sample Rate) as Appropriate		10.033	9.233
Sample #	CONCENTRATION in pCi/g		2.69E+00	2.48E+00
K211-6725	AVG pCi/L in DIGEST SOLUTION =			7.5126E+00
Instrument Code				
WB27810				
Analyst				
MCCOWN				
Date				
05/12/94				
Time				
23:30				

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL pCi/g = Rs * 1000mL/L * DF * / (EFF * SS * D g/L * 2220000dpm/pCi)

Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

v RESULT v

ALPHA TOTAL	in pCi/g	(AVERAGE) =	2.59E+00	DETECTION LEVEL 3.02E-01 pCi/g
RELATIVE COUNTING ERROR		=	12.4%	

Data Entry by: Date: 17-May-94

Approved by: Date: 17-may-94

Form L2 Rev. 2.1

Page 1 of 1

B/2 5-13-94 RJ

DF 402

K211-6725

316/30 - .5

292/30

Alpha Calculation (CEPC_CAL 2.0)
By: AL JOHANSEN, I on 05-13-1994 at 08:51:11
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 1 mL Dilution : 402

Sample # K211-6725 Mount # 1

$$\frac{316}{30} - 0.5 = 7.8245E+00 \text{ uCi/L alpha}$$

Sample # K211-6725 Mount # 2

$$\frac{292}{30} - 0.5 = 7.2906E+00 \text{ uCi/L alpha}$$

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

7-8

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-6825	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Returns
AT	LA-508-101	uCi/G Rec	N4C3B	0

Sample Size: .050mL-10mL-.500mL

Customer ID: C5851

Remarks Calculations Results

COUNT AS uCI/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 5-13-94	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5/12/94	23:30	

54-6800-001 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) SOLIDS

Type			SAMPLE	REPLICATE
	DETECTOR NUMBER		13	13
DUP	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	282	265
3254	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.5	0.5
AT	SAMPLE SIZE in mL	(SS)	0.500	0.500
Test Code	DILUTION FACTOR	(DF)	201	201
	DIGEST GRAMS of SOLIDS/LITER	(D g/L)	2.926	2.926
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
SOLID	Rc Rmax or Rs (Sample Rate) as Appropriate		8.900	8.333
Sample #	CONCENTRATION in µCi/g		2.37E+00	2.22E+00
K211-6825	AVG µCi/L in DIGEST SOLUTION =			6.7197E+00
Instrument Code				
WB27810	Rs (Sample Count Rate) = (TC / CT) - BKG			
Analyst	ALPHA TOTAL µCi/g = Rs * 1000mL/L * DF * / (EFF * SS * D g/L * 2220000dpm/µCi)			
MCCOWN	Relative Counting Error = 1 (The Square Root of TC + BKG * CT) / (TC - BKG * CT)) * 1.96 * 100			
Date	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
05/12/94				
Time				
23:30	v RESULT v			

ALPHA TOTAL	in µCi/g	(AVERAGE) =	2.30E+00	DETECTION LEVEL 3.00E-01 µCi/g
RELATIVE COUNTING ERROR	=		13.1%	

Data Entry by: Date: 17-May-94

Approved by: Date: 17-May-94

Form L2 Rev. 2.1

13/2 5-13-94 AJ DF 402

K211-6825

282/30 -.5

265/30

Alpha Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 05-13-1994 at 09:35:36
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 1 mL Dilution : 402

Sample # K211-6825 Mount # 1

$$\frac{282}{30} - 0.5 = 0.9407E+00 \text{ uCi/L alpha}$$

Sample # K211-6825 Mount # 2

$$\frac{265}{30} - 0.5 = 0.4587E+00 \text{ uCi/L alpha}$$

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

9-10

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-6925	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Returns
AT	LA-508-101	% RECOVERY	N4C3B	0

Sample Size	Customer ID
.050ML-10ML-.500ML + 10ML SPIKE	C5BS1

Remarks Calculations Results

SAMPLE SPIKED ID K211-6925
SPIKE ID 142851
SPIKE VOLUME 10ML

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 5-13-94	Hrs	Hrs

Date	Time Completed	Lab Chief Mgr
5/12/94	23:30	

54-660C-DE1 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) SPIKED SAMPLE

			SPIKE	REPLICATE
Type	DETECTOR NUMBER		13	13
SPIKE	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	1748	1751
3254	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.5	0.5
AT	SAMPLE VOLUME in mL (Spiked Vial)	(SS)	0.500	0.500
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial)	(DF)	201	201
	SPIKE VOLUME in mL	(SVol)	10.000	10.000
Matrix	SPIKE DILUTION FACTOR	(SDF)	1	1
SOLID	SPIKE VALUE in µCi/L	(SVal)	0.010397	0.010397
Sample #	INSTRUMENT EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
K211-6925	SAMPLE + SPIKE µCi/L	(S+S)	4.50E+01	4.51E+01
Instrument Code	AVG. SAMPLE or DIGEST µCi/L from FORM #1		7.51E+00	
WB27810				
Analyst	Rs (Sample Count Rate) = (TC / CT) - BKG			
MCCOWN	SAMPLE + SPIKE µCi/L = Rs * 1000mL/L * DF / (EFF * SS * 2220000dpm/µCi)			
Date	AVG. PERCENT SPIKE RECOVERY = (((((S+S µCi/L (Spike) + S+S µCi/L (Replicate))/2)-Sample µCi/L)*((SDF/Svol)/(DF/SS)))			
05/12/94				
Time				
23:30				

RESULT **AVG. PERCENT SPIKE RECOVERY = 89.9%**

Data Entry by:		Date:	17-May-94
Approved by:		Date:	17-May-94

Form L3 Rev. 2.1

13/2 5-13-94 AB DF402

K211-6925

1748
30

Alpha Calculation (CEPC_CAL 2.0)
By: AL JOHANSEN, , on 05-13-1994 at 10:54:55
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 1 mL Dilution : 402

1751
30

Sample # K211-6925 Mount # 1

$$\frac{1748}{30} \cdot 0.5 = 4.5049E+01 \text{ uCi/L alpha}$$

Sample # K211-6925 Mount # 2

$$\frac{1751}{30} \cdot 0.5 = 4.5127E+01 \text{ uCi/L alpha}$$

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3-4

Serial No	Sample Point	Date	Time Issued	Priority
K 210.-6625	C-111	4-25-94	14:55	23

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	N4C3B	0

Sample Size	Customer ID
.050mL-.10mL-.500mL	BLANK

Remarks Calculations Results

COUNT AS uCI/L
USE 13,14,15 OR 16

<1.93 E-1

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 5-13-94	Hrs	Hrs

Date	Time Completed	Last Work Mgr.
5/12/94	23:30	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) SOLIDS

			BLK	REPLICATE
Type	DETECTOR NUMBER		13	13
BLK	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	23	10
3254	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.5	0.5
AT	SAMPLE SIZE in mL	(SS)	0.500	0.500
Test Code	DILUTION FACTOR	(DF)	201	201
	DIGEST GRAMS of SOLIDS/LITER	(D g/L)	2.9036	2.9036
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
SOLID	Lc Rmax or Rs (Sample Rate) as Appropriate		0.720	0.426
Sample #	CONCENTRATION in µCi/g		1.93E-01	1.14E-01
K210-6625	AVG. µCi/L in DIGEST SOLUTION =		<	4.4695E-01
Instrument Code				
WB27810	Rs (Sample Count Rate) = (TC / CT) - BKG			
Analyst	ALPHA TOTAL µCi/g = Rs * 1000mL/L * DF * / (EFF * SS * D g/L * 2220000dpm/µCi)			
MCCOWN	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100			
Date	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
05/12/94				
Time				
23:30				

v RESULT v

ALPHA TOTAL	in µCi/g	(AVERAGE) =	< 1.93E-01	DETECTION LEVEL 3.02E-01 µCi/g

LESS THAN Value was Determined from Rmax.

RELATIVE COUNTING ERROR	=	196.0%

Data Entry by: Date: 17-May-94

Approved by: Date: 17-May-94

Form L2 Rev. 2.1

TOTAL ALPHA ANALYSIS - FUSION

13/2 5-13-94 AJ DF 402

K210-6625

23/30 -.5

Alpha Calculation (CKPC_CAL 2.0)
By: AL JOHANSEN, ' on 05-13-1994 at 08:50:30
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 1 mL Dilution : 402

10/30

Sample # K210-6625 Mount # 1

23
---------- - 0.5 < 4.7236E-01 uCi/L alpha
30

Sample # K210-6625 Mount # 2

10
---------- - 0.5 < 2.3456E-01 uCi/L alpha
30

OA 9

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. k212-214	Customer ID: C-111 C58FB LAD 5-25-94
Analysis: AT	Sample Prep: DIRECT

Instrument: N/A	Procedure/ Rev: LA-508-101 D-0
Technologist: ALETA K LEWIS	Date: 05/12/94
Starting Time: 12:00	Temperature 25 C
Ending Time: 14:30	Chemist: S. FITZGERALD

Comments: BATCH# 3442

	Description	Lab ID		Description	Lab ID
1	LMCS	K212-5525	11		
2	BLANK	K213-5625	12		
3	SAMPLE	K214-5725	13		
4	SAMPLE Dup	K214-5825	14		
5	SAMPLE + Spike	K214-5925	15		
6	~~SAMPLE~~ LAD 5-24-94		16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
EV-CRB	142B51	10ML		
			1243	

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-079, REV. 0

METHOD: LA-508-101

DATE START: May 12, 1994

PREPARED BY: L. L. Fritts LLFritts 5·25·94

DATE COMPLETE: May 25, 1994

	UNITS:	uCi/mL							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD 142B51	K212	AT	9.41E-6				90.5	2.62E-7	5.2
BLANK	K213	AT	<2.09E-7					5.24E-7	108.4
C58FB	K214	AT	<4.33E-7	<4.19E-7	N/A	N/A		5.24E-7	98.0
								5.24E-7	500.0
C58FB	K214	SPIKE	101.6						

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

1 of 2 **RERUN** Batch 3442

Serial No	Sample Point	Date	Time Issued	Priority
K 212.-5525	C-111	4-27-94	10: 2	21

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	N4CSB	1

Sample Size	Customer ID
? 10 ml	STD

Remarks Calculations Results

S510 EV-CRB

STD# 142851 RESULT 9.4054 E-3 µCi/L

STD VAL 1.0397 E-2 %REC 90.5 %

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 5-12-94	Hrs 5-12-94	Hrs 5-18-94	Hrs
Date 5/12/94	Time Completed 10:15	Lab Unit		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) LIQUIDS

			std	REPLICATE
Type: std	DETECTOR NUMBER		13	13
	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List: 3442	TOTAL COUNTS	(TC)	1477	1480
	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?: AT	BACKGROUND in cpm	(BKG)	0.8	0.8
	SAMPLE SIZE in mL	(SS)	10.000	10
Test Code:	DILUTION FACTOR	(DF)	1	1
	DIGEST DILUTION FACTOR	(DDF)	1	1
Matrix: LIQUID	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		48.433	48.533
Sample #: K 212-5525	SAMPLE CONCENTRATION in µCi/L		9.40E-03	9.42E-03
	AVG. µCi/L in SAMPLE and REPLICATE =			9.4054E-03

Instrument Code:

Analyst: A LEWIS

Date: 05/12/94

Time:

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

v RESULTS v

ALPHA TOTAL	in µCi/L	(AVERAGE) =	9.41E-03	DETECTION LEVEL 2.62E-07 µCi/mL
ALPHA TOTAL	in µCi/mL	(AVERAGE) =	9.41E-06	
RELATIVE COUNTING ERROR		=	5.2%	

Date Entry by: Date: 18-May-94

Approved by: Date: 25 May 94

Form L1 Rev. 2:1

Page 1 of 1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-079, REV. 0

13/2 5-12-94 #1-2 10ml

K212-5525

1477/30 - .8

1480/30 - .8

~~13~~ 5-12-94
Alpha Calculation (CSPC_CAL 2.0)
By: VA RAYMOND, , on 05-12-1994 at 21:31:25
Det #13 2 -inch mount Alpha eff. : .2332
Sample size : 10 mL Dilution : 1

Sample # K212-5525 Mount # 1

$$\frac{1477}{30} - 0.8 = 9.3957E-03 \text{ uCi/L alpha}$$

Sample # K212-5525 Mount # 2

$$\frac{1480}{30} - 0.8 = 9.4151E-03 \text{ uCi/L alpha}$$

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3 84

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 213.-5625	C-111	4-27-94	10: 7	21

Determination	Method Standard	Result Units	Charge Code	Returns
AT	LA-508-101	uCi/ML	N4C3B	1

Sample Size	Customer ID
? 5 ml	BLANK

Remarks Calculations Results

COUNT AS uCi/L
USE 13,14,15 OR 16

< 2.09 E-7

Alta Lewis

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
		Raymond		
Hrs	Hrs 5-12-94	Hrs 5-12-94	Hrs	Hrs

Date	Time Completed	Lab Use Only
5/12/94	10:15	

54-6800-061 (R 10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) LIQUIDS

			BLK	REPLICATE
Type	DETECTOR NUMBER		13	13
BLK	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	10	13
3442	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	5.000	5
Test Code	DILUTION FACTOR	(DF)	1	1
	DIGEST DILUTION FACTOR	(DDF)	1	1
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		0.539	0.539
Sample #	SAMPLE CONCENTRATION in µCi/L		2.09E-04	2.09E-04
K 213-5625	AVG. µCi/L in SAMPLE and REPLICATE =		<	2.0908E-04
Instrument Code				
	Rs (Sample Count Rate) = (TC / CT) - BKG			
Analyst	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)			
A LEWIS	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L			
Date	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100			
05/12/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
Time				

v RESULTS v

ALPHA TOTAL	in µCi/L	(AVERAGE) =	< 2.09E-04	DETECTION LEVEL
ALPHA TOTAL	in µCi/mL	(AVERAGE) =	< 2.09E-07	
LESS Than Value was Determined from Lc.				5.24E-07 µCi/mL
RELATIVE COUNTING ERROR		=	108.4%	

Date Entry by:		Date:	18-May-94
Approved by:		Date:	25 May 94

Form L1 Rev. 2.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-079, REV. 0

13/2 5-12-94 AJ #3-4 5 ml

K213-5625

10/30 - .8

13/30

Alpha Calculation (GROS_CALC 2.0)
By: VA LATKINO, on 05-12-1994 at 21:50:51
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 5 mL Dilution : 1

Sample # K213-5625 Mount # 1

10
---------- - 0.6 < 1.4762E-04 uCi/L alpha
30

Sample # K213-5625 Mount # 2

13
---------- - 0.6 < 1.4703E-04 uCi/L alpha
30

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

5rl

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5725	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	N4C3B	1

Sample Size	Customer ID
? 5ml	C56FB

Remarks Calculations Results

COUNT AS uCi/L
USE 13,14,15 OR 16

<4.33 E-7 uCi/ml

Celso Freire

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 5-12-94	Hrs 5-12-94	Hrs	Hrs

Date	Time Completed	Lab Mgr.	
5/12/94	10:15		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV 0

AT: LA-508-101 (D-0) LIQUIDS

			SAM	REPLICATE
Type	DETECTOR NUMBER		13	13
SAM	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	40	57
3442	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	5.000	5
Test Code	DILUTION FACTOR	(DF)	1	1
	DIGEST DILUTION FACTOR	(DDF)	1	1
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
LIQUID	i.e. Rmax or Rs (SAMPLE RATE) as APPROPRIATE		1.115	1.100
Sample #	SAMPLE CONCENTRATION in µCi/L		4.33E-04	4.27E-04
K 214-5725	AVG. µCi/L in SAMPLE and REPLICATE =		<	4.2977E-04
Instrument Code				
	Rs (Sample Count Rate) = (TC / CT) - BKG			
Analyst	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)			
A LEWIS	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L			
Date	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100			
05/12/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
Time				

v RESULTS v

ALPHA TOTAL	in µCi/L	(AVERAGE) =	< 4.33E-04	DETECTION LEVEL
ALPHA TOTAL	in µCi/mL	(AVERAGE) =	< 4.33E-07	
LESS THAN Value was Determined from Rs.				5.24E-07 µCi/mL
RELATIVE COUNTING ERROR		=	98.0%	

Data Entry by:		Date:	18-May-94
Approved by:		Date:	25 May 94

Form L1 Rev. 2.1

Page 1 of 1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 5-12-94 AD #5-6 5ml

K214-5725

40/30 -, 6

Alpha Calculation (CAPC_CAL 2.0)
By: VE RAYMOND, Tue 05-12-1994 at 21:30:21
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 5 mL Dilution : 1

57/30

Sample # K214-5725 Mount # 1

49
---------- - 0.0 = 2.00000E-04 uCi/L alpha
30

Sample # K214-5725 Mount # 2

57
---------- - 0.0 = 4.26783E-04 uCi/L alpha
30

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE.

758 **RERUN**

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5825	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	N4C3B	1

Sample Size	Customer ID
? 5ml	C58FB

Remarks Calculations Results

COUNT AS uCi/L
USE 13,14,15 OR 16

<4.19E-7 µCi/ml

Alita Lewis

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
		Raymond		
His	His 5-12-94	His 5-12-94	His	His

Date	Time Completed	Lab Unit Manager	
5/12/94	10:15		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

5-25-94

AT: LA-508-101 (D-0) LIQUIDS

			~~DF SAM~~	REPLICATE
Type	DETECTOR NUMBER		13	13
~~SAM~~ Dup	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	29	39
3442	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	5.000	5
Test Code	DILUTION FACTOR	(DF)	1	1
	DIGEST DILUTION FACTOR	(DDF)	1	1
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		0.719	1.079
Sample #	SAMPLE CONCENTRATION in µCi/L		2.79E-04	4.19E-04
K 214-5825	AVG. µCi/L in SAMPLE and REPLICATE =		<	3.4897E-04
Instrument Code				
	Rs (Sample Count Rate) = (TC / CT) - BKG			
Analyst	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)			
A LEWIS	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L			
Date	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100			
05/12/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
Time				

v RESULTS v

ALPHA TOTAL	in µCi/L	(AVERAGE) =	< 4.19E-04	DETECTION LEVEL
ALPHA TOTAL	in µCi/mL	(AVERAGE) =	< 4.19E-07	
LESS THAN Value was Determined from Rmax.				5.24E-07 µCi/mL
RELATIVE COUNTING ERROR		=	500.0%	

Data Entry by:		Date:	18-May-94
Approved by:		Date:	25 May 94

Form L1 Rev. 2.1 Page 4 of 1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-079 REV 0

13/2 5-12-94 AO #7-8 5ml

K014-5825

29/30 - .

39/30

Alpha Calculation (CRPC_CAL 2.0)
By: VZ RAYMOND, 88544, on 05-12-1994 at 21:26:54
Det #13 2 -inch mount Alpha eff. : .2222
Sample size : 5 mL Dilution : 1

Sample # K014-5825 Mount # 1

29
---------- - 0.0 < 2.20428-04 uCi/l alpha
30

Sample # K014-5825 Mount # 2

39
---------- - 0.0 = 1.5599E-04 uCi/l alpha
30

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

9 x 7c

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5925	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	N4C3B	1

Sample Size	Customer ID
? 5 ml	C58FB

Remarks Calculations Results

SAMPLE SPIKED ID
SPIKE ID
SPIKE VOLUME
10 ml 142B51

101.6%

Alda Lewis

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 5-12-94	Hrs 5-12-94	Hrs	Hrs

Date	Time Completed	Lab Unit No	
5/12/94	10:15		

54-660C-DE1 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) SPIKED SAMPLE

			SPIKE	REPLICATE
Type	DETECTOR NUMBER		13	13
SPIKE	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	1658	1656
3442	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE VOLUME in mL (Spiked Vial)	(SS)	5.000	5.000
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial)	(DF)	1	1
	SPIKE VOLUME in mL	(SVol)	10.000	10.000
Matrix	SPIKE DILUTION FACTOR	(SDF)	1	1
LIQUID	SPIKE VALUE in µCi/L	(SVal)	0.010397	0.010397
Sample #	INSTRUMENT EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
K214-5925	SAMPLE + SPIKE µCi/L	(S+S)	2.11E-02	2.11E-02
Instrument Code	AVG. SAMPLE or DIGEST µCi/L from FORM #1		<4.2977E-4	
Analyst	Rs (Sample Count Rate) = (TC / CT) - BKG			
A LEWIS	SAMPLE + SPIKE µCi/L = Rs * 1000mL/L * DF / (EFF * SS * 2220000dpm/µCi)			
Date	AVG. PERCENT SPIKE RECOVERY = (((((S+S µCi/L (Spike) + S+S µCi/L (Replicate))/2)-Sample µCi/L)*((SDF/Svol)/(DF/SS)))			
05/12/94				
Time	NOTE: Original Sample result was a LESS THAN value. Zero (0) was subtracted from the spiked value for percent recovery calculation.			

RESULT **AVG. PERCENT SPIKE RECOVERY = 101.6%**

Data Entry by:	Date: 18-May-94
Approved by:	Date: 25 May 94

Form L3 Rev. 2.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 5-12-94 AB #9-10 5ml

K214-5925

1658 / 30 - .8

1656 / 30

Alpha Calculation (CERO_CEL 2.0)
By: VA RAYMOND , on 05-12-1994 at 21:26:16
Det #13 2 -foot mount Alpha eff. : .2222
Sample size : 5 ml Dilution : 1

Sample # K214-5925 Mount # 1

1656 / 30 - 0.8 = 2.11321-02 uCi/ml alpha

Sample # K214-5925 Mount # 2

1656 / 30 - 0.8 = 2.11321-02 uCi/ml alpha

OA 5

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K215,K216	Customer ID: C58HCB C111
Analysis: AT	Sample Prep: DIRECT

Instrument: wA 57276	Procedure/ Rev: LA-508-101 - D0
Technologist: JD SPELLMAN	Date: 05/04/94
Starting Time: 0000	Temperature NA
Ending Time: 0300	Chemist: S. FITZGERALD

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	K215-5525	11		
2	SAMPLE	K216-5725	12		
3			13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
EV-CRB	142B51 10ML			

255

A-6000-881 (03/92)

08

ANALYTICAL BATCH SUMMARY SHEET

WHC-SD-WM-DP-079, REV. 0

METHOD: LA-508-101

DATE START: MAY 4, 1994

PREPARED BY: S.L. FITZGERALD

DATE COMPLETE: MAY 6, 1994

	UNITS:	uCi/mL							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD 142B51	K215	ALPHA	9.70E-03				93.3	2.05E-07	5.3
C-111	K216	ALPHA	9.67E-07					2.05E-07	18.9

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

5-6-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3347

Serial No	Sample Point	Date	Time Issued	Priority
K 215.-5525	C-111	4-28-94	11:14	21

Determination	Method Standard	Result Units	Charge Code	Returns
AT	LA-508-101	% RECOVERY	N4C3B	0

Sample Size	Customer ID
10mL	STD

Remarks Calculations Results

S510 EV-CRE

STD# 14285 RESULT 9.6997 E-3

STD VAL 1.0398 E-2 %REC 93.3 %

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Laboratory Mgr
5-4-94	0300	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) LIQUIDS

		STD	REPLICATE
DETECTOR NUMBER		14	14
DISH SIZE 1, 2, or 5	(MS)	2	2
TOTAL COUNTS	(TC)	1551	1411
COUNT TIME in MINUTES	(CT)	30	30
BACKGROUND in cpm	(BKG)	0.4	0.4
SAMPLE SIZE in mL	(SS)	10.000	10
DILUTION FACTOR	(DF)	1	1
DIGEST DILUTION FACTOR	(DDF)	1	1
EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
Lc Rmax or Rs, (SAMPLE RATE) as APPROPRIATE		51.300	46.633
SAMPLE CONCENTRATION in µCi/L		1.02E-02	9.24E-03
AVG. µCi/L in SAMPLE and REPLICATE =			9.6997E-03

Type	Work List	AT or TB ?	Test Code	Matrix	Sample #	Instrument Code	Analyst	Date	Time
STD	3347	AT		LIQUID	K215-5525		MEYERS	05/04/94	3:00

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

v RESULTS v

ALPHA TOTAL	in µCi/L	(AVERAGE) =	9.70E-03	DETECTION LEVEL 2.05E-07 µCi/mL
ALPHA TOTAL	in µCi/mL	(AVERAGE) =	9.70E-06	
RELATIVE COUNTING ERROR		=	5.3%	

Data Entry by:		Date:	05-May-94
Approved by:		Date:	6-May-94

Form L1 Rev. 2.1

14/2 5-4-94 1-2 K215-5525

Alpha Calculation (CRPC_CAL 2.0)
By: RA WILLIAMS, . , on 05-04-1994 at 12:03:44
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

$\frac{1551}{30}$ - 4

Sample # K215-5525 Mount # 1

$\frac{1551}{30}$

1551
---------- - 0.4 = 1.0162E-02 uCi/L alpha
30

Sample # K215-5525 Mount # 2

1411
---------- - 0.4 = 9.2375E-03 uCi/L alpha
30

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 216.-5725	C-111	4-28-94	11:23	21

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	N4C3B	0

Sample Size	Customer ID
10 mL	C58HCB

Remarks Calculations Results

COUNT AS uCi/L
USE 13,14,15 OR 16

9.67 E-7 uCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Last Date Mgr.
5-4-94	0300	

54-680C-061 (R 10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) LIQUIDS

			SAM	REPLICATE
Type	DETECTOR NUMBER		14	14
SAM	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	140	177
3347	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.4	0.4
AT	SAMPLE SIZE in mL	(SS)	10.000	10
Test Code	DILUTION FACTOR	(DF)	1	1
	DIGEST DILUTION FACTOR	(DDF)	1	1
Matrix	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
LIQUID	Lc, Pmax or Rs, (SAMPLE RATE) as APPROPRIATE		4.267	5.500
Sample #	SAMPLE CONCENTRATION in µCi/L		8.45E-04	1.09E-03
K216-5725	AVG. µCi/L in SAMPLE and REPLICATE =			9.6733E-04
Instrument Code				
	Rs (Sample Count Rate) = (TC / CT) - BKG			
Analyst	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)			
MEYERS	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L			
Date	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100			
05/04/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
Time				
3:00	v RESULTS v			

ALPHA TOTAL	in µCi/L	(AVERAGE) =	9.67E-04	DETECTION LEVEL 2.05E-07 µCi/mL
ALPHA TOTAL	in µCi/mL	(AVERAGE) =	9.67E-07	
RELATIVE COUNTING ERROR		=	18.9%	

Data Entry by:		Date:	05-May-94
Approved by:		Date:	6-May-94

Form L1 Rev. 2.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

1412 5-4-94 . 3-4 K216-5725

Alpha Calculation (CRPC_CAL 2.0)
By: KB WILLIAMS, , on 05-04-1994 at 12:02:56
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

140/30 - .4

Sample # K216-5725 Mount # 1

140
---------- - 0.4 = 8.4517E-04 uCi/L alpha
30

177/30

Sample # K216-5725 Mount # 2

177
---------- - 0.4 = 1.0895E-03 uCi/L alpha
30

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K218	Customer ID: C5951 C111
Analysis: ~~GEA~~ AT LAD 6-6-94	Sample Prep: Fusion

Instrument: NA	Procedure/ Rev: LA-508-101 D-C
Technologist: Aleta Lewis	Date: 6-2-94
Starting Time: 12:00	Temperature NA
Ending Time: 14:30	Chemist: ~~Paula Bachoter~~ LAD 6-6-94 L. Fritts

Comments:

	Description	Lab ID		Description	Lab ID
1	Std	K217-5525	11		
2	BLK	K219-6638	12	LAD 6-6-94	
3	Sample	K218-6725	13		
4	Sample Dup	K218-6825	14		
5	Sam + Spike	K218-6925	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
Lmcs std	5B52			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-079, REV. 0

METHOD: LA-508-101

DATE START: June 2, 1994

PREPARED BY: L. L. Fritts

DATE COMPLETE: June 2, 1994

	UNITS:	uCi/G							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD 5B52	K217	ALPHA	7.99E-3				102.4	2.59E-7	5.9
BLANK	K219	ALPHA	~~<3.91E-2~~ <1.22E-2					3.14E-2	178.9
C-111	K218	ALPHA	1.21E-1	1.25E-1	1.23E-1	3.25		3.14E-2	27.3
								3.14E-2	25.6
C-111	K218	SPIKE	96.5						

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No	Sample Point		Time Issued	Priority
K 219.-6625	C-111	5-18-94	13:33	20

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	N403B	1

Sample Size	Customer ID
.025 ML	BLANK

Remarks Calculations Results

COUNT AS uCi/L
USE 13,14,15 OR 16

Re ~~<3.91E-2 uCi/g~~

<1.22E-2 uCi/g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6-2-94	Time Completed			

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) SOLIDS

			BLANK	REPLICATE
Type	DETECTOR NUMBER		18	15
BLANK	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	12	14
3578	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.6	0.7
AT	SAMPLE SIZE in mL	(SS)	0.025	0.025
Test Code	DILUTION FACTOR	(DF)	1	1
	DIGEST GRAMS of SOLIDS/LITER	(D g/L)	3.298	3.298
Matrix	EFFICIENCY FACTOR	(EFF)	0.2095	0.2380
SOLID	Lc, Rmax, or Rs (Sample Rate) as Appropriate		0.467	0.504
Sample #	CONCENTRATION in µCi/g		1.22E-02	1.16E-02
K219-6625	AVG. µCi/L in DIGEST SOLUTION =		<	3.9150E-02
Instrument Code				

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/g = Rs * 1000mL/L * DF * / (EFF * SS * D g/L * 2220000dpm/µCi)

Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

Analyst: A LEWIS

Date: 06/02/94

Time:

v RESULT v

ALPHA TOTAL	in µCi/g	(AVERAGE) =	< 1.22E-02	DETECTION LEVEL
LESS Than Value was Determined from Lc.				3.14E-02 µCi/g
RELATIVE COUNTING ERROR		=	178.9%	

Data Entry by: Date: 02-Jun-94

Approved by: Date: 2 Jun 94

Form L2 Rev. 2.1

Alpha Calculation (CAPC_CAL 2.0)
By: DH MILICIA, on 06-02-1994 at 15:55:54
Det #15 2 -inch mount Alpha eff. : .238
Sample size : .025 mL Dilution : 1

Sample # K-219-6625 Mount # 1

14
---------- - 0.7 < 2.8945E-02 uCi/L alpha
30

Alpha Calculation (CAPC_CAL 2.0)
By: DH MILICIA, 61453, on 06-02-1994 at 15:56:10
Det #18 2 -inch mount Alpha eff. : .2095
Sample size : .025 mL Dilution : 1

Sample # K-219-6625 Mount # 1

12
---------- - 0.6 < 2.8540E-02 uCi/L alpha
30

12/30

18/2 6-2-94 6 15/2

K219-6625

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

REPUN 3578

Serial No	Sample Point	Date	Time Issued	Priority
K217-5525	C-111	5-4-94	10:30	10

Determination	Method Standard	Result Units	Charge Code	Returns
AT	LA-508-101	% RECOVERY	N403B	1

Sample Size	Customer ID
10 ML	STD

Remarks Calculations Results

7.99E-3

5B52 RESULT ~~7.17E-3~~

STD VAL 7.799E-3 %REC ~~95.8~~ 102.4 LLJ 6.2.94

Alita Lewis

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Supv.
6-2-94		

54-680C-061 (R 10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) LIQUIDS

			STANDARD	REPLICATE
Type	DETECTOR NUMBER		18	15
STANDARD	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	1225	1184
	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.6	0.7
AT	SAMPLE SIZE in mL	(SS)	10.000	10
Test Code	DILUTION FACTOR	(DF)	1	1
	DIGEST DILUTION FACTOR	(DDF)	1	1
Matrix	EFFICIENCY FACTOR	(EFF)	0.2095	0.2380
LIQUID	Rc, Rmax or Rs, (SAMPLE RATE) as APPROPRIATE		40.233	38.767
Sample #	SAMPLE CONCENTRATION in µCi/L		8.65E-03	7.34E-03
K217-5525	AVG. µCi/L in SAMPLE and REPLICATE =			7.9939E-03
Instrument Code				

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

Analyst: A LEWIS

Date: 06/02/94

Time:

v RESULTS v

ALPHA TOTAL	in µCi/L	(AVERAGE) =	7.99E-03	DETECTION LEVEL 2.59E-07 µCi/mL
ALPHA TOTAL	in µCi/mL	(AVERAGE) =	7.99E-06	
RELATIVE COUNTING ERROR		=	5.9%	

Data Entry by: LLJ Date: 02-Jun-94

Approved by: LLJ Date: 2 Jun 94

Form L1 Rev. 2.1

Alpha Calculation (CAPC_CAL 2.0)
By: GH MILICIA, on 06-02-1994 at 15:26:29
Det #15 2 -inch mount Alpha eff. : .238
Sample size : 10 mL Dilution : 1

Sample # K-217-5525 Mount # 1

$$\frac{1184}{30} \times 0.7 = 7.3372E\text{-}03 \text{ uCi/L alpha}$$

18/2 6-2-94 15/2 K217-5525

Alpha Calculation (CAPC_CAL 2.0)
By: GH MILICIA, 61453, on 06-02-1994 at 15:27:03
Det #18 2 -inch mount Alpha eff. : .2095
Sample size : 10 mL Dilution : 1

Sample # K-217-5525 Mount # 1

$$\frac{1225}{30} \times 0.6 = 8.6507E\text{-}03 \text{ uCi/L alpha}$$

$\frac{1225}{30}$

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 218.-6725	C-111	5- 4-94	16:38	20

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	N4C3B	1

Sample Size	Customer ID
.025 ML	C59 S1

Remarks Calculations Results

COUNT AS uCI/L
USE 13,14,15 OR 16

LAD 6-6-94

~~1.21 E-1 uCi/g~~

1.21 E-1 uci/g

alita Lewis

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
		D. Hayden		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Hy Lab	
6-2-94			

S4-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) SOLIDS

			SAMPLE	REPLICATE
Type	DETECTOR NUMBER		18	15
SAMPLE	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	226	100
3678	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.6	0.7
AT	SAMPLE SIZE in mL	(SS)	0.025	0.025
Test Code	DILUTION FACTOR	(DF)	1	1
	DIGEST GRAMS of SOLIDS/LITER	(D g/L)	3.298	3.298
Matrix	EFFICIENCY FACTOR	(EFF)	0.2095	0.2380
SOLID	Rc, Rmax or Rs (Sample Rate) as Appropriate		6.933	2.633
Sample #	CONCENTRATION in µCi/g		1.81E-01	6.04E-02
K218-6725	AVG µCi/L in DIGEST SOLUTION =			3.9783E-01
Instrument Code				
	Rs (Sample Count Rate) = (TC / CT) - BKG			
Analyst	ALPHA TOTAL µCi/g = Rs * 1000mL/L * DF * / (EFF * SS * D g/L * 2220000dpm/µCi)			
A LEWIS	Relative Counting Error = { (The Square Root of TC + BKG * CT) / (TC - BKG * CT) } * 1.96 * 100			
Date	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
06/02/94				
Time				

v RESULT v

ALPHA TOTAL	in µCi/g	(AVERAGE) =	1.21E-01	DETECTION LEVEL 3.14E-02 pCi/g
RELATIVE COUNTING ERROR	=		27.3%	

Data Entry by: [signature] Date: 02-Jun-94

Approved by: [signature] Date: 23 Jun 94

Form L2 Rev. 2.1

Page 1 of 1

WHC-SD-WM-DP-079, REV. 0

18/2 6.246 2 15/2

R218-6725

226/30

Alpha Calculation (CRPC.CAL 2.0)
by: DM MILICIA, on 06-02-1994 at 15:27:47
Det #15 2-inch mount Alpha eff.: .2308
Sample size: .025 mL Dilution: 1

Sample # R-218-6725 Count # 1

100
---------- - 0.7 = 1.5350E-01 dCi/L alpha
30

Alpha Calculation (CRPC.CAL 2.0)
by: DM MILICIA, on 06-02-1994 at 15:28:13
Det #15 2-inch mount Alpha eff.: .2095
Sample size: .025 mL Dilution: 1

Sample # R-218-6725 Count # 1

226
---------- - 0.6 = 5.9630E-01 dCi/L alpha
30

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 218.-6825	C-111	5- 4-94	16:38	20

Determination	Method Standard	Result Units	Charge Code	Returns
AT	LA-508-101	uCi/G Rec	N4C3B	1

Sample Size	Customer ID
.025 ML	C52 S1

Remarks Calculations Results

COUNT AS 001/1
DET 16:14:12 05 16

1.25 E-1 µCi/g

1

Alta Lewis

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6-2-94	Time Completed	Lab Unit Manager		

84-6800-001 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) SOLIDS

			SAMPLE	REPLICATE
Type: DUPLICATE	DETECTOR NUMBER		18	15
	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List: 3678	TOTAL COUNTS	(TC)	228	108
	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?: AT	BACKGROUND in cpm	(BKG)	0.6	0.7
	SAMPLE SIZE in mL	(SS)	0.025	0.025
Test Code:	DILUTION FACTOR	(DF)	1	1
	DIGEST GRAMS of SOLIDS/LITER	(D g/L)	3.298	3.298
Matrix: SOLID	EFFICIENCY FACTOR	(EFF)	0.2095	0.2380
	Rc, Rmax, or Rs (Sample Rate) as Appropriate		7.000	2.900
Sample #: K218-6825	CONCENTRATION in µCi/g		1.83E-01	6.66E-02
	AVG. µCi/L in DIGEST SOLUTION =			4.1079E-01

Instrument Code:

Analyst: A LEWIS

Date: 06/02/94

Time:

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/g = Rs * 1000mL/L * DF * / (EFF * SS * D g/L * 2220000dpm/µCi)

Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

v RESULT v

ALPHA TOTAL	in µCi/g	(AVERAGE) =	1.25E-01	DETECTION LEVEL 3.14E-02 µCi/g
RELATIVE COUNTING ERROR		=	25.6%	

Data Entry by: Date: 02-Jun-94

Approved by: Date: 2 Jun 94

Form L2 Rev. 2.1

TOTAL ALPHA ANALYSIS - FUSION

18/2 6-2-94 3 15/2.

K218-6825

228
30

Alpha Calculation (CKPC_CAL 2.0)
By: DM MILLICIA, on 06-02-1994 at 15:28:03
Det #15 2 -inch mount Alpha eff. : .236
Sample size : .025 mL Dilution : 1

Sample # K-218-6825 Mount # 1

106
---------- 0.7 = 2.1966E-01 uCi/L alpha
30

Alpha Calculation (CKPC_CAL 2.0)
By: DM MILLICIA, on 06-02-1994 at 15:29:24
Det #18 2 -inch mount Alpha eff. : .2095
Sample size : .025 mL Dilution : 1

Sample # K-218-6825 Mount # 1

228
---------- 0.6 = 6.0203E-01 uCi/L alpha
30

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 218.-6925	C-111	5- 4-94	16:38	20

Determination	Method Standard	Result Units	Charge Code	Returns
AT	LA-508-101	% RECOVERY	N403B	0

Sample Size	Customer ID
.025 ML	C59 S1

Remarks Calculations Results

SAMPLE BRANDED ID 5658
SPIKE VOLUME 10ml

96.5%

Alita Lewis

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
His	His	His	His	His

Date	Time Completed	Lab Chief Initials	
6-2-94			

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) SPIKED SAMPLE

			SPIKE	REPLICATE
Type	DETECTOR NUMBER		18	15
SPIKE	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	1304	1233
3578	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.6	0.7
AT	SAMPLE VOLUME in mL (Spiked Vial)	(SS)	0.025	0.025
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial)	(DF)	1	1
	SPIKE VOLUME in mL	(SVol)	10.000	10.000
Matrix	SPIKE DILUTION FACTOR	(SDF)	1	1
SOLID	SPIKE VALUE in µCi/L	(SVal)	0.007799	0.007799
Sample #	INSTRUMENT EFFICIENCY FACTOR	(EFF)	0.2095	0.238
K218-6925	SAMPLE + SPIKE µCi/L	(S+S)	3.69E+00	3.06E+00
Instrument Code	AVG. SAMPLE or DIGEST µCi/L from FORM #1		3.62E-01	
Analyst	Rs (Sample Count Rate) = (TC / CT) - BKG			
A LEWIS	SAMPLE + SPIKE µCi/L = Rs * 1000mL/L * DF / (EFF * SS * 2220000dpm/µCi)			
Date	AVG. PERCENT SPIKE RECOVERY = (((((S+S µCi/L (Spike) + S+S µCi/L (Replicate))/2)-Sample µCi/L)*((SDF/Svol)/(DF/SS)			
06/02/94				
Time				

RESULT **AVG. PERCENT SPIKE RECOVERY = 96.5%**

Data Entry by: Date: 02-Jun-94
Approved by: Date: 2 Jun 94

Form L3 Rev. 2.1

TOTAL ALPHA ANALYSIS - FUSION

WHC-SD-WM-DP-079, REV. 0

Alpha Calculation (CMPC_CAL 2.0)
By: DW MILICIA, , on 06-02-1994 at 15:30:03
Det #15 2 -inch mount Alpha eff. : .238
Sample size : .025 mL Dilution : 1

Sample # K-218-6925 Mount # 1

$$\frac{1233}{30} \times 0.7 = 3.0585E+00 \text{ uCi/L alpha}$$

Alpha Calculation (CMPC_CAL 2.0)
By: DW MILICIA, , on 06-02-1994 at 15:30:30
Det #16 2 -inch mount Alpha eff. : .2095
Sample size : .025 mL Dilution : 1

Sample # K-218-6925 Mount # 1

$$\frac{1304}{30} \times 0.6 = 3.0872E+00 \text{ uCi/L alpha}$$

$\frac{1304}{30}$

MB/2 6-2-94 # 15/2

K 218-6925

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272

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K 217 -K 219	Customer ID: C59 S1 C111
Analysis: AT	Sample Prep: FUSION

Instrument: WA 45709	Procedure/ Rev: LA-508-101 D-0
Technologist: ALETA LEWIS	Date: 05/27/94
Starting Time: 08:00	Temperature 25 C
Ending Time: 14:30	Chemist: S. FITZGERALD

Comments: BATCH# 3500

	Description	Lab ID		Description	Lab ID
1	LMCS	K 217-5525	11		
2	SAMPLE	K 218-6725	12		
3	SAMPLE	K 218-6825	13		
4	BLANK	K 219-6625	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	5B52	10ML		

1273

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-079, REV. 0

METHOD: LA-508-101

DATE START: MAY 27, 1994

PREPARED BY: S.L. FITZGERALD

DATE COMPLETE: JUNE 1, 1994

	UNITS:	uCi/g							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD 5B52	K217	ALPHA	7.44E-03				95.4	2.34E-07	5.9
BLANK	K219	ALPHA	<1.10E-02					2.84E-02	113.2
C-111	K218	ALPHA	8.39E-02	8.17E-02	8.28E-02	2.66		2.84E-02	22.6
								2.80E-02	22.7

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

1-2 Batch 3500

Serial No	Sample Point	Date	Time Issued	Priority
K 217.-5525	C-111	5- 4-94	16:36	20

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	N4C3B	0

Sample Size	Customer ID
? 10 ml	STD

Remarks, Calculations, Results
S510 EV-CRB
STD# 5B52 RESULT 7.4428 E-3
STD VAL 7.7993 E-3 %REC 95.4 %

OUT FOR RERUN

Alita Lewis

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D.H. Nutsin			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-27-94		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) LIQUIDS

			std	REPLICATE
Type	DETECTOR NUMBER		13	13
std	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	1151	1187
3500	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.6	0.6
AT	SAMPLE SIZE in mL	(SS)	10.000	10
Test Code	DILUTION FACTOR	(DF)	1	1
	DIGEST DILUTION FACTOR	(DDF)	1	1
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
LIQUID	Lc, Rmax or Rs, (SAMPLE RATE) as APPROPRIATE		37.767	38.967
Sample #	SAMPLE CONCENTRATION in µCi/L		7.33E-03	7.56E-03
K217-5525	AVG. µCi/L in SAMPLE and REPLICATE =			7.4428E-03
Instrument Code				
	Rs (Sample Count Rate) = (TC / CT) - BKG			
Analyst	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)			
A LEWIS	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L			
Date	Relative Counting Error = ((The Square Root of TC + BKG * CT) / (TC - BKG * CT)) * 1.96 * 100			
05/27/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
Time				
0800				

v RESULTS v

ALPHA TOTAL	in µCi/L	(AVERAGE) =	7.44E-03	DETECTION LEVEL
ALPHA TOTAL	in µCi/mL	(AVERAGE) =	7.44E-06	2.34E-07 µCi/mL
RELATIVE COUNTING ERROR		=	5.9%	

Data Entry by:		Date:	01-Jun-94
Approved by:		Date:	6-1-94

Form L1 Rev. 2.1

13/2

K217-5525

1151/30

1187/30

Alpha Calculation (CRPC_CAL 2.0)
By: [illegible] on 05-26-1994 at 17:19:17
Det #13 2 -inch mount Alpha eff. : .2922
Sample size : 10 mL Dilution : 1

Sample # E-217 Mount # 1

1151
---------- - 0.6 = 7.3264E-05 uCi/L alpha
30

Sample # E-217 Mount # 2

1187
---------- - 0.6 = 7.5592E-05 uCi/L alpha
30

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7-8

Serial No	Sample Point	Date	Time Issued	Priority
K 219.-6625	C-111	5-16-94	13:33	20

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	N4C3B	0

Sample Size	Customer ID
? .025 ml	BLANK

Remarks Calculations Results

COUNT AS uCI/L
USE 13,14,15 OR 16

< 1.10 E-2 uci/g rec

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Alita Lewis	D.H. Wilson	E. Bueas		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-27-94		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) SOLIDS

		BLK	REPLICATE
Type	DETECTOR NUMBER	13	13
BLK	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	9	4
3500	COUNT TIME in MINUTES (CT)	30	30
AT or TB ?	BACKGROUND in cpm (BKG)	0.6	0.6
AT	SAMPLE SIZE in mL (SS)	0.025	0.025
Test Code	DILUTION FACTOR (DF)	1	1
	DIGEST GRAMS of SOLIDS/LITER (D g/L)	3.298	3.298
Matrix	EFFICIENCY FACTOR (EFF)	0.2322	0.2322
SOLID	Lc, Rmax or Rs (Sample Rate) as Appropriate	0.467	0.467
Sample #	CONCENTRATION in µCi/g	1.10E-02	1.10E-02
K219-6625	AVG. µCi/L in DIGEST SOLUTION =	<	3.6214E-02
Instrument Code			
	Rs (Sample Count Rate) = (TC / CT) - BKG		
Analyst	ALPHA TOTAL µCi/g = Rs * 1000mL/L * DF * / (EFF * SS * D g/L * 2220000dpm/µCi)		
A LEWIS	Relative Counting Error = 1 (The Square Root of TC + BKG * CT) / (TC - BKG * CT)) * 1.96 * 100		
Date	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
05/27/94			
Time			
0800	v RESULT v		

ALPHA TOTAL	in µCi/g (AVERAGE) =	< 1.10E-02	DETECTION LEVEL 2.84E-02 µCi/g
LESS Than Value was Determined from Lc.			
RELATIVE COUNTING ERROR	=	113.2%	

Data Entry by: Date: 01-Jun-94

Approved by: Date: 6-1-94

Form L2 Rev. 2.1 Page 1 of 1

TOTAL ALPHA ANALYSIS - FUSION

WHC-SD-WM-DP-079, REV. 0

13/2

K219-6625

9/30

Alpha Calculation (GRPC_CAL 2.0)
By: EB BARILA, 4, on 05-26-1994 at 17:54:41
Det #13 2 -inch mount Alpha eff. : .2592
Sample size : .025 mL Dilution : 1

4/30

Sample # K-219 Mount # 1

9
---------- - 0.6 < 2.5569E-02 uCi/L alpha
30

Sample # K-219 Mount # 2

4
---------- - 0.6 < 2.5569E-02 uCi/L alpha
30

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3-4

Serial No	Sample Point	Date	Time Issued	Priority
K 218.-6725	C-111	5- 4-94	16:38	20

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	N4C3B	0

Sample Size: ? .025 ml

Customer ID: C59 S1

Remarks Calculations Results

COUNT AS uCI/L
USE 13,14,15 OR 16

8.39E-2 uci/g rec

Alta Lewis

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D. H Mitchin	[illegible]		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-27-94		[illegible]

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) SOLIDS

			SAMPLE	REPLICATE
Type	DETECTOR NUMBER		13	13
SAMPLE	DISH SIZE 1, 2, or 5	(MS)	2	2
Work List	TOTAL COUNTS	(TC)	130	120
3500	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.6	0.6
AT	SAMPLE SIZE in mL	(SS)	0.025	0.025
Test Code	DILUTION FACTOR	(DF)	1	1
	DIGEST GRAMS of SOLIDS/LITER	(D g/L)	3.298	3.298
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
SOLID	Lc, Rmax, or Rs (Sample Rate) as Appropriate		3.733	3.400
Sample #	CONCENTRATION in µCi/g		8.78E-02	8.00E-02
K218-6725	AVG µCi/L in DIGEST SOLUTION =			2.7676E-01
Instrument Code				
	Rs (Sample Count Rate) = (TC / CT) - BKG			
Analyst	ALPHA TOTAL µCi/g = Rs * 1000mL/L * DF * / (EFF * SS * D g/L * 2220000dpm/µCi)			
A LEWIS	Relative Counting Error = ((The Square Root of TC + BKG * CT) / (TC - BKG * CT)) * 1.96 * 100			
Date	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
05/27/94				
Time				
0800	v RESULT v			

ALPHA TOTAL in µCi/g (AVERAGE) = 8.39E-02

DETECTION LEVEL 2.84E-02 µCi/g

RELATIVE COUNTING ERROR = 22.6%

Data Entry by: [illegible] Date: 01-Jun-94

Approved by: [illegible] Date: 6-1-94

Form L2 Rev. 2.1

WHC-SD-WM-DP-0

13/2

K218-6725

130
30

Alpha Calculation (CRPC_CAL 2.0)
By: [illegible] on 05-26-1994 at 17:19:52
Det #19 2 -foil count Alpha eff. : .2922
Sample size : .025 mL Dilution : 1

120
30

Sample # K-218 Count # 1

$$\frac{130}{30} \times 0.6 = 2.8970E-01 \text{ uCi/L alpha}$$

Sample # K-218 Count # 2

$$\frac{120}{30} \times 0.6 = 2.6353E-01 \text{ uCi/L alpha}$$

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5-6

Serial No	Sample Point	Date	Time Issued	Priority
K 218.-6825	C-111	5- 4-94	16:38	20

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	N4C3B	0

Sample Size	Customer ID
? .025 ml	C59 S1

Remarks Calculations Results

COUNT AS uCI/L
USE 13,14,15 OR 16

8.17E-2 uci/g Rec

OUT FOR RERUN

alta Lewis

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D.H. Milian	[illegible]		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-27-94		[illegible]	[illegible]

54-6800-061 (R-10-83)

WHC-SD-WM-DP-078, REV. 0

AT: LA-508-101 (D-0) SOLIDS

			SAMPLE	REPLICATE
Type	DETECTOR NUMBER		13	13
DUP	DISH SIZE 1, 2, or 5	(DS)	2	2
Work List	TOTAL COUNTS	(TC)	128	119
3500	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.6	0.6
AT	SAMPLE SIZE in mL	(SS)	0.025	0.025
Test Code	DILUTION FACTOR	(DF)	1	1
	DIGEST GRAMS of SOLIDS/LITER	(D g/L)	3.3404	3.3404
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
SOLID	Lc, Rmax, or Rs (Sample Rate) as Appropriate		3.667	3.367
Sample #	CONCENTRATION in µCi/g		8.52E-02	7.82E-02
K218-6825	AVG. µCi/L in DIGEST SOLUTION =			2.7288E-01
Instrument Code				
	Rs (Sample Count Rate) = (TC / CT) - BKG			
Analyst	ALPHA TOTAL µCi/g = Rs * 1000mL/L * DF * / (EFF * SS * D g/L * 2220000dpm/µCi)			
A LEWIS	Relative Counting Error = ((The Square Root of TC + BKG * CT) / (TC - BKG * CT)) * 1.96 * 100			
Date	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
05/27/94				
Time				
0800	v RESULT v			

ALPHA TOTAL	in µCi/g	(AVERAGE) =	8.17E-02	DETECTION LEVEL 2.80E-02 µCi/g
RELATIVE COUNTING ERROR	=		22.7%	

Data Entry by: [illegible] Date: 01-Jun-94

Approved by: [illegible] Date: 6-1-94

Form L2 Rev. 2.1

TOTAL ALPHA ANALYSIS - FUSION

WHC-SD-WM-DP-079, REV. 0

13/2

K218-4825

128/30

119/30

Alpha Calculation (CRPC_CAL 2.0)
By: EM BARELA, on 05-26-1994 at 17:20:19
Det #13 2 -inch mount Alpha eff. : .2532
Sample size : .025 mL Dilution : 1

Sample # E-218 Mount # 1

$$\frac{128}{30} \cdot 0.6 = 2.8452E-01 \text{ uCi/L alpha}$$

Sample # E-218 Mount # 2

$$\frac{119}{30} \cdot 0.6 = 2.6124E-01 \text{ uCi/L alpha}$$

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K211	Customer ID: C5851
Analysis: GEA	Sample Prep: Fusion

Instrument: ~~WB57237~~ LAD 9-14-94 ~~WB57260~~ WC38931	Procedure/ Rev: LA 548-121 D-0
Technologist: RD Meyers	Date: 6/27/94
Starting Time: 0245	Temperature NA
Ending Time: 0315	Chemist: ~~Gatlow~~ LAD 7-15-94 PP Bachelor

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	K209.5530	11		
2	BLK	K210.6630	12		
3	Sample	K211.6730	13		
4	dup	K211.6830	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	139851 .050ml			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-079, REV. 0

METHOD: LA-548-121

DATE START: 13 JULY 1994

PREPARED BY: P. P. Bachelor

DATE COMPLETE: 13 JULY 1994

	UNITS:		uCi/G						
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD	K209-5530	CO-60	2.22E+01				~~93.00~~		6.8
		CS-134	1.54E+01				107.5		7.3
		CS-137	2.41E+01				~~104.00~~		9.2
							96.1		
BLANK	K210-6630	CS-137	<5.51E-01					5.51E-01	
SAMPLE	K211-6730	CS-137	8.85E+01	8.30E+01	8.58E+01	6.41		5.51E-01	2.15,2.26
	K211-6830								

NARRATIVE: NO SPECIAL PROBLEM

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

2709 Batch 3819

Serial No	Sample Point	Date	Time Issued	Priority
K 209.-5530	C-111	4-25-94	14:54	28

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA --	LA-548-121	% RECOVERY	N408E	0

Sample Size	Customer ID
1.050ml	STD

Remarks Calculations Results

NGLX STD# 134651
R001 STD VAL 2.5056 E+1
RESULT 2.409 E+1 % REC 104.00 Pa 8/2/94 96.1%
P005 STD VAL 2.0624 E+1
RESULT 2.217 E+1 % REC 107.5%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
6/27/94	0315		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

PREPARATION OF SAMPLE MOUNTS FOR GAMMA ENERGY ANALYSIS; LA-548-121 (D-0)

Serial No.	ANALYTE	P	STANDARD pCi/L	pCi/G	N/A	COUNTING ERROR %	N/A	N/A	DET. LIMIT (pCi/G)
K209-5530	CS137		24.0900	ERR					
Batch ID	CO60		22.1700	ERR					
3819				ERR					
Room No.				ERR					
0				ERR					
Analyst				ERR					
MEYERS				ERR					
Date				ERR					
06/27/94				ERR					
				ERR					
g/L				ERR					
				ERR					
				ERR					
				ERR					
				ERR					
				ERR					
				ERR					
				ERR					
				ERR					
				ERR					
				ERR					

pCi/g = (pCi/L) / (g/L)

Data Entry by:		Date:	20-Jul-94
Approved by:		Date:	4-Aug-94

Form 1 Rev. 1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

2710

WHC-SD-WM-DP-079, REV. 0

Serial No	Sample Point	Date	Time Issued	Priority
K 210.-6630	C-111	4-25-94	14:55	23

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/G Rec	N4C3B	0

Sample Size	Customer ID
? .050ml	BLANK

Remarks Calculations Results

COUNT AS uCI/L
LASER PRINTOUT

Cs 137

$$\frac{< 1.60\ \mu ci/L}{2.9036\ g/L} = < 5.51^{E-01}\ \mu ci/g$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
	6-27-94			
Date 6/27/94	Time Completed 0315	Lab Unit Mgr		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

PREPARATION OF SAMPLE MOUNTS FOR GAMMA ENERGY ANALYSIS: LA-548-121 (D-0)

Serial No.	ANALYTE	P	BLANK pCi/L	pCi/G	N/A	COUNTING ERROR %	N/A	N/A	DET. LIMIT (pCi/G)
K210-6630	CS137	<	1.6000	5.51E-01					
Batch ID				0.00E+00					
3819				0.00E+00					
Rerun No.				0.00E+00					
0				0.00E+00					
Analyst				0.00E+00					
MEYERS				0.00E+00					
Date				0.00E+00					
06/27/94				0.00E+00					
				0.00E+00					
g/L				0.00E+00					
2.9036				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					

pCi/g = (pCi/L) / (g/L)

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Data Entry by:		Date:	20-Jul-94
Approved by:		Date:	4-Aug-94

Form 1 Rev. 1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

2711

WHC-SD-WM-DP-079, REV. 0

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-6730	C-111	4-26-94	14:57	28

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/G hec	N4C3B	0

Sample Size	Customer ID
2 .050m)	C58S1

Remarks, Calculations, Results

COUNT AS uCI/L
LASER PRINTOUT

(CS-137) $\frac{2.57^{E02}\ \mu Ci/L}{2.9036\ g/L} = 8.85^{E01}\ \mu Ci/g\ Cs137$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
	6-27-94			
Date	Time Completed	Lab Unit Mgr		
6/27/94	0315	Bachelor		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

PREPARATION OF SAMPLE MOUNTS FOR GAMMA ENERGY ANALYSIS: LA-548-121 (D-0)

Serial No.	ANALYTE	?	SAMPLE µCi/L	µCi/G	N/A	COUNTING ERROR %	N/A	N/A	DET. LIMIT (µCi/G)
K211-6730	CS137		257.0000	8.85E+01					
Batch ID.				0.00E+00					
3B19				0.00E+00					
Rerun No.				0.00E+00					
0				0.00E+00					
Analyst.				0.00E+00					
MEYERS				0.00E+00					
Date:				0.00E+00					
06/27/94				0.00E+00					
				0.00E+00					
g/L				0.00E+00					
2.9036				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					

µCi/g = (µCi/L) / (g/L)

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Data Entry by:		Date:	20-Jul-94
Approved by:	Bachelor	Date:	4-Aug-94

Form 1 Rev. 1 Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

2212

WHC-SD-WM-DP-079, REV. 0

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-6830	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Returns
GEA	LA-548-121	uCi/G Rec	N4CSB	0

Sample Size	Customer ID
2.050m)	C5881

Remarks Calculations Results

COUNT AS uCI/L
LASER PRINTOUT

$$\frac{2.43^{E02}\ \mu ci/L}{2.926\ g/L} = 8.30^{E01}\ \mu ci/g\ Cs\text{-}137$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6/27/94	Time Completed 0315	Lab Unit Mgr		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

WHC-SD-WM-DP-079, REV. 0

PREPARATION OF SAMPLE MOUNTS FOR GAMMA ENERGY ANALYSIS: LA-548-121 (D-0)

Serial No.	ANALYTE	SAMPLE ?	SAMPLE µCi/L	SAMPLE µCi/G	DUPLICATE ?	DUPLICATE µCi/L	DUPLICATE µCi/G	COUNTING ERROR %	AVERAGE (µCi/G)	RPD	DET. LIMIT (µCi/G)
K211-6830	CS137		243.0000	8.30E+01			ERR		ERR	NA	
Batch ID				0.00E+00			ERR		ERR	NA	
3819				0.00E+00			ERR		ERR	ERR	
Run No.				0.00E+00			ERR		ERR	ERR	
0				0.00E+00			ERR		ERR	ERR	
Analyst				0.00E+00			ERR		ERR	ERR	
MEYERS				0.00E+00			ERR		ERR	ERR	
Date				0.00E+00			ERR		ERR	ERR	
06/27/94				0.00E+00			ERR		ERR	ERR	
				0.00E+00			ERR		ERR	ERR	
g/L				0.00E+00			ERR		ERR	ERR	
2.926				0.00E+00			ERR		ERR	ERR	
				0.00E+00			ERR		ERR	ERR	
DUP's g/L				0.00E+00			ERR		ERR	ERR	
				0.00E+00			ERR		ERR	ERR	
				0.00E+00			ERR		ERR	ERR	
				0.00E+00			ERR		ERR	ERR	
				0.00E+00			ERR		ERR	ERR	
				0.00E+00			ERR		ERR	ERR	
				0.00E+00			ERR		ERR	ERR	

µCi/g = (µCi/L) / (g/L)

AVERAGE (µCi/g) = (SAMPLE + DUPLICATE) / 2

RPD = (SAMPLE - DUPLICATE) / AVERAGE * 100

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Data Entry by:		Date:	20-Jul-94
Approved by:		Date:	4-Aug-94

Form 1 Rev. 1

```
*****************************************************************************
* 222-S Laboratory Counting Room   27-JUN-1994 09:13:28.14                  *
*****************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Sample ID:                K209-5530
Sample Size:              1.00000E-03 LI
Dilution Factor:          2.00000E+01
Conversion LI to LI:      1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:              GEA2
File Number:              NI3AF:1.cnf
Geometry:                 42
Description:
Count Time:               0 00:50:00.00 sec
Real Time:                0 00:50:00.99 sec

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:        27-JUN-1994 05:17:51.62
Decayed to:               27-JUN-1994 05:17:51.62
Standard Deviations:      2
Analysis Library:         LABGEA
Analyst:                  MB

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       21-MAR-1994 09:31:55.15
 Date of last efficiency calibration:   21-MAR-1994 09:43:42.61
*****************************************************************************
```

Removed by: M Brown

date: 6-27-94

WHC-SD-WM-DP-079, REV. 0

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	563.58	104	2.36	1127.21	1118	17	50.5		CS-134	25.6
0	569.50	108	1.01	1139.06	1135	10	33.9		CS-134	14.7
3	604.93	665	1.55	1209.90	1205	23	8.3	2.45E+00	CS-134	15.0
0	661.89*	866	1.51	1323.80	1316	17	9.2		CS-137	24.1
0	797.01	540	1.65	1594.00	1586	42	17.9		CS-134	17.5
0	1173.38	589	1.80	2346.81	2341	16	9.3		CO-60	23.1
0	1332.64	488	1.96	2665.43	2656	20	9.8		CO-60	21.3

Sample ID : K209-5530
Acquisition date : 27-JUN-1994 05:17:51

WHC-SD-WM-DP-079, REV. 0

Total number of lines in spectrum	7	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	7	100.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-60	1925.30D	1.000	2.217E+01	2.217E+01	0.150E+01	6.77	
CS-134	753.10D	1.000	1.536E+01	1.536E+01	0.113E+01	7.33	
CS-137	11020.00D	1.000	2.409E+01	2.409E+01	0.220E+01	9.15	
	Total Activity :		6.162E+01	6.162E+01			
	Grand Total Activity :		6.162E+01	6.162E+01			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"A" = Nuclide specific abn. limit

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
NA-22	10.	1274.55	6.1486E-01
NA-24	10.	1368.53	6.6708E-01
K-40	116.	1460.75	2.1878E+01
CR-51	149.	320.09	7.3928E+00
MN-54	40.	834.83	8.4928E-01
FE-59	53.	1099.25	2.2079E+00
ZN-65	29.	1115.55	1.8596E+00
SE-75	147.	264.66	1.0956E+00
SR-85	101.	513.99	9.1610E-01
Y-88	1.	1836.06	2.6336E-01
NB-95	45.	765.79	8.4117E-01
ZR-95	58.	756.73	1.7286E+00
RU-103	80.	497.08	8.5728E-01
RURH-106	67.	621.93	1.7209E+01
SN-113	105.	391.67	1.1263E+00
SB-125	116.	427.89	2.7782E+00
I-131	106.	364.48	8.5003E-01
BA-133	115.	356.02	1.1353E+00
BA-140	73.	537.31	3.2579E+00
LA-140	6.	1596.21	6.2225E-01
CEPR-144	154.	133.54	8.2840E+00
EU-152	9.	1408.01	3.0421E+00
EU-154	10.	1274.51	1.7933E+00
EU-155	174.	105.31	2.6225E+00
TL-208	96.	583.14	1.1302E+00
BI-212	40.	727.27	1.2100E+01
PB-212	183.	239.00	1.5692E+00
RA-224	180.	240.99	1.6920E+01
RA-226	172.	186.10	1.5306E+01
TH-228	165.	215.99	2.2469E+01
U-235	155.	143.76	4.2078E+00
NP-237	144.	86.50	5.4323E+00
PU-239	156.	129.30	7.2822E+03
AM-241	132.	59.54	5.0167E+00
PU-241	165.	148.57	2.5349E+05
AM-243	156.	74.67	1.4529E+00

```
*****************************************************************************
* 222-S Laboratory Counting Room   27-JUN-1994 09:04:20.54                  *
*****************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Sample ID:              K210-6630
Sample Size:            1.00000E-03 LI
Dilution Factor:        2.00000E+01
Conversion LI to LI:    1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:            GEA2
File Number:            NI3AF:1.cnf
Geometry:               42
Description:
Count Time:             0 00:50:00.00 sec
Real Time:              0 00:50:00.49 sec

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:      27-JUN-1994 06:14:33.64
Decayed to:             27-JUN-1994 06:14:33.64
Standard Deviations:    2
Analysis Library:       LABGEA
Analyst:                MB

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       21-MAR-1994 09:31:55.15
 Date of last efficiency calibration:   21-MAR-1994 09:43:42.61
*****************************************************************************

Post-NID Peak Search Report
***** No peaks found *****
```

Removed by: [signature]

date: 6-27-94

WHC-SD-WM-DP-079, REV. 0

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"A" = Nuclide specific abn. limit

Sample ID : K210-6630
Acquisition date : 27-JUN-1994 06:14:33

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
NA-22	8.	1274.55	5.5234E-01
NA-24	8.	1368.53	5.7716E-01
K-40	99.	1460.75	2.0205E+01
CR-51	50.	320.09	4.2690E+00
MN-54	19.	834.83	5.8706E-01
FE-59	15.	1099.25	1.1856E+00
CO-60	6.	1332.50	4.9568E-01
ZN-65	12.	1115.55	1.1708E+00
SE-75	63.	264.66	7.1551E-01
SR-85	39.	513.99	5.6891E-01
Y-88	2.	1836.06	3.7244E-01
NB-95	17.	765.79	5.2029E-01
ZR-95	19.	756.73	9.8316E-01
RU-103	31.	497.08	5.3118E-01
RURH-106	22.	621.93	9.8988E+00
SN-113	40.	391.67	6.9665E-01
SB-125	45.	427.89	1.7222E+00
I-131	38.	364.48	5.0957E-01
BA-133	44.	356.02	6.9922E-01
CS-134	33.	604.70	5.9849E-01
CS-137	153.	661.65	1.6015E+00
BA-140	32.	537.31	2.1429E+00
LA-140	4.	1596.21	4.7597E-01
CEPR-144	68.	133.54	5.5262E+00
EU-152	7.	1408.01	2.6828E+00
EU-154	8.	1274.51	1.6045E+00
EU-155	73.	105.31	1.7053E+00
TL-208	39.	583.14	7.2139E-01
BI-212	27.	727.27	1.0037E+01
PB-212	80.	239.00	1.0379E+00
RA-224	76.	240.99	1.0999E+01
RA-226	96.	186.10	1.1439E+01
TH-228	71.	215.99	1.4766E+01
U-235	69.	143.76	2.8158E+00
NP-237	76.	86.50	3.9382E+00
PU-239	66.	129.30	4.7408E+03
AM-241	48.	59.54	3.0339E+00
PU-241	89.	148.57	1.8687E+05
AM-243	46.	74.67	7.9102E-01

```
*****************************************************************************
* 222-S Laboratory Counting Room   27-JUN-1994 10:04:37.91                  *
*****************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Sample ID:                K211-6730
Sample Size:              1.00000E-03 LI
Dilution Factor:          2.00000E+01
Conversion LI to LI:      1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:              GEA2
File Number:              dka300:[spec.GEA2]2g2711.cnf
Geometry:                 42
Description:
Count Time:               0 00:50:00.00 sec
Real Time:                0 00:50:03.05 sec

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:        27-JUN-1994 09:14:01.00
Decayed to:               27-JUN-1994 09:14:01.00
Standard Deviations:      2
Analysis Library:         LABGEA
Analyst:                  MB

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       21-MAR-1994 09:31:55.15
 Date of last efficiency calibration:   21-MAR-1994 09:43:42.61
*****************************************************************************
```

Removed by: _____

date: 6-27-94

WHC-SD-WM-DP-079, REV. 0

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	86.57	327	0.94	173.62	171	8	48.1		~~NP-237~~	31.9
									EU-155	12.2
0	105.54	355	1.24	211.52	207	9	47.5		EU-155	15.2
0	123.01	533	1.01	246.44	241	10	32.8		EU-154	10.9
0	661.84*	9217	1.48	1323.70	1317	14	2.2		CS-137	256.
0	723.34	76	1.07	1446.69	1441	12	41.1		EU-154	9.70
0	873.04	54	0.81	1746.06	1740	11	44.7		EU-154	13.3
0	996.45	33	1.42	1992.90	1989	11	68.6		EU-154	10.7
0	1004.90	74	1.18	2009.80	2003	14	38.0		EU-154	14.2
0	1274.45	110	1.66	2549.02	2542	14	20.4		EU-154	13.4
									~~NA-22~~	4.60

Sample ID : K211-6730 Acquisition date : 27-JUN-1994 09:14:01

WHC-SD-WM-DP-079, REV. 0

Total number of lines in spectrum	9	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	9	100.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~NA-22~~	~~950.40D~~	~~1.000~~	~~4.601E+00~~	~~4.601E+00~~	~~0.940E+00~~	~~20.43~~	154Eu 893 6/28/9
CS-137	11020.00D	1.000	2.565E+02	2.565E+02	0.055E+02	2.15	
EU-154	3138.00D	1.000	1.134E+01	1.134E+01	0.212E+01	18.67	
EU-155	1710.00D	1.000	1.519E+01	1.519E+01	0.721E+01	47.48	comment on high uncertainty 60%
~~NP-237~~	~~7.82E+08D~~	~~1.000~~	~~3.190E+01~~	~~3.190E+01~~	~~1.536E+01~~	~~48.14~~	155Eu 893 6/28/9
			---	---			
	Total Activity :		3.195E+02	3.195E+02			

Grand Total Activity : 3.195E+02 3.195E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : K211-6730 Acquisition date : 27-JUN-1994 09:14:01

WHC-SD-WM-DP-079, REV. 0

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
NA-24	14.	1368.53	7.8860E-01
K-40	104.	1460.75	2.0751E+01
CR-51	412.	320.09	1.2279E+01
MN-54	36.	834.83	8.0974E-01
FE-59	20.	1099.25	1.3668E+00
CO-60	10.	1332.50	6.5144E-01
ZN-65	18.	1115.55	1.4405E+00
SE-75	539.	264.66	2.0996E+00
SR-85	255.	513.99	1.4581E+00
Y-88	2.	1836.06	3.6748E-01
NB-95	38.	765.79	7.6522E-01
ZR-95	41.	756.73	1.4517E+00
RU-103	248.	497.08	1.5067E+00
RURH-106	110.	621.93	2.2084E+01
SN-113	356.	391.67	2.0751E+00
SB-125	406.	427.89	5.1957E+00
I-131	360.	364.48	1.5678E+00
BA-133	384.	356.02	2.0757E+00
CS-134	125.	604.70	1.1707E+00
BA-140	188.	537.31	5.2271E+00
LA-140	9.	1596.21	7.3066E-01
CEPR-144	1276.	133.54	2.3874E+01
EU-152	10.	1408.01	3.2274E+00
TL-208	145.	583.14	1.3904E+00
BI-212	50.	727.27	1.3525E+01
PB-212	652.	239.00	2.9572E+00
RA-224	669.	240.99	3.2647E+01
RA-226	887.	186.10	3.4746E+01
TH-228	712.	215.99	4.6623E+01
U-235	1184.	143.76	1.1631E+01
PU-239	1308.	129.30	2.1118E+04
AM-241	1295.	59.54	1.5736E+01
PU-241	1117.	148.57	6.6047E+05
AM-243	1434.	74.67	4.4109E+00

```
*****************************************************************************
* 222-S Laboratory Counting Room   27-JUN-1994 11:07:39.76                  *
*****************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Sample ID:                K211-6830
Sample Size:              1.00000E-03 LI
Dilution Factor:          2.00000E+01
Conversion LI to LI:      1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:              GEA2
File Number:              dka300:[spec.GEA2]2g2712.cnf
Geometry:                 42
Description:
Count Time:               0 00:50:00.00 sec
Real Time:                0 00:50:03.03 sec

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:        27-JUN-1994 10:17:02.36
Decayed to:               27-JUN-1994 10:17:02.36
Standard Deviations:      2
Analysis Library:         LABGEA
Analyst:                  MB

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       21-MAR-1994 09:31:55.15
 Date of last efficiency calibration:   21-MAR-1994 09:43:42.61
*****************************************************************************
```

Removed by: MG

date: 6-27-94

WHC-SD-WM-DP-079, REV. 0

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	86.64	225	0.96	173.75	170	8	72.6		~~NP-237~~	22.0
									EU-155	8.43
0	105.33	376	1.48	211.10	207	10	48.9		EU-155	16.1
0	123.19	667	1.26	246.81	244	8	21.5		EU-154	13.6
0	661.81*	8735	1.51	1323.64	1315	18	2.3		CS-137	243.
0	723.43	106	1.06	1446.87	1441	12	28.4		EU-154	13.5
0	873.47	51	1.15	1746.92	1741	12	51.3		EU-154	12.6
0	996.09	47	1.24	1992.19	1986	12	46.2		EU-154	15.4
0	1004.96	66	1.69	2009.93	2003	13	40.2		EU-154	12.5
0	1274.68	118	1.72	2549.49	2541	18	26.3		EU-154	14.4
									~~NA-22~~	4.95

Sample ID : K211-6830 Acquisition date : 27-JUN-1994 10:17:02

WHC-SD-WM-DP-079, REV. 0

Total number of lines in spectrum	9	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	9	100.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~NA-22~~	~~950.40D~~	~~1.000~~	~~4.950E+00~~	~~4.950E+00~~	~~1.302E+00~~	~~26.30~~	~~154E-QDS 6/28/9~~
CS-137	11020.00D	1.000	2.430E+02	2.430E+02	0.055E+02	2.26	
EU-154	3138.00D	1.000	1.345E+01	1.345E+01	0.193E+01	14.35	
EU-155	1710.00D	1.000	1.608E+01	1.608E+01	0.786E+01	48.88	comment on uncertainty QDS
~~NP-237~~	~~7.82E+08D~~	~~1.000~~	~~2.197E+01~~	~~2.197E+01~~	~~1.594E+01~~	~~72.58~~	~~155E-QDS 6/28/9~~
			---	---			
	Total Activity :		2.995E+02	2.995E+02			

Grand Total Activity : 2.995E+02 2.995E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : K211-6830
Acquisition date : 27-JUN-1994 10:17:02

WHC-SD-WM-DP-079, REV. 0

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
NA-24	6.	1368.53	5.1645E-01
K-40	112.	1460.75	2.1547E+01
CR-51	435.	320.09	1.2630E+01
MN-54	33.	834.83	7.7042E-01
FE-59	19.	1099.25	1.3180E+00
CO-60	12.	1332.50	7.1153E-01
ZN-65	17.	1115.55	1.4273E+00
SE-75	541.	264.66	2.1033E+00
SR-85	238.	513.99	1.4094E+00
Y-88	1.	1836.06	2.6336E-01
NB-95	44.	765.79	8.2786E-01
ZR-95	56.	756.73	1.6865E+00
RU-103	250.	497.08	1.5112E+00
RURH-106	112.	621.93	2.2268E+01
SN-113	390.	391.67	2.1722E+00
SB-125	378.	427.89	5.0130E+00
I-131	369.	364.48	1.5882E+00
BA-133	369.	356.02	2.0358E+00
CS-134	133.	604.70	1.2060E+00
BA-140	148.	537.31	4.6346E+00
LA-140	7.	1596.21	6.7158E-01
CEPR-144	1293.	133.54	2.4029E+01
EU-152	9.	1408.01	3.0551E+00
TL-208	142.	583.14	1.3760E+00
BI-212	35.	727.27	1.1408E+01
PB-212	669.	239.00	2.9972E+00
RA-224	662.	240.99	3.2488E+01
RA-226	957.	186.10	3.6099E+01
TH-228	748.	215.99	4.7771E+01
U-235	1176.	143.76	1.1593E+01
PU-239	1253.	129.30	2.0669E+04
AM-241	1185.	59.54	1.5055E+01
PU-241	1097.	148.57	6.5461E+05
AM-243	1479.	74.67	4.4802E+00

Batch 3276

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY WHC-SD-WM-DP-079, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. K214	Customer ID: C5EFB C111
Analysis: GEA	Sample Prep: Direct

Instrument: ~~WB 57253~~ LAD 5-25-94 ~~WB 57265~~ WC38931	Procedure/ Rev: LA-545-121/D-0
Technologist: RD Meyers	Date: 5/2/94
Starting Time: 0220	Temperature NA
Ending Time: 0250	Chemist: ~~Gaffney~~ LAD 5-24-94 Paula Bachelor

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	K212.5530	11		
2	BLK	K213.5630	12		
3	Sample	K214.5730	13		
4	Sample dup	K214.5630	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	139851, 100ml			

301

A-8000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-079, REV. 0

METHOD: LA-548-121

DATE START: 25 MAY 1994

PREPARED BY: P. P. Bachelor

DATE COMPLETE: 25 MAY 1994

	UNITS:		uCi/mL						
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD	K212-5530	CO-60	2.08E+01				98.90		4.4
		CS-134	1.53E+01						4.3
		CS-137	2.48E+01				98.60		4.9
BLANK	K213-5630	CS-137	<2.27E-06					2.27E-06	
SAMPLE	K214-5730	CS-137	1.67E-04	1.63E-04	1.65E-04	0.02		2.27E-06	25.24
	K214-5830								26.38

NARRATIVE: [ ] NO SPECIAL PROBLEM

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

The result for K214-5730 and K214-5830 CS-137 have high uncertainties, which make the values questionable.

3419 Batch 3276

Serial No	Sample Point	Date	Time Issued	Priority
K 212.-5530	C-111	4-27-94	10: 2	21

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	% RECOVERY	N4C3B	0

Sample Size	Customer ID
.100 ml	STD

Remarks Calculations Results

COLX STD# 13/1851
R901 STD VAL 2.51 E01
RESULT 2.48 E01 % REC 98.6 (5137)
R905 STD VAL 2.10 E01
RESULT 2.08 E01 % REC 98.9 (6060

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	5-2-94			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5/2/94	0250	

54-660C-061 (R-10-83)

3420

Serial No	Sample Point	Date	Time Issued	Priority
K 213.-5630	C-111	4-27-94	10: 7	21

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	N4C3B	0

Sample Size	Customer ID
1 ml	BLANK

Remarks Calculations Results

COUNT AS uCI/L ^{137}Cs < 2.27 E-06 µCi/mL
LASER PRINTOUT

No Detectable Isotopes

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5/2/94	0250	

54-660C-061 (R-10-83)

3422

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5730	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	N4C3B	0

Sample Size	Customer ID
m	C58FB

Remarks Calculations Results

COUNT AS uCI/L
LASER PRINTOUT

$\frac{1.67\ E-01}{1000}$ uCi/L

High level of Uncertainty = 1.67 E-04 uCi/ml Cs137

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/2/94	0250		

54-6800-061 (R 12-83)

2423

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5830	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	N4C3B	0

Sample Size	Customer ID
m	C58FB

Remarks Calculations Results

COUNT AS uCI/L
LASER PRINTOUT

^{137}Cs = 1.63 E-04 uCi/mL high uncertainty

~~No Detectable Isotopes~~ 5-26-94

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/2/94	0250		

54-6800-061 (R 12-83)

```
*****************************************************************************
* 222-S Laboratory Counting Room    2-MAY-1994 07:15:54.04                  *
*****************************************************************************
     >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Sample ID:                K212-5530
Sample Size:              1.00000E-03 LI
Dilution Factor:          1.00000E+01
Conversion LI to LI:      1.00000E+00

     >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:
File Number:              dka300:[spec.GEA3]3g3419.cnf
Geometry:                 42
Description:
Count Time:               0 00:50:00.00 sec
Real Time:                0 00:50:01.69 sec

     >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:        2-MAY-1994 06:25:18.44
Decayed to:               2-MAY-1994 06:25:18.44
Standard Deviations:      2
Analysis Library:         ENVGEA
Analyst:                  ALJ

     >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       11-MAR-1994 11:47:01.11
 Date of last efficiency calibration:   15-MAR-1994 10:28:40.20
*****************************************************************************
```

Removed by: MC Blair

date: 5/2/94

WHC-SD-WM-DP-079, REV. 0

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	563.40	190	1.89	1127.01	1122	12	29.7		CS-134	19.0
0	569.26	263	1.28	1138.72	1134	11	22.6		CS-134	14.5
0	604.75	1637	1.51	1209.69	1204	12	5.9		CS-134	15.0
0	661.65*	2191	1.65	1323.47	1317	15	4.9		CS-137	24.8
0	795.81	1203	1.72	1591.79	1584	15	6.9		CS-134	15.9
0	801.51	102	1.52	1603.19	1598	11	41.3		CS-134	13.3
0	1173.06	1355	1.87	2346.38	2340	15	5.9		CO-60	21.4
0	1332.27*	1154	2.00	2664.92	2655	20	6.6		CO-60	20.2
0	1364.85	39	2.57	2730.10	2722	16	32.0			
0	1400.70	21	1.71	2801.83	2795	13	67.7			
0	1460.44*	19	1.09	2921.36	2914	13	166.4		K-40	3.29

Summary of Nuclide Activity
Sample ID : K212-5530 Acquisition date : 2-MAY-1994 06:25:18

WHC-SD-WM-DP-079, REV. 0

Total number of lines in spectrum	11	
Number of unidentified lines	2	
Number of lines tentatively identified by NID	9	81.82%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~K-40~~	~~4.66E+11D~~	~~1.000~~	~~3.292E+00~~	~~3.292E+00~~	~~5.479E+00~~	~~166.44~~	BKG 5/5/94
CO-60	1925.30D	1.000	2.082E+01	2.082E+01	0.092E+01	4.40	
CS-134	753.10D	1.000	1.531E+01	1.531E+01	0.066E+01	4.32	
CS-137	11020.00D	1.000	2.482E+01	2.482E+01	0.120E+01	4.85	
	Total Activity :		6.425E+01	6.425E+01			

Grand Total Activity : 6.425E+01 6.425E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : K212-5530 Acquisition date : 2-MAY-1994 06:25:18

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
BE-7	195.	477.59	4.6007E+00
NA-22	22.	1274.55	3.6945E-01
SC-46	100.	889.23	5.7694E-01
CR-51	241.	320.09	3.8455E+00
MN-54	100.	834.83	5.4757E-01
CO-56	89.	846.76	5.2243E-01
CO-57	247.	122.06	2.7192E-01
CO-58	74.	810.75	4.6189E-01
FE-59	76.	1099.25	1.0682E+00
ZN-65	66.	1115.55	1.1260E+00
SE-75	270.	264.66	6.0434E-01
KR-85	190.	513.99	1.1589E+02
SR-85	190.	513.99	5.0880E-01
Y-88	5.	1836.06	2.3042E-01
Y-91	35.	1204.90	1.4862E+02
NB-94	91.	871.10	5.4118E-01
NB-95	80.	765.79	4.5649E-01
ZR-95	74.	756.73	7.9141E-01
RU-103	167.	497.08	5.0085E-01
RURH-106	94.	621.93	8.3206E+00
AG-108M	210.	433.94	5.0587E-01
CD-109	235.	88.03	8.7878E+00
AG-110M	128.	657.76	5.3230E-01
SN-113	257.	391.67	7.2902E-01
TE-123M	285.	159.00	3.0218E-01
SB-124	1231.	602.73	1.4852E+00
SB-125	223.	427.89	1.5840E+00
TE-125M	210.	35.46	0.0000E+00
I-129	220.	39.60	0.0000E+00
I-131	211.	364.48	4.9516E-01
XE-131M	255.	163.98	1.2771E+01
BA-133	207.	356.02	6.2772E-01
CS-136	89.	818.51	5.0890E-01
CS-138	6.	1435.86	4.3592E-01
CE-139	261.	165.85	3.0830E-01
BA-140	265.	162.67	3.9698E+02
LA-140	3.	1596.20	1.8195E-01
CE-141	312.	145.44	5.3369E-01
CE-144	250.	133.51	2.0729E+00
CEPR-144	251.	133.54	4.1475E+00
EU-152	13.	1408.01	1.4583E+00
EU-154	22.	1274.51	1.0751E+00
EU-155	236.	105.31	1.1558E+00
HF-181	199.	482.20	6.0127E-01
TA-182	231.	67.75	1.4841E+00
HG-203	264.	279.19	4.5022E-01
BI-207	402.	569.70	8.0899E-01
TL-208	154.	583.14	5.7991E-01
PB-210	183.	46.50	0.0000E+00
BI-212	81.	727.27	7.0429E+00
PB-212	315.	239.00	8.3221E-01

Sample ID : K212-5530 Acquisition date : 2-MAY-1994 06:25:18

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
BI-214	180.	609.32	1.2505E+00
PB-214	271.	351.92	1.6073E+00
RA-224	310.	240.99	9.0288E+00
RA-226	306.	186.10	8.1931E+00
AC-228	113.	911.07	2.1601E+00
TH-228	320.	215.99	1.2596E+01
TH-229	238.	86.44	1.0984E+01
U-232	271.	129.08	3.5166E+02
PA-233	250.	311.98	1.0765E+00
PA-234M	82.	1001.03	9.8064E-01
TH-234	244.	92.80	2.9181E+00
U-235	312.	143.76	2.3566E+00
NP-237	236.	86.50	2.6018E+00
U-237	313.	208.00	1.5035E+00
NP-238	80.	984.45	2.0382E+00
NP-239	242.	106.12	1.1128E+00
PU-239	271.	129.30	3.7508E+03
AM-241	224.	59.54	3.1362E+00
AM-243	212.	43.60	0.0000E+00

```
*****************************************************************************
* 222-S Laboratory Counting Room    2-MAY-1994 09:11:57.30                  *
*****************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Sample ID:                K213-5630
Sample Size:              1.00000E-03 LI
Dilution Factor:          1.00000E+00
Conversion LI to LI:      1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:
File Number:              NI3AC:1.cnf
Geometry:                 42
Description:
Count Time:               0 00:50:00.00 sec
Real Time:                0 00:50:00.46 sec

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:        2-MAY-1994 07:38:29.43
Decayed to:               2-MAY-1994 06:25:18.44
Standard Deviations:      2
Analysis Library:         LABGEA
Analyst:                  MB

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       11-MAR-1994 11:47:01.11
 Date of last efficiency calibration:   15-MAR-1994 10:28:40.20
*****************************************************************************
```

Removed by: MCBloomer

date: 5/2/94

WHC-SD-WM-DP-079, REV. 0

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	33.24	80	1.54	67.06	63	9	64.1			
0	511.40*	2	1.32	1023.01	1016	15	*****			
0	609.80*	19	1.15	1219.78	1214	13	162.2			
0	661.49*	2	1.64	1323.15	1317	11	*****		CS-137	2.266E-03
0	969.64	18	3.95	1939.48	1935	13	84.4			
0	1215.31	20	3.03	2430.92	2427	11	65.0			
0	1460.73*	5	2.20	2921.95	2916	18	670.7		K-40	8.096E-02

Sample ID : K213-5630 Acquisition date : 2-MAY-1994 07:38:29

WHC-SD-WM-DP-079, REV. 0

Total number of lines in spectrum	7	
Number of unidentified lines	4	
Number of lines tentatively identified by NID	3	42.86%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~K-40~~	~~4.66E+11D~~	~~1.000~~	~~8.096E-02~~	~~8.096E-02~~	~~54.30E-02~~	~~670.70~~	? BKG [illegible]
~~CS-137~~	~~11020.00D~~	~~1.000~~	~~2.266E-03~~	~~2.266E-03~~	~~29.02E-03~~	~~1280.63~~	
			---	---			
Total Activity :			8.322E-02	8.322E-02			
Grand Total Activity :			8.322E-02	8.322E-02			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : K213-5630 Acquisition date : 2-MAY-1994 07:38:29

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
NA-22	11.	1274.55	2.6038E-02
CR-51	39.	320.09	1.5530E-01
MN-54	24.	834.83	2.7111E-02
FE-59	13.	1099.25	4.4597E-02
CO-60	10.	1332.50	2.6300E-02
ZN-65	16.	1115.55	5.5817E-02
SE-75	71.	264.66	3.1078E-02
SR-85	45.	513.99	2.4778E-02
Y-88	4.	1836.06	2.0923E-02
NB-95	17.	765.79	2.0838E-02
ZR-95	24.	756.73	4.5469E-02
RU-103	22.	497.08	1.8053E-02
RURH-106	17.	621.93	3.5682E-01
SN-113	39.	391.67	2.8460E-02
SB-125	24.	427.89	5.2091E-02
I-131	34.	364.48	1.9838E-02
BA-133	41.	356.02	2.7810E-02
CS-134	17.	604.70	1.7635E-02
BA-140	33.	537.31	8.8289E-02
LA-140	2.	1596.21	1.4251E-02
CEPR-144	78.	133.54	2.3127E-01
EU-152	12.	1408.01	1.4054E-01
EU-154	11.	1274.51	7.5633E-02
EU-155	46.	105.31	5.1086E-02
TL-208	44.	583.14	3.1170E-02
BI-212	19.	727.27	3.4426E-01
PB-212	86.	239.00	4.3461E-02
RA-224	74.	240.99	4.4104E-01
RA-226	72.	186.10	3.9631E-01
TH-228	75.	215.99	6.0910E-01
U-235	82.	143.76	1.2090E-01
NP-237	90.	86.50	1.6096E-01
PU-239	79.	129.30	2.0255E+02
AM-241	49.	59.54	1.4741E-01
PU-241	67.	148.57	6.4029E+03
AM-243	68.	74.67	3.7053E-02

```
*****************************************************************************
* 222-S Laboratory Counting Room    2-MAY-1994 10:04:25.95                  *
*****************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Sample ID:              K214-5730
Sample Size:            1.00000E-03 LI
Dilution Factor:        1.00000E+00
Conversion LI to LI:    1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:
File Number:            dka300:[spec.GEA3]3g3422.cnf
Geometry:               42
Description:
Count Time:             0 00:50:00.00 sec
Real Time:              0 00:50:00.47 sec

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:      2-MAY-1994 09:13:48.86
Decayed to:             2-MAY-1994 06:25:18.44
Standard Deviations:    2
Analysis Library:       LABGEA
Analyst:                MB

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       11-MAR-1994 11:47:01.11
 Date of last efficiency calibration:   15-MAR-1994 10:28:40.20
*****************************************************************************
```

Removed by: D. Hamilton

date: 5-2-94

WHC-SD-WM-DP-079, REV. 0

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	583.93	50	1.13	1168.05	1162	13	43.6			
0	661.62*	147	1.48	1323.42	1318	11	25.2		CS-137	0.167
0	1460.59*	9	1.24	2921.66	2915	14	344.5		K-40	0.157

Summary of Nuclide Activity
Sample ID : K214-5730

Acquisition date : 2-MAY-1994 09:13:48

WHC-SD-WM-DP-079, REV. 0

Total number of lines in spectrum	3	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	3	100.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~K-40~~	~~4.66E+11D~~	~~1.000~~	~~1.566E-01~~	~~1.566E-01~~	~~5.396E-01~~	~~344.46~~	BKG 5/2/94
CS-137	11020.00D	1.000	1.667E-01	1.667E-01	0.421E-01	25.24	comment on big uncertainty
	Total Activity :		3.233E-01	3.233E-01			
	Grand Total Activity :		3.233E-01	3.233E-01			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"A" = Nuclide specific abn. limit

Sample ID : K214-5730
Acquisition date : 2-MAY-1994 09:13:48

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
NA-22	8.	1274.55	2.1872E-02
CR-51	51.	320.09	1.7781E-01
MN-54	26.	834.83	2.8000E-02
FE-59	15.	1099.25	4.8131E-02
CO-60	8.	1332.50	2.2719E-02
ZN-65	10.	1115.55	4.3620E-02
SE-75	68.	264.66	3.0298E-02
SR-85	67.	513.99	3.0246E-02
Y-88	3.	1836.06	1.7647E-02
NB-95	17.	765.79	2.0904E-02
ZR-95	16.	756.73	3.6681E-02
RU-103	30.	497.08	2.1396E-02
RURH-106	30.	621.93	4.7143E-01
SN-113	38.	391.67	2.8017E-02
SB-125	43.	427.89	6.9195E-02
I-131	46.	364.48	2.3466E-02
BA-133	44.	356.02	2.8863E-02
CS-134	36.	604.70	2.5556E-02
BA-140	29.	537.31	8.3596E-02
LA-140	2.	1596.21	1.2955E-02
CEPR-144	75.	133.54	2.2649E-01
EU-152	8.	1408.01	1.1394E-01
EU-154	8.	1274.51	6.3858E-02
EU-155	62.	105.31	5.9387E-02
TL-208	54.	583.14	3.4397E-02
BI-212	19.	727.27	3.3902E-01
PB-212	98.	239.00	4.6323E-02
RA-224	75.	240.99	4.4364E-01
RA-226	101.	186.10	4.7109E-01
TH-228	68.	215.99	5.7909E-01
U-235	86.	143.76	1.2341E-01
NP-237	78.	86.50	1.4963E-01
PU-239	87.	129.30	2.1257E+02
AM-241	44.	59.54	1.3981E-01
PU-241	88.	148.57	7.3285E+03
AM-243	85.	74.67	4.1378E-02

```
*****************************************************************************
* 222-S Laboratory Counting Room    2-MAY-1994 12:10:09.10                  *
*****************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Sample ID:                K214-5830
Sample Size:              1.00000E-03 LI
Dilution Factor:          1.00000E+00
Conversion LI to LI:      1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:
File Number:              dka300:[spec.GEA3]3g2423.cnf
Geometry:                 42
Description:
Count Time:               0 00:50:00.00 sec
Real Time:                0 00:50:00.49 sec

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:        2-MAY-1994 11:19:32.51
Decayed to:               2-MAY-1994 06:25:18.44
Standard Deviations:      2
Analysis Library:         LABGEA
Analyst:                  MB

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       11-MAR-1994 11:47:01.11
 Date of last efficiency calibration:   15-MAR-1994 10:28:40.20
*****************************************************************************
```

Removed by: [illegible]

date: 5/2/94

WHC-SD-WM-DP-079, REV. 0

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	33.16	50	1.01	66.90	64	8	94.9			
0	609.90*	1	1.80	1219.99	1213	11	*****			
0	661.62*	144	1.36	1323.41	1315	14	26.4		CS-137	0.163
0	1240.35	13	3.90	2481.00	2474	14	134.1			
0	1460.26*	1	1.87	2921.00	2912	19	*****		K-40	1.542E-02

Sample ID : K214-5830 Acquisition date : 2-MAY-1994 11:19:32

WHC-SD-WM-DP-079, REV. 0

Total number of lines in spectrum	5	
Number of unidentified lines	3	
Number of lines tentatively identified by NID	2	40.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~K-40~~	~~4.66E+11D~~	~~1.000~~	~~1.542E-02~~	~~1.542E-02~~	~~57.37E-02~~	~~3720.25~~	BKG 5/5/94
~~CS-137~~	~~11020.00D~~	~~1.000~~	~~1.631E-01~~	~~1.631E-01~~	~~0.430E-01~~	~~26.38~~	comment on hi uncertainty
			---	---			
Total Activity :			1.785E-01	1.785E-01			
Grand Total Activity :			1.785E-01	1.785E-01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : K214-5830 Acquisition date : 2-MAY-1994 11:19:32

WHC-SD-WM-DP-079, REV. 0

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
NA-22	17.	1274.55	3.2027E-02
CR-51	60.	320.09	1.9292E-01
MN-54	11.	834.83	1.8490E-02
FE-59	18.	1099.25	5.1939E-02
CO-60	9.	1332.50	2.3938E-02
ZN-65	12.	1115.55	4.8551E-02
SE-75	75.	264.66	3.1974E-02
SR-85	45.	513.99	2.4818E-02
Y-88	0.	1836.06	0.0000E+00
NB-95	20.	765.79	2.2675E-02
ZR-95	20.	756.73	4.0835E-02
RU-103	38.	497.08	2.3828E-02
RURH-106	27.	621.93	4.4562E-01
SN-113	45.	391.67	3.0644E-02
SB-125	39.	427.89	6.6534E-02
I-131	54.	364.48	2.5482E-02
BA-133	46.	356.02	2.9668E-02
CS-134	20.	604.70	1.8891E-02
BA-140	23.	537.31	7.4339E-02
LA-140	3.	1596.21	1.8595E-02
CEPR-144	77.	133.54	2.3032E-01
EU-152	8.	1408.01	1.1515E-01
EU-154	16.	1274.51	9.2575E-02
EU-155	67.	105.31	6.1552E-02
TL-208	49.	583.14	3.2709E-02
BI-212	26.	727.27	4.0217E-01
PB-212	89.	239.00	4.4160E-02
RA-224	73.	240.99	4.3657E-01
RA-226	105.	186.10	4.7944E-01
TH-228	85.	215.99	6.4954E-01
U-235	82.	143.76	1.2073E-01
NP-237	70.	86.50	1.4144E-01
PU-239	72.	129.30	1.9340E+02
AM-241	54.	59.54	1.5423E-01
PU-241	91.	148.57	7.4613E+03
AM-243	85.	74.67	4.1346E-02

Batch 3343

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-079, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. K216	Customer ID: C58HCB C111
Analysis: GEA	Sample Prep: Direct

Instrument: ~~WB 5.7231~~ ~~LAD 5.2595~~ ~~WB 5.7215~~ WC 38931	Procedure/ Rev: LA-548-121/D-0
Technologist: RD Meyers	Date: 4/30/94
Starting Time: 0200	Temperature NA
Ending Time: 0300	Chemist: S Catlow

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	K2B 5530	11		
2	Sample	K216 5730	12		
3			13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	139851 100ml			

318

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: **LA-548-121**

DATE START: **25 MAY 1994**

PREPARED BY: **P. P. Bachelor**

DATE COMPLETE: **25 MAY 1994**

	UNITS:		uCi/mL						
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD	K215-5530	CO-60	2.09E+01				99.80		4.4
		CS-134	1.55E+01						4.3
		CS-137	2.50E+01				99.50		4.9
BLANK									
SAMPLE	K216-5730	CS-137	<2.65E-04						

NARRATIVE: PPB NO SPECIAL PROBLEM

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

3410 Batch 3343

Serial No	Sample Point	Date	Time Issued	Priority
K 215.-5530	C-111	4-28-94	11:14	21

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	% RECOVERY	N4C3B	0

Sample Size	Customer ID
100 ml	STD

Remarks Calculations Results

COLX STD=136B51
K901 STD VAL 2.5147 E+1
RESULT 2.503 E+1 % REC 99.5 %
K905 STD VAL
RESULT 2.098 E+1 % REC 99.8 %

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	4-30-94			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/30/94	0300	Bachelor

54-5800-061 (R-10-83)

3411

Serial No	Sample Point	Date	Time Issued	Priority
K 216.-5730	C-111	4-28-94	11:23	21

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	N4C3B	0

Sample Size	Customer ID
100 ml	C58HCB

Remarks Calculations Results

COUNT AS uCI/L
LASER PRINTOUT

^{137}Cs < 2.65 E-04 µCi/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	4-30-94			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
04/30/94	0300	Bachelor

54-5800-061 (R-10-83)

```
*****************************************************************************
* 222-S Laboratory Counting Room   30-APR-1994 07:21:17.12                  *
*****************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Sample ID:              K215-5530
Sample Size:            1.00000E-03 LI
Dilution Factor:        1.00000E+01
Conversion LI to LI:    1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:
File Number:            dka300:[spec.GEA3]3g3410.cnf
Geometry:               42
Description:
Count Time:             0 00:50:00.00 sec
Real Time:              0 00:50:01.67 sec

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:      30-APR-1994 06:30:39.14
Decayed to:             30-APR-1994 06:30:39.14
Standard Deviations:    2
Analysis Library:       LABGEA
Analyst:                ALJ

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       11-MAR-1994 11:47:01.11
 Date of last efficiency calibration:   15-MAR-1994 10:28:40.20
*****************************************************************************
```

Removed by: [signature]

date: 4-30-94

WHC-SD-WM-DP-079, REV. 0

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	563.35	138	1.25	1126.91	1121	12	42.3		CS-134	13.8
0	569.33	202	1.31	1138.86	1134	11	30.8		CS-134	11.1
0	604.72	1627	1.42	1209.64	1203	15	6.4		CS-134	14.9
0	661.70*	2209	1.41	1323.58	1316	15	4.9		CS-137	25.0
0	673.12	38	1.63	1346.41	1343	11	80.2			
4	795.88	1243	1.66	1591.93	1584	35	6.0	1.58E+00	CS-134	16.4
4	802.02	146	2.42	1604.21	1584	35	30.2		CS-134	18.9
0	1173.19	1329	1.99	2346.64	2339	18	6.3		CO-60	21.0
0	1332.41*	1200	1.92	2665.20	2657	16	6.0		CO-60	21.0
0	1364.48	44	1.73	2729.36	2721	14	30.2			
0	1460.56*	16	2.25	2921.62	2916	13	211.5		K-40	2.86

Sample ID : K215-5530
Acquisition date : 30-APR-1994 06:30:39

WHC-SD-WM-DP-079, REV. 0

Total number of lines in spectrum	11	
Number of unidentified lines	2	
Number of lines tentatively identified by NID	9	81.82%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~K-40~~	~~4.66E+11D~~	~~1.000~~	~~2.865E+00~~	~~2.865E+00~~	~~6.058E+00~~	~~211.45~~	BKG 5/1/94
CO-60	1925.30D	1.000	2.098E+01	2.098E+01	0.091E+01	4.36	
CS-134	753.10D	1.000	1.547E+01	1.547E+01	0.066E+01	4.30	
CS-137	11020.00D	1.000	2.503E+01	2.503E+01	0.123E+01	4.92	
	Total Activity :		6.434E+01	6.434E+01			

Grand Total Activity : 6.434E+01 6.434E+01

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"A" = Nuclide specific abn. limit

Sample ID : K215-5530
Acquisition date : 30-APR-1994 06:30:39

WHC-SD-WM-DP-079, REV. 0

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
NA-22	21.	1274.55	3.5808E-01
CR-51	220.	320.09	3.6774E+00
MN-54	79.	834.83	4.8715E-01
FE-59	71.	1099.25	1.0352E+00
ZN-65	65.	1115.55	1.1113E+00
SE-75	259.	264.66	5.9214E-01
SR-85	170.	513.99	4.8051E-01
Y-88	3.	1836.06	1.8096E-01
NB-95	77.	765.79	4.4576E-01
ZR-95	84.	756.73	8.4321E-01
RU-103	167.	497.08	5.0072E-01
RURH-106	101.	621.93	8.5967E+00
SN-113	232.	391.67	6.9267E-01
SB-125	213.	427.89	1.5450E+00
I-131	231.	364.48	5.1773E-01
BA-133	215.	356.02	6.4046E-01
BA-140	144.	537.31	1.8480E+00
LA-140	4.	1596.21	1.9735E-01
CEPR-144	262.	133.54	4.2375E+00
EU-152	16.	1408.01	1.6112E+00
EU-154	21.	1274.51	1.0501E+00
EU-155	254.	105.31	1.1995E+00
TL-208	135.	583.14	5.4303E-01
BI-212	65.	727.27	6.3124E+00
PB-212	327.	239.00	8.4779E-01
RA-224	317.	240.99	9.0990E+00
RA-226	305.	186.10	8.1767E+00
TH-228	337.	215.99	1.2928E+01
U-235	270.	143.76	2.1925E+00
NP-237	226.	86.50	2.5474E+00
PU-239	273.	129.30	3.7634E+03
AM-241	198.	59.54	2.9517E+00
PU-241	273.	148.57	1.2934E+05
AM-243	240.	74.67	6.9482E-01

```
*****************************************************************************
* 222-S Laboratory Counting Room   30-APR-1994 08:16:54.56                  *
*****************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Sample ID:                K216-5730
Sample Size:              1.00000E-03 LI
Dilution Factor:          1.00000E+01
Conversion LI to LI:      1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:
File Number:              dka300:[spec.GEA3]3g3411.cnf
Geometry:                 42
Description:
Count Time:               0 00:50:00.00 sec
Real Time:                0 00:50:00.47 sec

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:        30-APR-1994 07:26:16.19
Decayed to:               30-APR-1994 07:26:16.19
Standard Deviations:      2
Analysis Library:         LABGEA
Analyst:                  ALJ

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       11-MAR-1994 11:47:01.11
 Date of last efficiency calibration:   15-MAR-1994 10:28:40.20
*****************************************************************************
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Removed by: [signature]

date: 4/30/94

WHC-SD-WM-DP-079, REV. 0

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	33.37	48	1.47	67.32	64	8	90.3			
0	608.98*	10	1.85	1218.16	1213	9	242.2			
0	661.54*	23	1.58	1323.25	1319	9	112.3		CS-137	0.265
0	1460.74*	22	1.70	2921.96	2914	16	147.1		K-40	3.80

Summary of Nuclide Activity
Sample ID : K216-5730

Acquisition date : 30-APR-1994 07:26:16

WHC-SD-WM-DP-079, REV. 0

Total number of lines in spectrum	4	
Number of unidentified lines	2	
Number of lines tentatively identified by NID	2	50.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~K-40~~	~~4.66E+11D~~	~~1.000~~	~~3.796E+00~~	~~3.796E+00~~	~~5.584E+00~~	~~147.07~~	
~~CS-137~~	~~11020.00D~~	~~1.000~~	~~2.654E-01~~	~~2.654E-01~~	~~2.981E-01~~	~~112.32~~	BKG 5/1/94
			---	---			
	Total Activity :		4.062E+00	4.062E+00			
	Grand Total Activity :		4.062E+00	4.062E+00			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"A" = Nuclide specific abn. limit

Sample ID : K216-5730
Acquisition date : 30-APR-1994 07:26:16

WHC-SD-WM-DP-079, REV

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
NA-22	12.	1274.55	2.7362E-01
CR-51	51.	320.09	1.7779E+00
MN-54	17.	834.83	2.2856E-01
FE-59	17.	1099.25	5.1077E-01
CO-60	14.	1332.50	3.0326E-01
ZN-65	11.	1115.55	4.6366E-01
SE-75	55.	264.66	2.7362E-01
SR-85	36.	513.99	2.2270E-01
Y-88	3.	1836.06	1.8165E-01
NB-95	16.	765.79	2.0094E-01
ZR-95	18.	756.73	3.8876E-01
RU-103	23.	497.08	1.8463E-01
RURH-106	24.	621.93	4.2273E+00
SN-113	34.	391.67	2.6482E-01
SB-125	45.	427.89	7.1405E-01
I-131	49.	364.48	2.3912E-01
BA-133	39.	356.02	2.7094E-01
CS-134	25.	604.70	2.1154E-01
BA-140	26.	537.31	7.8607E-01
LA-140	4.	1596.21	1.8631E-01
CEPR-144	81.	133.54	2.3560E+00
EU-152	5.	1408.01	9.1032E-01
EU-154	12.	1274.51	7.9744E-01
EU-155	93.	105.31	7.2626E-01
TL-208	41.	583.14	2.9870E-01
BI-212	18.	727.27	3.2915E+00
PB-212	84.	239.00	4.2894E-01
RA-224	63.	240.99	4.0463E+00
RA-226	91.	186.10	4.4748E+00
TH-228	75.	215.99	6.0830E+00
U-235	90.	143.76	1.2685E+00
NP-237	58.	86.50	1.2889E+00
PU-239	65.	129.30	1.8416E+03
AM-241	51.	59.54	1.4954E+00
PU-241	73.	148.57	6.6954E+04
AM-243	70.	74.67	3.7572E-01

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-079, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. K 218 - 219	Customer ID: G59 S1 C111
Analysis: GEA	Sample Prep: FUSION

Instrument: ~~WB 57237~~ ~~WB 57265~~ WC 58931 LAD 6-17-94	Procedure/ Rev: LA-548-121 / D-0
Technologist: Sutton Boatright	Date: 5-31-94
Starting Time: 1700	Temperature N/A
Ending Time: 1730	Chemist: ~~S Fitzgerald~~ 6-13-94 LAD P Bachelor

Comments:

	Description	Lab ID
1	LMCS K	217-5530
2	sample K	218-6730
3	sample dup K	218-6830
4	blank K	219-6630
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	139B51 / .100 ml			
			.327	

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-079, REV. 0

METHOD: LA-548-121

DATE START: 16 June 1994

PREPARED BY: P. P. Bachelor

DATE COMPLETE: 16 June 1994

	UNITS:		uCi/g						
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD	K217-5530	CO-60	2.19E+01				105.20		2.2
		CS-134	1.54E+01						2.4
		CS-137	2.65E+01				105.50		2.5
BLANK	K219-6630	CS-137	<4.01E-O2					4.01E-02	
SAMPLE	K218-6730	CS-137	7.15E-01	7.36E-01	7.25E-01	2.88		4.01E-02	12.33
	K218-6830								11.22

NARRATIVE: PPB NO SPECIAL PROBLEM

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

4346 Batch 3501

Serial No	Sample Point	Date	Time Issued	Priority
K 217.-5530	C-111	5- 4-94	16:36	20

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	% RECOVERY	N4C3B	0

Sample Size	Customer ID
? .100 ml	STD

Remarks, Calculations, Results

COLX STD# 139B51
R901 STD VAL 2.5082 E+1
RESULT 2.647 E+1 % REC 105.5 %
R905 STD VAL 2.0805 E+1
RESULT 2.188 E+1 % REC 105.2 %

SLHB

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
5-31-94 SLHand	BoJright			
Hrs	Hrs	Hrs	Hrs	Hrs
	17:30			

Date	Time Completed	Lab Unit Mgr	
5-31-94	~~17:30~~	Bachelor	

LAD 6-17-94

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

4347

WHC-SD-WM-DP-079, REV. 0

Serial No	Sample Point	Date	Time Issued	Priority
K 218.-6730	C-111	5- 4-94	16:38	20

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/G Rec	N4C3B	0

Sample Size	Customer ID
? .100 ml	C59 S1

Remarks Calculations Results

COUNT AS uCI/L
LASER PRINTOUT

SL Hood Boatright

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-31-94	1730		

54-6800-061 (R-10-83)

PREPARATION OF SAMPLE MOUNTS FOR GAMMA ENERGY ANALYSIS: LA-548-121 (D-0)

Serial No.	ANALYTE	?	SAMPLE pCi/L	SAMPLE pCi/G	N/A	COUNTING ERROR %	N/A	N/A	DET. LIMIT (pCi/G)
K218-6730	CS-137		2.3570	7.15E-01		12.33			
Batch ID				0.00E+00					
3501				0.00E+00					
Recon No.				0.00E+00					
0				0.00E+00					
Analyst				0.00E+00					
BOATRIGHT				0.00E+00					
Date				0.00E+00					
05/31/94				0.00E+00					
				0.00E+00					
g%				0.00E+00					
3.298				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					

pCi/g = (pCi/L) / (g/L)

Data Entry by:		Date:	15-Jun-94
Approved by:		Date:	16-June-94

Form 1 Rev. 1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

4349

WHC-SD-WM-DP-079, REV. 0

Serial No	Sample Point	Date	Time Issued	Priority
K 218.-6830	C-111	5- 4-94	16:38	20

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/G Rec	N4C3B	0

Sample Size	Customer ID
? .100 ml	C59 S1

Remarks Calculations Results

COUNT AS uCI/L Dup
LASER PRINTOUT

7.36 E-1

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-31-94	1730	

54-6800-061 (R-10-83)

PREPARATION OF SAMPLE MOUNTS FOR GAMMA ENERGY ANALYSIS: LA-548-121 (D-0)

Serial No.	ANALYTE	?	SAMPLE µCi/L	SAMPLE pCi/G	?	DUPLICATE µCi/L	DUPLICATE pCi/G	COUNTING ERROR %	AVERAGE (pCi/G)	RPD	DET. LIMIT (pCi/G)
K218-6830	CS-137		2.3570	7.15E-01		2.4570	7.36E-01		7.25E-01	2.9	
Batch ID: 3501				0.00E+00			0.00E+00		0.00E+00	ERR	
				0.00E+00			0.00E+00		0.00E+00	ERR	
Retain No. 0				0.00E+00			0.00E+00		0.00E+00	ERR	
				0.00E+00			0.00E+00		0.00E+00	ERR	
Analyst: BOATRIGHT				0.00E+00			0.00E+00		0.00E+00	ERR	
				0.00E+00			0.00E+00		0.00E+00	ERR	
Date: 05/31/94				0.00E+00			0.00E+00		0.00E+00	ERR	
				0.00E+00			0.00E+00		0.00E+00	ERR	
g%: 3.298				0.00E+00			0.00E+00		0.00E+00	ERR	
				0.00E+00			0.00E+00		0.00E+00	ERR	
DUP. g%: 3.3404				0.00E+00			0.00E+00		0.00E+00	ERR	
				0.00E+00			0.00E+00		0.00E+00	ERR	
				0.00E+00			0.00E+00		0.00E+00	ERR	
				0.00E+00			0.00E+00		0.00E+00	ERR	
				0.00E+00			0.00E+00		0.00E+00	ERR	
				0.00E+00			0.00E+00		0.00E+00	ERR	
				0.00E+00			0.00E+00		0.00E+00	ERR	

µCi/g = (µCi/L) / (g/L)

AVERAGE (µCi/g) = (SAMPLE + DUPLICATE) / 2

RPD = (SAMPLE − DUPLICATE) / AVERAGE * 100

Data Entry by:		Date:	15-Jun-94
Approved by:		Date:	16-June-94

Form 1 Rev. 1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

LAB ~~4851~~ 4351

Serial No	Sample Point	Date	Time Issued	Priority
K 219.-6630	C-111	5-18-94	13:33	20

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/G Rec	N4C3B	0

Sample Size	Customer ID
? .100ml	BLANK

Remarks Calculations Results

COUNT AS uCI/L
LASER PRINTOUT

< 4.01 E-2

SL Hood Boatright

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Eric Barela			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-31-94	1730	Bachelor	

54-6800-061 (R-10-83)

PREPARATION OF SAMPLE MOUNTS FOR GAMMA ENERGY ANALYSIS: LA-548-121 (D-0)

Sample No.	ANALYTE	P	BLANK µCi/L	BLANK µCi/G	N/A	COUNTING ERROR %	N/A	N/A	DET. LIMIT (pCi/G)
K219-6630	CS-137	<	0.1323	4.01E-02					
Batch ID				0.00E+00					
3501				0.00E+00					
Room No.				0.00E+00					
D				0.00E+00					
Analyst				0.00E+00					
BOATRIGHT				0.00E+00					
Date				0.00E+00					
05/31/94				0.00E+00					
				0.00E+00					
g				0.00E+00					
3.298				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					
				0.00E+00					

µCi/g = (µCi/L) / (g/L)

Data Entry by:		Date:	15-Jun-94
Approved by:	Bachelor	Date:	16-June-94

Form 1 Rev. 1

**********/**** **********
* 222-S Laboratory Counting Room 31-MAY-1994 19:04:11.73 *
****

>>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<

Sample ID: K-217
Sample Size: 1.00000E-03 LI
Dilution Factor: 1.00000E+01
Conversion LI to LI: 1.00000E+00

Removed by: Em Barela
date: 5-31-94

>>>>>>>>>> COUNT INFORMATION <<<<<<<<<<

Detector ID: GEA4
File Number: dka300:[spec.GEA4]4g4346.cnf
Geometry: 41
Description:
Count Time: 0 00:50:00.00 sec
Real Time: 0 00:50:06.59 sec

WHC-SD-WM-DP-079, REV. 0

>>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<

Sample Count Time: 31-MAY-1994 18:13:20.29
Decayed to: 31-MAY-1994 18:13:20.29
Standard Deviations: 2
Analysis Library: ENVGEA
Analyst: EMB

>>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<

Date of last energy calibration: 18-APR-1994 11:17:09.37
Date of last efficiency calibration: 18-APR-1994 11:18:36.88

****

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	351.79*	0	1.35	703.51	700	8	*****			
0	475.37	153	1.25	950.65	947	9	68.9			
0	563.09	527	1.42	1126.09	1119	13	23.5		CS-134	14.9
0	569.18	879	1.32	1138.26	1133	11	13.5		CS-134	13.6
0	604.56	5989	1.42	1209.02	1201	14	3.2		CS-134	15.1
0	609.26*	23	1.53	1218.42	1215	8	347.2			
0	661.50*	8615	1.47	1322.91	1316	14	2.5		CS-137	26.5
0	795.69	4357	1.56	1591.28	1583	16	3.8		CS-134	16.2
0	801.78	428	1.67	1603.47	1599	12	20.8		CS-134	15.7
0	911.39*	77	1.47	1822.69	1819	10	103.7			
0	1173.05	4973	1.72	2346.05	2339	16	3.2		CO-60	21.9
0	1332.28	4543	1.87	2664.56	2656	18	3.1		CO-60	21.8
0	1364.91	102	1.93	2729.83	2724	14	35.2			
0	1400.52	54	1.11	2801.06	2796	10	46.5			
0	1460.51*	29	1.84	2921.06	2911	20	271.0		K-40	1.40
0	1592.04	14	1.44	3184.16	3182	8	93.8			
0	1763.63	45	1.02	3527.42	3519	21	78.8			

Sample ID ': K-217 Acquisition date : 31-MAY-1994 18:13:20

WHC-SD-WM-DP-079, REV. 0

Total number of lines in spectrum 17
Number of unidentified lines 4
Number of lines tentatively identified by NID 13 76.47%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~K-40~~	~~4.66E+11D~~	~~1.000~~	~~1.400E+00~~	~~1.400E+00~~	~~3.793E+00~~	~~270.98~~	BKG 6/1/94
CO-60	1925.30D	1.000	2.188E+01	2.188E+01	0.049E+01	2.24	
CS-134	753.10D	1.000	1.543E+01	1.543E+01	0.037E+01	2.38	
CS-137	11020.00D	1.000	2.647E+01	2.647E+01	0.067E+01	2.51	
	Total Activity :		6.518E+01	6.518E+01			

Grand Total Activity : 6.518E+01 6.518E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

WHC-SD-WM-DP-079, REV. 0

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
BE-7	733.	477.59	2.5263E+00
NA-22	62.	1274.55	1.7056E-01
NA-24	63.	1368.53	1.8417E-01
SC-46	350.	889.23	3.1111E-01
CR-51	864.	320.09	1.9855E+00
MN-54	288.	834.83	2.6442E-01
CO-56	318.	846.76	2.8178E-01
CO-57	810.	122.06	1.3437E-01
CO-58	293.	810.75	2.5931E-01
FE-59	287.	1099.25	5.8605E-01
ZN-65	288.	1115.55	6.6108E-01
SE-75	870.	264.66	2.9520E-01
KR-85	670.	513.99	6.2301E+01
SR-85	671.	513.99	2.7349E-01
Y-88	21.	1836.06	1.3490E-01
Y-91	118.	1204.90	7.5541E+01
NB-94	344.	871.10	3.0183E-01
NB-95	318.	765.79	2.5362E-01
ZR-95	316.	756.73	4.5700E-01
RU-103	596.	497.08	2.6988E-01
RURH-106	380.	621.93	4.5662E+00
AG-108M	767.	433.94	2.6734E-01
CD-109	726.	88.03	4.0946E+00
AG-110M	517.	657.76	2.9041E-01
SN-113	835.	391.67	3.5789E-01
TE-123M	871.	159.00	1.4392E-01
SB-124	4613.	602.73	7.9304E-01
SB-125	865.	427.89	8.6043E-01
TE-125M	677.	35.46	0.0000E+00
I-129	639.	39.60	0.0000E+00
I-131	878.	364.48	2.7469E-01
XE-131M	882.	163.98	6.4531E+00
BA-133	836.	356.02	3.4330E-01
CS-136	289.	818.51	2.5941E-01
CS-138	33.	1435.86	2.9454E-01
CE-139	885.	165.85	1.5436E-01
BA-140	875.	162.67	1.9625E+02
LA-140	22.	1596.20	1.2781E-01
CE-141	845.	145.44	2.3974E-01
CE-144	815.	133.51	1.0218E+00
CEPR-144	815.	133.54	2.0413E+00
EU-152	61.	1408.01	8.7417E-01
EU-154	62.	1274.51	4.9640E-01
EU-155	721.	105.31	5.4676E-01
HF-181	647.	482.20	3.0792E-01
TA-182	648.	67.75	6.1061E-01
HG-203	893.	279.19	2.2536E-01
BI-207	1415.	569.70	4.2641E-01
TL-208	675.	583.14	3.3883E-01
PB-210	609.	46.50	0.0000E+00
BI-212	349.	727.27	4.0444E+00

Sample ID : K-217 Acquisition date : 31-MAY-1994 18:13:20

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
PB-212	1088.	239.00	4.2106E-01
BI-214	606.	609.32	6.3088E-01
PB-214	977.	351.92	8.3048E-01
RA-224	1023.	240.99	4.4653E+00
RA-226	1002.	186.10	4.0238E+00
AC-228	452.	911.07	1.2463E+00
TH-228	1055.	215.99	6.2251E+00
TH-229	767.	86.44	5.2116E+00
U-232	820.	129.08	1.6706E+02
PA-233	875.	311.98	5.4813E-01
PA-234M	316.	1001.03	5.4784E-01
TH-234	802.	92.80	1.4119E+00
U-235	864.	143.76	1.0703E+00
NP-237	764.	86.50	1.2369E+00
U-237	1001.	208.00	7.3068E-01
NP-238	310.	984.45	1.1449E+00
NP-239	728.	106.12	5.2205E-01
PU-239	839.	129.30	1.8017E+03
AM-241	658.	59.54	1.1750E+00
AM-243	679.	43.60	0.0000E+00

```
*****************************************************************************
* 222-S Laboratory Counting Room   31-MAY-1994 22:06:35.85                  *
*****************************************************************************
     >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Sample ID:                K-219-6630
Sample Size:              1.00000E-03 LI
Dilution Factor:          1.00000E+01
Conversion LI to LI:      1.00000E+00

     >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:              GEA4
File Number:              dka300:[spec.GEA4]4g4351.cnf
Geometry:                 41
Description:
Count Time:               0 00:50:00.00 sec
Real Time:                0 00:50:02.42 sec

     >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:        31-MAY-1994 21:15:57.83
Decayed to:               31-MAY-1994 21:15:57.83
Standard Deviations:      2
Analysis Library:         ENVGEA
Analyst:                  EMB

     >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       18-APR-1994 11:17:09.37
 Date of last efficiency calibration:   18-APR-1994 11:18:36.88
*****************************************************************************
```

Removed by: Em Barela

date: 5-31-94

WHC-SD-WM-DP-079, REV. 0

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw %Err	Fit	Nuclides	Activity uCi/LI
0	75.21*	22	0.75	150.41	147	7356.7		AM-243	5.532E-02
0	84.62*	14	0.69	169.22	166	7535.6			
0	92.67*	20	0.97	185.33	183	6367.1			
0	238.70*	33	0.96	477.34	474	7248.4		PB-212	9.092E-02
0	295.22*	14	1.33	590.37	587	9607.2		PB-214	0.134
0	351.86*	86	1.52	703.66	697	15124.0		PB-214	0.493
0	583.05*	52	1.16	1166.02	1160	12125.7			
0	609.28*	2	1.53	1218.47	1213	12*****		BI-214	1.373E-02
0	661.56*	43	1.23	1323.02	1318	11154.6		CS-137	0.132
0	768.32	41	0.87	1536.55	1530	16134.4		BI-214	2.66
0	911.35*	29	1.66	1822.62	1818	11192.3			
0	1120.21*	29	1.40	2240.36	2236	9171.2		BI-214	0.848
0	1377.88	29	1.63	2755.76	2750	15 90.3			
0	1764.41*	39	1.89	3528.97	3521	18 74.8		BI-214	1.56

Summary of Nuclide Activity
Sample ID : K-219-6630

Acquisition date : 31-MAY-1994 21:15:57

Total number of lines in spectrum 14
Number of unidentified lines 1
Number of lines tentatively identified by NID 13 92.86%

WHC-SD-WM-DP-079, REV. 0

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~CS-137~~	~~11020.00D~~	~~1.000~~	~~1.323E-01~~	~~1.323E-01~~	~~2.046E-01~~	~~154.61~~	
~~PB-212~~	~~698.74D~~	~~1.000~~	~~9.092E-02~~	~~9.092E-02~~	~~22.58E-02~~	~~248.37~~	
~~BI-214~~	~~28700.00D~~	~~1.000~~	~~2.016E-01~~	~~2.016E-01~~	~~3.288E-01~~	~~163.05~~	OK 6/1/9
~~PB-214~~	~~0.04D~~	~~1.348~~	~~2.698E-01~~	~~3.637E-01~~	~~4.889E-01~~	~~134.44~~	
~~AM-243~~	~~2.69E+06D~~	~~1.000~~	~~5.532E-02~~	~~5.532E-02~~	~~19.73E-02~~	~~356.68~~	
			---	---			
	Total Activity :		7.500E-01	8.439E-01			

Grand Total Activity : 7.500E-01 8.439E-01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : K-219-6630
Acquisition date : 31-MAY-1994 21:15:57

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
BE-7	158.	477.59	1.1741E+00
NA-22	48.	1274.55	1.4969E-01
NA-24	42.	1368.53	1.5095E-01
K-40	824.	1460.75	6.4735E+00
SC-46	84.	889.23	1.5215E-01
CR-51	286.	320.09	1.1412E+00
MN-54	87.	834.83	1.4535E-01
CO-56	58.	846.76	1.2071E-01
CO-57	325.	122.06	8.5135E-02
CO-58	91.	810.75	1.4430E-01
FE-59	71.	1099.25	2.9205E-01
CO-60	55.	1332.50	1.6528E-01
ZN-65	69.	1115.55	3.2366E-01
SE-75	330.	264.66	1.8169E-01
KR-85	219.	513.99	3.5622E+01
SR-85	220.	513.99	1.5646E-01
Y-88	14.	1836.06	1.1152E-01
Y-91	72.	1204.90	5.9147E+01
NB-94	87.	871.10	1.5166E-01
NB-95	89.	765.79	1.3418E-01
ZR-95	84.	756.73	2.3589E-01
RU-103	140.	497.08	1.3083E-01
RURH-106	114.	621.93	2.5019E+00
AG-108M	192.	433.94	1.3370E-01
CD-109	281.	88.03	2.5453E+00
AG-110M	105.	657.76	1.3107E-01
SN-113	221.	391.67	1.8397E-01
TE-123M	326.	159.00	8.7999E-02
SB-124	116.	602.73	1.2575E-01
SB-125	207.	427.89	4.2064E-01
TE-125M	210.	35.46	0.0000E+00
I-129	251.	39.60	0.0000E+00
I-131	230.	364.48	1.4045E-01
XE-131M	330.	163.98	3.9476E+00
BA-133	209.	356.02	1.7185E-01
CS-134	109.	795.84	1.8043E-01
CS-136	100.	818.51	1.5269E-01
CS-138	27.	1435.86	2.6221E-01
CE-139	340.	165.85	9.5714E-02
BA-140	352.	162.67	1.2453E+02
LA-140	30.	1596.20	1.4978E-01
CE-141	320.	145.44	1.4750E-01
CE-144	333.	133.51	6.5317E-01
CEPR-144	333.	133.54	1.3047E+00
EU-152	35.	1408.01	6.6733E-01
EU-154	48.	1274.51	4.3594E-01
EU-155	295.	105.31	3.4977E-01
HF-181	165.	482.20	1.5564E-01
TA-182	275.	67.75	3.9771E-01
HG-203	285.	279.19	1.2723E-01
BI-207	129.	569.70	1.2882E-01

Sample ID : K-219-6630 Acquisition date : 31-MAY-1994 21:15:57

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
TL-208	252.	583.14	2.0698E-01
PB-210	253.	46.50	0.0000E+00
BI-212	122.	727.27	2.3904E+00
RA-224	351.	240.99	2.6147E+00
RA-226	395.	186.10	2.5276E+00
AC-228	177.	911.07	7.8087E-01
TH-228	356.	215.99	3.6133E+00
TH-229	317.	86.44	3.3517E+00
U-232	332.	129.08	1.0629E+02
PA-233	267.	311.98	3.0269E-01
PA-234M	70.	1001.03	2.5734E-01
TH-234	334.	92.80	9.1078E-01
U-235	312.	143.76	6.4264E-01
NP-237	314.	86.50	7.9285E-01
U-237	352.	208.00	4.3348E-01
NP-238	70.	984.45	5.4438E-01
NP-239	307.	106.12	3.3929E-01
PU-239	324.	129.30	1.1206E+03
AM-241	271.	59.54	7.5460E-01

```
*****************************************************************************
* 222-S Laboratory Counting Room   31-MAY-1994 20:02:02.32                  *
*****************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Sample ID:                K-218-6730
Sample Size:              1.00000E-03 LI
Dilution Factor:          1.00000E+01
Conversion LI to LI:      1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:              GEA4
File Number:              dka300:[spec.GEA4]4g4347.cnf
Geometry:                 41
Description:
Count Time:               0 00:50:00.00 sec
Real Time:                0 00:50:02.98 sec

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:        31-MAY-1994 19:11:25.92
Decayed to:               31-MAY-1994 19:11:25.92
Standard Deviations:      2
Analysis Library:         ENVGEA
Analyst:                  EMB

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       18-APR-1994 11:17:09.37
 Date of last efficiency calibration:   18-APR-1994 11:18:36.88
*****************************************************************************
```

Removed by: Em Barela

date: 5-31-94

WHC-SD-WM-DP-079, REV. 0

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw %Err	Fit	Nuclides	Activity uCi/LI
0	92.54*	52	1.27	185.07	182	7211.7			
0	238.49*	11	1.37	476.93	473	8901.3		PB-212	3.026E-02
0	351.79*	0	1.23	703.51	698	11*****			
0	511.30*	100	2.33	1022.51	1015	20118.5			
0	661.55*	767	1.48	1323.00	1316	14 12.3		CS-137	2.36
0	910.93*	20	1.88	1821.77	1814	14321.9			
0	1119.89*	6	1.82	2239.72	2235	9904.7			
0	1764.32*	18	2.54	3528.79	3520	18145.9			

Sample ID : K-218-6730 Acquisition date : 31-MAY-1994 19:11:25

WHC-SD-WM-DP-079, REV. 0

Total number of lines in spectrum	8	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	8	100.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	11020.00D	1.000	2.357E+00	2.357E+00	0.290E+00	12.33	
~~PB-212~~	~~698.74D~~	~~1.000~~	~~3.026E-02~~	~~3.026E-02~~	~~27.27E-02~~	~~901.25~~	BKG 6/1/94
Total Activity :			2.387E+00	2.387E+00			
Grand Total Activity :			2.387E+00	2.387E+00			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : K-218-6730
Acquisition date : 31-MAY-1994 19:11:25

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
BE-7	198.	477.59	1.3147E+00
NA-22	66.	1274.55	1.7558E-01
NA-24	39.	1368.53	1.4547E-01
K-40	791.	1460.75	6.3414E+00
SC-46	73.	889.23	1.4248E-01
CR-51	317.	320.09	1.2023E+00
MN-54	97.	834.83	1.5319E-01
CO-56	82.	846.76	1.4299E-01
CO-57	724.	122.06	1.2705E-01
CO-58	87.	810.75	1.4114E-01
FE-59	67.	1099.25	2.8392E-01
CO-60	51.	1332.50	1.5928E-01
ZN-65	73.	1115.55	3.3228E-01
SE-75	421.	264.66	2.0536E-01
KR-85	240.	513.99	3.7281E+01
SR-85	240.	513.99	1.6369E-01
Y-88	17.	1836.06	1.2298E-01
Y-91	73.	1204.90	5.9666E+01
NB-94	98.	871.10	1.6109E-01
NB-95	115.	765.79	1.5259E-01
ZR-95	91.	756.73	2.4566E-01
RU-103	177.	497.08	1.4688E-01
RURH-106	115.	621.93	2.5180E+00
AG-108M	214.	433.94	1.4140E-01
CD-109	827.	88.03	4.3687E+00
AG-110M	142.	657.76	1.5236E-01
SN-113	273.	391.67	2.0476E-01
TE-123M	562.	159.00	1.1560E-01
SB-124	118.	602.73	1.2663E-01
SB-125	225.	427.89	4.3911E-01
TE-125M	476.	35.46	0.0000E+00
I-129	492.	39.60	0.0000E+00
I-131	268.	364.48	1.5187E-01
XE-131M	609.	163.98	5.3601E+00
BA-133	282.	356.02	1.9931E-01
CS-134	132.	795.84	1.9826E-01
CS-136	59.	818.51	1.1770E-01
CS-138	25.	1435.86	2.5303E-01
CE-139	572.	165.85	1.2415E-01
BA-140	569.	162.67	1.5817E+02
LA-140	15.	1596.20	1.0797E-01
CE-141	598.	145.44	2.0177E-01
CE-144	609.	133.51	8.8334E-01
CEPR-144	610.	133.54	1.7658E+00
EU-152	30.	1408.01	6.1630E-01
EU-154	66.	1274.51	5.0972E-01
EU-155	727.	105.31	5.4877E-01
HF-181	207.	482.20	1.7394E-01
TA-182	666.	67.75	6.1889E-01
HG-203	401.	279.19	1.5107E-01
BI-207	154.	569.70	1.4045E-01

Sample ID : K-218-6730 Acquisition date : 31-MAY-1994 19:11:25

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
TL-208	248.	583.14	2.0555E-01
PB-210	479.	46.50	0.0000E+00
BI-212	116.	727.27	2.3314E+00
BI-214	278.	609.32	4.2730E-01
PB-214	421.	351.92	5.4502E-01
RA-224	500.	240.99	3.1224E+00
RA-226	609.	186.10	3.1369E+00
AC-228	189.	911.07	8.0538E-01
TH-228	504.	215.99	4.3022E+00
TH-229	806.	86.44	5.3442E+00
U-232	650.	129.08	1.4870E+02
PA-233	300.	311.98	3.2096E-01
PA-234M	88.	1001.03	2.8873E-01
TH-234	797.	92.80	1.4073E+00
U-235	590.	143.76	8.8445E-01
NP-237	806.	86.50	1.2704E+00
U-237	507.	208.00	5.2011E-01
NP-238	76.	984.45	5.6695E-01
NP-239	727.	106.12	5.2181E-01
PU-239	657.	129.30	1.5950E+03
AM-241	577.	59.54	1.1002E+00
AM-243	455.	43.60	0.0000E+00

```
*****************************************************************************
* 222-S Laboratory Counting Room   31-MAY-1994 21:07:55.01                  *
*****************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Sample ID:                K-218-6830
Sample Size:              1.00000E-03 LI
Dilution Factor:          1.00000E+01
Conversion LI to LI:      1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:              GEA4
File Number:              dka300:[spec.GEA4]4g4350.cnf
Geometry:                 41
Description:
Count Time:               0 00:50:00.00 sec
Real Time:                0 00:50:02.98 sec

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:        31-MAY-1994 20:17:19.86
Decayed to:               31-MAY-1994 20:17:19.86
Standard Deviations:      2
Analysis Library:         ENVGEA
Analyst:                  EMB

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       18-APR-1994 11:17:09.37
 Date of last efficiency calibration:   18-APR-1994 11:18:36.88
*****************************************************************************
```

Removed by: Em Barela

date: 5-31-94

WHC-SD-WM-DP-079, REV. 0

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	238.70*	24	1.07	477.34	474	9441.6			PB-212	6.491E-02
0	338.43*	40	1.15	676.80	673	8184.5			AC-228	0.505
0	352.20*	69	1.32	704.33	699	11139.8				
0	583.16*	41	1.42	1166.23	1160	14181.9				
0	661.56*	800	1.44	1323.02	1316	13 11.2			CS-137	2.46
0	726.80	48	1.29	1453.50	1450	12 94.6				
0	911.18*	13	1.93	1822.28	1818	10423.0			AC-228	0.164
0	1119.66*	1	1.31	2239.26	2233	14*****				
0	1587.70	20	1.83	3175.49	3173	8 72.3				
0	1764.45*	18	1.80	3529.05	3521	17162.2				
0	1829.24	15	0.68	3658.67	3654	11 51.6				

Sample ID : K-218-6830 Acquisition date : 31-MAY-1994 20:17:19

WHC-SD-WM-DP-079, REV. 0

Total number of lines in spectrum	11	
Number of unidentified lines	2	
Number of lines tentatively identified by NID	9	81.82%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	11020.00D	1.000	2.457E+00	2.457E+00	0.276E+00	11.22	
~~PB-212~~	~~698.74D~~	~~1.000~~	~~6.490E-02~~	~~6.491E-02~~	~~28.66E-02~~	~~441.56~~	BKG 6/1/9
~~AC-228~~	~~2444.44D~~	~~1.000~~	~~2.860E-01~~	~~2.860E-01~~	~~5.570E-01~~	~~194.74~~	
			---	---			
	Total Activity :		2.808E+00	2.808E+00			

Grand Total Activity : 2.808E+00 2.808E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : K-218-6830
Acquisition date : 31-MAY-1994 20:17:19

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
BE-7	183.	477.59	1.2614E+00
NA-22	73.	1274.55	1.8560E-01
NA-24	25.	1368.53	1.1704E-01
K-40	821.	1460.75	6.4630E+00
SC-46	85.	889.23	1.5319E-01
CR-51	326.	320.09	1.2187E+00
MN-54	96.	834.83	1.5260E-01
CO-56	86.	846.76	1.4673E-01
CO-57	712.	122.06	1.2601E-01
CO-58	92.	810.75	1.4512E-01
FE-59	81.	1099.25	3.1036E-01
CO-60	70.	1332.50	1.8656E-01
ZN-65	79.	1115.55	3.4569E-01
SE-75	392.	264.66	1.9829E-01
KR-85	222.	513.99	3.5815E+01
SR-85	222.	513.99	1.5731E-01
Y-88	10.	1836.06	9.4575E-02
Y-91	56.	1204.90	5.2263E+01
NB-94	98.	871.10	1.6154E-01
NB-95	113.	765.79	1.5123E-01
ZR-95	104.	756.73	2.6188E-01
RU-103	181.	497.08	1.4886E-01
RURH-106	123.	621.93	2.6020E+00
AG-108M	206.	433.94	1.3873E-01
CD-109	729.	88.03	4.1011E+00
AG-110M	127.	657.76	1.4371E-01
SN-113	276.	391.67	2.0568E-01
TE-123M	604.	159.00	1.1981E-01
SB-124	124.	602.73	1.2996E-01
SB-125	247.	427.89	4.6013E-01
TE-125M	485.	35.46	0.0000E+00
I-129	491.	39.60	0.0000E+00
I-131	267.	364.48	1.5144E-01
XE-131M	555.	163.98	5.1177E+00
BA-133	256.	356.02	1.9008E-01
CS-134	107.	795.84	1.7846E-01
CS-136	85.	818.51	1.4114E-01
CS-138	45.	1435.86	3.4216E-01
CE-139	572.	165.85	1.2412E-01
BA-140	550.	162.67	1.5552E+02
LA-140	20.	1596.20	1.2297E-01
CE-141	640.	145.44	2.0868E-01
CE-144	657.	133.51	9.1690E-01
CEPR-144	657.	133.54	1.8325E+00
EU-152	51.	1408.01	8.0448E-01
EU-154	73.	1274.51	5.3766E-01
EU-155	762.	105.31	5.6191E-01
HF-181	196.	482.20	1.6964E-01
TA-182	657.	67.75	6.1468E-01
HG-203	380.	279.19	1.4700E-01
BI-207	139.	569.70	1.3389E-01

Sample ID : K-218-6830 Acquisition date : 31-MAY-1994 20:17:19

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
TL-208	268.	583.14	2.1354E-01
PB-210	480.	46.50	0.0000E+00
BI-212	137.	727.27	2.5370E+00
BI-214	307.	609.32	4.4901E-01
PB-214	441.	351.92	5.5768E-01
RA-224	497.	240.99	3.1114E+00
RA-226	562.	186.10	3.0137E+00
TH-228	490.	215.99	4.2428E+00
TH-229	781.	86.44	5.2589E+00
U-232	661.	129.08	1.4995E+02
PA-233	360.	311.98	3.5148E-01
PA-234M	80.	1001.03	2.7618E-01
TH-234	761.	92.80	1.3750E+00
U-235	631.	143.76	9.1443E-01
NP-237	780.	86.50	1.2501E+00
U-237	528.	208.00	5.3083E-01
NP-238	66.	984.45	5.2992E-01
NP-239	756.	106.12	5.3204E-01
PU-239	661.	129.30	1.6001E+03
AM-241	554.	59.54	1.0779E+00
AM-243	436.	43.60	0.0000E+00

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-079, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. K211	Customer ID: C58S1
Analysis: SR90	Sample Prep: FUSION

Instrument:	~~WB27012#11~~ SLF 6-30-94 WA45696	Procedure/ Rev:	LA-220-101 D0
Technologist:	ROB KING Rob King	Date:	06/25/94
Starting Time:	16:30	Temperature	25 C
Ending Time:	20:30	Chemist:	S. FITZGERALD

Comments: BATCH # 3818

	Description	Lab ID		Description	Lab ID
1	LMCS STD	K209-5586	11		
2	SAMPLE BLANK	K210-6686	12		
3	SAMPLE	K211-6786	13		
4	SAMPLE DUP	K211-6886	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	136B51/1ML			
			3419	

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-079, REV. 0

METHOD: LA-220-101

DATE START: JUNE 25, 1994

PREPARED BY: S.L. FITZGERALD

DATE COMPLETE: JUNE 30, 1994

	UNITS:	uCi/g							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD 136B51	K209	SR	1.38E+00				102	7.09E-06	0.9
BLANK	K210	SR	1.92E-01					2.43E-03	1.5
C-111	K211	SR	4.13E+03	4.19E+03	4.16E+03	1.44		2.44E+00	0.3
								2.41E+00	0.3

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

[ ] LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Baker 3818

Serial No	Sample Point	Date	Time Issued	Priority
K 209.-5586	C-111	4-25-94	14:54	23

Determination	Method Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	% RECOVERY	N4C3B	0

Customer ID: STD

Sample Size: ? 1m + 1m Sr carrier

Remarks, Calculations, Results

COUNT ON DETECTOR#11
S376 ITS

SEPARATION DATE: 6/25/94
SEPARATION TIME: 17:45

STD#136451 RESULT 1.38E00 RT 6-27-94

STD VAL ~~1.36E00~~ 1.34E00 %REC ~~101.5~~ 102.4

GROSS: 8.1699 g
TARE: 8.0825 g
NET: 0.0874 g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date: 6/25/94	Time Completed: 20:30	Lab Unit Mgr		

94-8600-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS

						STANDARD
Type: STANDARD	DETECTOR NUMBER		12	CARRIER ADDED in mL	(CVA)	1.000
Work Log: 3818	TOTAL COUNTS	(TC)	11791	GROSS WEIGHT	(W2)	8.1699
Matrix: LIQUID	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)	8.0825
Sample #: K209-5586	BACKGROUND in cpm	(BKG)	15	NET WEIGHT	(W3)	0.0874
Analyst: R. KING	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (hours)	(DT)	3.50
Date: 06/25/94	DILUTION FACTOR	(DF)	1			
Time: 20:30	DIGEST DILUTION FACTOR	(DDF)	1			
	SAMPLE COUNT RATE	(Rs)	1184.10	Sr-90 EFFICIENCY FACTOR	(C1)	0.4180
	CRITICAL LEVEL	(Lc)	2.86	Y-90 EFFICIENCY FACTOR	(C2)	0.4560
	SEPARATION TIME	(ST)	17:45	Rmax		N/A
	SEPARATION DATE	(SD)	06/25/94	DETECTION LIMIT	(Ld)	5.99
	TIME OF COUNT	(TOC)	21:15	Sr-89/90 CONC in µCi/L =		1.3783E+00
	DATE OF COUNT	(DOC)	06/25/94			

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)
Sr-89/90 µCi/L = Rs*1000mL/L *DF*DDF/
((C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) *SS*Rec*2220000dpm/µCi)
NOTE 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA x 0.1000))
Sr-89/90 µCi/mL = (Sr-89/90 µCi/L) / 1000mL/L
Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))
Percent Carrier Recovery = (Net Weight / Expected Weight) * 100
NOTE Expected Weight = CVA * 0.1
Detection Levels and Less Than Values are determined from Procedure LA-508-002.
Delta Time (hours)=((DOC - SD) * 24) + (TOC - ST) /100

v RESULTS v

Sr-89/90 CONCENTRATION	=	1.38E+00	µCi/L
Sr-89/90 CONCENTRATION	=	1.38E-03	µCi/mL
RELATIVE COUNTING ERROR	=	0.9%	
PERCENT CARRIER RECOVERY	=	87.4%	

DETECTION LEVEL
7.09E-06 µCi/mL

Data Entry by:		Date:	27-Jun-94
Approved by:		Date:	30-Jun-94

Form X1 Rev. 1.1

12/2 6-25-94 @ 2115 MB ΔT=3.50

K209-5586

Sr Calculation (CRYC_CAL 2.0)
By: MC BIERMAN, on 06-25-1994 at 22:00:46
1179/10 = 117.9 / 15 Count Sr eff : .418 Y eff : .466
Sample size : 1 ml Dilution : 1 Method : 1

Sample # K209-5586
Count # 1 Decay time = 3.50 hrs

$$\frac{11791}{10} \times 15.0 = 1.2046E+00 \text{ uCi/L strontium}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 210-6686	C-111	4-25-94	14:55	23

Determination	Method Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/G	N4C3B	0

Sample Size	Customer ID
? 1ml + 1ml Sr carrier	BLANK

Remarks, Calculations, Results

REAGENT BLANK

COUNT AS uCI/L

1.92E-01 uci/g

SEPARATION DATE: 6/25/94
SEPARATION TIME: 17:45

GROSS: 7.8802 g
TARE: 7.7929 g
NET: 0.0873 g

Not King

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
6/25/94	20:30		

54-5800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

Sr-89/90 LA-220-101 (D-0) SOLIDS

						BLANK
Type	DETECTOR NUMBER		12	CARRIER ADDED in mL	(CVA)	1.000
BLANK	TOTAL COUNTS	(TC)	4866	GROSS WEIGHT	(W2)	7.8802
Work List	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)	7.7929
3818	BACKGROUND in cpm	(BKG)	15	NET WEIGHT	(W3)	0.0873
Test Code	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (HOURS)	(DT)	3.92
	DILUTION FACTOR	(DF)	1			
Matrix	DIGEST g/L	(Dg/L)	2.9036			
SOLID	SAMPLE COUNT RATE	(Rs)	471.50	SR-90 EFFICIENCY FACTOR	(C1)	0.4180
Sample #	CRITICAL LEVEL	(Lc)	2.86	Y-90 EFFICIENCY FACTOR	(C2)	0.4660
K210-6686	SEPARATION TIME	(ST)	17:45	Rmax		N/A
Instrument Code	SEPARATION DATE	(SD)	06/25/94	DETECTION LIMIT	(Ld)	5.99
WB27812#11	TIME OF COUNT	(TOC)	21:40	Sr-89/90 CONC. in µCi/g =		1.9160E-01
Analyst	DATE OF COUNT	(DOC)	06/25/94			
R. KING						
Date						
06/25/94						
Time						
20:30						

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)

Sr-89/90 µCi/g = Rs*1000mL/L *DF/(C1 + C2 (1 - e to the power of ((-natural log 2) * DT / 64.2)) *SS*Rec *Dg/L*2220000dpm/µCi)

NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))

Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))

Percent Carrier Recovery = (Net Weight / Expected weight) * 100

NOTE: Expected weight = CVA * 0.1

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100

▼ RESULTS ▼

Sr-89/90 CONCENTRATION	=	1.92E-01	µCi/g
RELATIVE COUNTING ERROR	=	1.5%	
PERCENT CARRIER RECOVERY	=	87.3%	

DETECTION LEVEL

2.43E-03 µCi/g

Data Entry by:		Date:	27-Jun-94
Approved by:		Date:	30-Jun-94

Form L2 Rev. 1.1

Page 1 of 1

12/2 6-25-94 @ 2140 m3 ΔT = 3.92

K210-6686

Sr Calculation (CRPT_CAL 2.0)

By: [illegible], on 06-25-1994 at 22:06:04

[illegible] 2 -inch [illegible] Sr eff : .438 Y eff : .466

[illegible] Dilution : 1 Method : 1

4265/10 15

Sample # K210-6686

Mount # 1 Decay time = 3.92 hrs

$$\frac{4665}{10} \times 15.0 = 4.8562E-01 \text{ nCi/L strontium}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No.	Sample Point	Date	Time Issued	Priority
K 211.-678S	C-111	4-25-94	14:57	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/G	N4C3B	0

Sample Size	Customer ID
? 1ml BK .100-.10-.100+1ml Sr carrier	C58S1

Remarks, Calculations, Results

COUNT AS uCI/L

4.13E03 uci/g

SEPARATION DATE: 6/25/94
SEPARATION TIME: 17:45

GROSS: 7.8649 g
TARE: 7.7772 g
NET: 0.0877 g

Nat King

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Mgr.	Mgr.
6/25/94	20:30		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

Sr-89/90 LA-220-101 (D-0) SOLIDS

							SAMPLE
Type	DETECTOR NUMBER		12	CARRIER ADDED in mL	(CVA)		1.000
SAMPLE	TOTAL COUNTS	(TC)	101592	GROSS WEIGHT	(W2)		7.8649
Work Sheet	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)		7.7772
3818	BACKGROUND in cpm	(BKG)	15	NET WEIGHT	(W3)		0.0877
Instrument Code	SAMPLE VOLUME in mL	(SS)	0.100	DELTA TIME (HOURS)	(DT)		4.17
	DILUTION FACTOR	(DF)	101				
Matrix	DIGEST g/L	(Dg/L)	2.9036				
SOLID	SAMPLE COUNT RATE	(Rs)	10144.20	SR-90 EFFICIENCY FACTOR	(C1)		0.4180
Sample #	CRITICAL LEVEL	(Lc)	2.86	Y-90 EFFICIENCY FACTOR	(C2)		0.4660
K211-678S	SEPARATION TIME	(ST)	17:45	Rmax			N/A
Instrument Code	SEPARATION DATE	(SD)	06/25/94	DETECTION LIMIT	(Ld)		5.99
WB27812#11	TIME OF COUNT	(TOC)	21:55	Sr-89/90 CONC in µCi/g =			4.1332E+03
Analyst	DATE OF COUNT	(DOC)	06/25/94				
R. KING							
Date							
06/25/94							
Time							
20:30							

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)
Sr-89/90 µCi/g = Rs*1000mL/L *DF/(C1 + C2 (1 - e to the power of ((-natural log 2) * DT / 64.2)) *SS*Rec.*Dg/L*2220000dpm/µCi)
NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))
Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))
Percent Carrier Recovery = (Net Weight / Expected weight) * 100
NOTE: Expected weight = CVA * 0.1
Detection Levels and Less Than Values are determined from Procedure LA-508-002.
Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100

▼ RESULTS ▼

Sr-89/90 CONCENTRATION	=	4.13E+03	µCi/g
RELATIVE COUNTING ERROR	=	0.3%	
PERCENT CARRIER RECOVERY	=	87.7%	

DETECTION LEVEL
2.44E+00 µCi/g

Data Entry by:		Date:	27-Jun-94
Approved by:		Date:	30-Jun-94

Form L2 Rev. 1.1

Page 1 of 1

14/6-25-94 @ 2155 MB

ΔT = 4.17

K211-6786

101592

: (CAPS CHL 2.0)
By: MC KIERNAN, : 06-25-1994 at 21:55:07
Det: 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : .1 mL Dilution : 301 Method : 1

Sample # K211-6786
Count # 1 Decay time = 4.17 hrs

101592
---------- - 15.0 = 1.0523E+04 uCi/L strontium
10

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-6886	C-111	4-25-94	14:57	23

Determination	Method-Standard	Result Units	Charge Code	Returns
Sr90	LA-220-101	uCi/G Rec	N4C3B	0

Sample Size	Customer ID
? .100-10-.100 + 1ml 5/ Carrier	C58S1

Remarks, Calculations, Results

DUPLICATE SAMPLE

COUNT AS uCI/L

87.7% 6/28/94

SEPARATION DATE: 6/25/94
SEPARATION TIME: 17:45

GROSS: 7.9239 g
TARE: 7.8362 g
NET: 0.0877 g

4.19E+3 uCi/g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6/25/94	Time Completed 20:30	Lab Brn Mgr		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

Sr-89/90 LA-220-101 (D-0) SOLIDS

						DUPLICATE
Type: DUPLICATE	DETECTOR NUMBER		12	CARRIER ADDED in mL	(CVA)	1.000
Work List: 3819	TOTAL COUNTS	(TC)	104108	GROSS WEIGHT	(W2)	7.9239
	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)	7.8362
Test Code:	BACKGROUND in cpm	(BKG)	15	NET WEIGHT	(W3)	0.0877
	SAMPLE VOLUME in mL	(SS)	0.100	DELTA TIME (HOURS)	(DT)	4.42
	DILUTION FACTOR	(DF)	101			
Matrix: SOLID	DIGEST g/L	(Dg/L)	2.926			
	SAMPLE COUNT RATE	(Rs)	10395.80	SR-90 EFFICIENCY FACTOR	(C1)	0.4180
Sample # K211-6886	CRITICAL LEVEL	(Lc)	2.88	Y-90 EFFICIENCY FACTOR	(C2)	0.4660
	SEPARATION TIME	(ST)	17:45	Rmax		N/A
Instrument Code: WB27812#11	SEPARATION DATE	(SD)	06/25/94	DETECTION LIMIT	(Ld)	5.99
	TIME OF COUNT	(TOC)	22:10	Sr-89/90 CONC in µCi/g =		4.191E+03
Analyst: R. KING	DATE OF COUNT	(DOC)	06/25/94			
Date: 06/25/94						
Time: 20:30						

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)

Sr-89/90 µCi/g = Rs*1000mL/L *DF/(C1 + C2 (1 - e to the power of ((-natural log 2) * DT / 64.2)) *SS*Rec.*Dg/L*2220000dpm/µCi)

NOTE 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))

Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))

Percent Carrier Recovery = (Net Weight / Expected weight) * 100

NOTE Expected weight = CVA * 0.1

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100

▼ RESULTS ▼

Sr-89/90 CONCENTRATION	=	4.19E+03	µCi/g
RELATIVE COUNTING ERROR	=	0.3%	
PERCENT CARRIER RECOVERY	=	87.7%	

DETECTION LEVEL
2.41E+00 µCi/g

Data Entry by:		Date:	27-Jun-94
Approved by:		Date:	28-Jun-94

Form L2 Rev. 1.1 Page 1 of 1

12/2 6-25-91 @ 2210 MS ΔT = 4.42

K211-6886

Sr Calculation (EPPC_CAL 2.0)

By: MC DIEKMAN, on 06-25-1994 at 22:07:43

Bi 212 Sample Count Sr eff : .418 Y eff : .466

Sample Size : 1 ml Dilution : 101 Method : 1

10/2/10

10

Sample # K211-6886

Count # 1 Decay time = 4.42 hrs

106108

---------- - 15.0 = 1.0755E+04 uCi/L strontium

10

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Batch 3279

QA 13

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No. K214	Customer ID: C58FB C111
Analysis: Sr 90	Sample Prep: DIRECT

Instrument: WB27812	Procedure/ Rev: UA-220-101 0-0
Technologist: A Hallibaugh	Date: 5-3-94
Starting Time: 0003	Temperature NA
Ending Time: 0350	Chemist: S. Fitzgerald

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS Std	K212-5586	11		
2	Reagent Blank	K213-5686	12		
3	Sample	K214-5786	13		
4	Sample Dup	K214-5886	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS Std	136B51 1 ml			
			359	

A-6000-881 (03/92)

QA

ANALYTICAL BATCH SUMMARY SHEET **WHC-SD-WM-DP-079, REV. 0**

METHOD:	DATE START:
LA-220-101	**MAY 3, 1994**
PREPARED BY: **S.L. FITZGERALD**	DATE COMPLETE: **MAY 6, 1994**

	UNITS:	uCi/mL							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD 136B51	K212	SR	1.38E+00				102	7.28E-06	1.0
BLANK	K213	SR	<3.42E-06					6.92E-06	85
C-111	K214	SR	2.22E-03	2.19E-03	2.21E-03	1.36		6.86E-06	0.7
								6.93E-06	0.7

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3279

Serial No	Sample Point	Date	Time Issued	Priority
K 212.-5586	C-111	4-27-94	10: 2	21

Determination	Method/Standard	Result Units	Charge Code	Returns
Sr90	LA-220-101	% RECOVERY	N4C3B	0

Sample Size	Customer ID
1ml + 1ml SR CARRIER	STD

Remarks, Calculations, Results

COUNT ON DETECTOR#11
S376 ITS

STD# 136851 RESULT 1.38

STD VAL 1.3522 %REC 102.1

G. 7.8988
T. 7.8177
N. 0.0811

SEP TIME 0110
SEP DATE 5-3-94

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 5-3-94	Hrs	Hrs	Hrs

Date	Time Completed	Lab Supt Mgr
5-3-94	0350	

WHC-SD-WM-DP-079, REV. 0

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS

Type	DETECTOR NUMBER		12	CARRIER ADDED in mL	(CVA)	1.000
STANDARD	TOTAL COUNTS	(TC)	11163	GROSS WEIGHT	(W2)	7.8988
Work List	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)	7.8177
3279	BACKGROUND in cpm	(BKG)	14	NET WEIGHT	(W3)	0.0811
Test Code	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (hours)	(DT)	4.92
Sr90	DILUTION FACTOR	(DF)	1			
Matrix	DIGEST DILUTION FACTOR	(DDF)	1			
LIQUID	SAMPLE COUNT RATE	(Rs)	1101.30	SR-90 EFFICIENCY FACTOR	(C1)	0.4180
Sample #	CRITICAL LEVEL	(Lc)	2.76	Y-90 EFFICIENCY FACTOR	(C2)	0.4660
K212-5586	SEPARATION TIME	(ST)	01:10	Rmax		N/A
Instrument Code	SEPARATION DATE	(SD)	05/03/94	DETECTION LIMIT	(Ld)	5.79
WB27812	TIME OF COUNT	(TOC)	06:06	Sr-89/90 CONC. in µCi/L =		1.3836E+00
Analyst	DATE OF COUNT	(DOC)	05/03/94			
A HOLLIBAUGH						
Date						
05/03/94						
Time						
03:50						

STANDARD

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)
Sr-89/90 µCi/L = Rs*1000mL/L *DF*DDF/
(C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) *SS*Rec.*2220000dpm/µCi)
NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA x 0.1000))
Sr-89/90 µCi/mL = (Sr-89/90 µCi/L) / 1000mL/L
Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))
Percent Carrier Recovery = (Net Weight / Expected Weight) * 100
NOTE: Expected Weight = CVA * 0.1
Detection Levels and Less Than Values are determined from Procedure LA-508-002.
Delta Time (hours)=((DOC - SD) * 24) + (TOC - ST) /100

v RESULTS v

Sr-89/90 CONCENTRATION	=	1.38E+00	µCi/L
Sr-89/90 CONCENTRATION	=	1.38E-03	µCi/mL
RELATIVE COUNTING ERROR	=	1.0%	
PERCENT CARRIER RECOVERY	=	81.1%	

DETECTION LEVEL
7.28E-06 µCi/mL

Data Entry by:		Date:	07-May-94
Approved by:		Date:	9-May-94

Form X1 Rev. 1.1

12/2 5-3-94 AJ 0605 ΔT= 4.92

K212-5586 1ml

11153/10 - 14

Sr Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, , on 05-03-1994 at 06:46:36
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : 1 mL Dilution : 1 Method : 1

Sample # K212-5586
Mount # 1 Decay time = 4.92 hrs

11153
---------- - 14.0 = 1.1220E+00 uCi/L strontium
10

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-079, REV. 0

Serial No	Sample Point	Date	Time Issued	Priority
K 213.-5686	C-111	4-27-94	10: 7	21

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/ML	N4C3B	0

Sample Size	Customer ID
1ml + 1ml SR CARRIER	BLANK

Remarks, Calculations, Results

REAGENT BLANK - G. 7.9354

COUNT AS uCI/L T. 7.8504

<3.42 E-06 uci/ml N. 0.0850

SEP TIME 0110
SEP DATE 5-3-94

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 5-3-94	Hrs	Hrs	Hrs

Date	Time Completed	Laboratory Mgr
5-3-94	0350	

54-5600-061 (R-10-83)

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS

Type	Work List	Test Code	Matrix	Sample #	Instrument Code	Analyst	Date	Time
BLANK	3279	Sr90	LIQUID	K213-5686	WB27812	A HOLLIBAUGH	05/03/94	03:50

						BLANK
DETECTOR NUMBER		12	CARRIER ADDED in mL	(CVA)	1.000
TOTAL COUNTS	(TC)	141	GROSS WEIGHT	(W2)	7.9354
COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)	7.8504
BACKGROUND in cpm	(BKG)	14	NET WEIGHT	(W3)	0.0850
SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (hours)	(DT)	5.25
DILUTION FACTOR	(DF)	1			
DIGEST DILUTION FACTOR	(DDF)	1			
SAMPLE COUNT RATE	(Rs)	0.10	SR-90 EFFICIENCY FACTOR	(C1)	0.4180
CRITICAL LEVEL	(Lc)	2.76	Y-90 EFFICIENCY FACTOR	(C2)	0.4660
SEPARATION TIME	(ST)	01:10	Rmax		2.87
SEPARATION DATE	(SD)	05/03/94	DETECTION LIMIT	(Ld)	5.79
TIME OF COUNT	(TOC)	06:25	Sr-89/90 CONC in µCi/L =	<	3.4231E-03
DATE OF COUNT	(DOC)	05/03/94			

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)

Sr-89/90 µCi/L = Rs*1000mL/L *DF*DDF/

(C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) *SS*Rec.*2220000dpm/µCi)

NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA x 0.1000))

Sr-89/90 µCi/mL = (Sr-89/90 µCi/L) / 1000mL/L

Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))

Percent Carrier Recovery = (Net Weight / Expected Weight) * 100

NOTE: Expected Weight = CVA * 0.1

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

Delta Time (hours)=((DOC - SD) * 24) + (TOC - ST) /100

v RESULTS v

Sr-89/90 CONCENTRATION	=	< 3.42E-03	µCi/L
Sr-89/90 CONCENTRATION	=	< 3.42E-06	µCi/mL

LESS THAN Value was Determined from Rmax.

RELATIVE COUNTING ERROR	=	500.0%
PERCENT CARRIER RECOVERY	=	85.0%

DETECTION LEVEL 6.92E-06 µCi/mL

Data Entry by:		Date:	07-May-94
Approved by:		Date:	9-may-94

Form X1 Rev. 1.1

Page 1 of 1

12/2 ~~5-3-94~~ 5-3-94 AJ 0625 ΔT = 5.25

K213-5686 1ml

141/10 - 14

Sr Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, , on 05-03-1994 at 06:48:06
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : 1 mL Dilution : 1 Method : 1

Sample # K213-5686
Mount # 1 Decay time = 5.25 hrs

141
---------- - 14.0 (2.9093E-03 uCi/L strontium
10

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5786	C-111	4-27-94	10:17	21

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/ML	N4C3B	0

Sample Size	Customer ID
1 ml + 1 ml SR CARRIER	C58FB

Remarks, Calculations Results

COUNT AS uCI/L

2.22E-03 mci/ml

G. 7.8665
T. 7.7811
N. 0.0854

SEPTIME 0110
SEPDATE 5-3-94

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 5-3-94	Hrs	Hrs	Hrs
Date 5-3-94	Time Completed 0350	Lab Unit Mgr		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS

							SAMPLE
Type	DETECTOR NUMBER		12	CARRIER ADDED in mL	(CVA)		1.000
SAMPLE	TOTAL COUNTS	(TC)	18863	GROSS WEIGHT	(W2)		7.8665
Work List	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)		7.7811
3278	BACKGROUND in cpm	(BKG)	14	NET WEIGHT	(W3)		0.0854
Test Code	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (hours)	(DT)		5.68
Sr90	DILUTION FACTOR	(DF)	1				
Matrix	DIGEST DILUTION FACTOR	(DDF)	1				
LIQUID	SAMPLE COUNT RATE	(Rs)	1872.30	SR-90 EFFICIENCY FACTOR	(C1)		0.4180
Sample #	CRITICAL LEVEL	(Lc)	2.76	Y-90 EFFICIENCY FACTOR	(C2)		0.4560
K214-5786	SEPARATION TIME	(ST)	01:10	Rmax			N/A
Instrument Code	SEPARATION DATE	(SD)	05/03/94	DETECTION LIMIT	(Ld)		5.79
WB27812	TIME OF COUNT	(TOC)	06:45	Sr-89/90 CONC. in µCi/L =			2.2179E+00
Analyst	DATE OF COUNT	(DOC)	05/03/94				
A HOLLIBAUGH							
Date							
05/03/94							
Time							
03:50							

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)
Sr-89/90 µCi/L = Rs*1000mL/L *DF*DDF/
((C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) *SS*Rec.*2220000dpm/µCi)
NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA x 0.1000))
Sr-89/90 µCi/mL = (Sr-89/90 µCi/L) / 1000mL/L
Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))
Percent Carrier Recovery = (Net Weight / Expected Weight) * 100
NOTE: Expected Weight = CVA * 0.1
Detection Levels and Less Than Values are determined from Procedure LA-508-002.
Delta Time (hours)=((DOC - SD) * 24) + (TOC - ST) /100

v RESULTS v

Sr-89/90 CONCENTRATION	=	2.22E+00	µCi/L
Sr-89/90 CONCENTRATION	=	2.22E-03	µCi/mL
RELATIVE COUNTING ERROR	=	0.7%	
PERCENT CARRIER RECOVERY	=	85.4%	

DETECTION LEVEL
6.86E-06 µCi/mL

Data Entry by:		Date:	07-May-94
Approved by:		Date:	7-May-94

Form X1 Rev. 1.1

STRONTIUM 89\90 ANALYSIS - UNDIGESTED SAMPLE

13/2 5-3-94 AJ 0645 ΔT = 5.58

18863/10 -14 K214-5786 1mo

Sr Calculation - (CRPC_CAL 2.0)
By: AL JOHANSEN, , on 05-03-1994 at 07:05:40
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : 1 mL Dilution : 1 Method : 1

Sample # K214-5786
Mount # 1 Decay time = 5.58 hrs

18863
---------- - 14.0 = 1.8939E+00 uCi/L strontium
10

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5886	C-111	4-27-94	10:17	21

Determination	Method/Standard	Result Units	Charge Code	Returns
Sr90	LA-220-101	uCi/ML	N4C3B	0

Sample Size	Customer ID
1ml + 1ml SR CARRIER	C58FB

Remarks, Calculations, Results

DUPLICATE SAMPLE
COUNT AS uCI/L
2.19E-03 uci/ml

G. 7.7801
T. 7.6957
N. 0.0844

SEP TIME 0110
SEP DATE 5-3-94

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 5-3-94	Hrs	Hrs	Hrs

Date	Time Completed
53-94	0.350

Lab Unit Mgr

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS

Type						DUPLICATE
DUPLICATE	DETECTOR NUMBER		12	CARRIER ADDED in mL	(CVA)	1.000
Work List	TOTAL COUNTS	(TC)	18438	GROSS WEIGHT	(W2)	7.7801
3279	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)	7.6957
Test Code	BACKGROUND in cpm	(BKG)	14	NET WEIGHT	(W3)	0.0844
Sr90	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (hours)	(DT)	5.76
Matrix	DILUTION FACTOR	(DF)	1			
LIQUID	DIGEST DILUTION FACTOR	(DDF)	1			
Sample #	SAMPLE COUNT RATE	(Rs)	1829.80	Sr-90 EFFICIENCY FACTOR	(C1)	0.4180
X214-5886	CRITICAL LEVEL	(Lc)	2.76	Y-90 EFFICIENCY FACTOR	(C2)	0.4660
Instrument Code	SEPARATION TIME	(ST)	01:10	Ymax		N/A
WB27812	SEPARATION DATE	(SD)	05/03/94	DETECTION LIMIT	(Ld)	5.79
Analyst	TIME OF COUNT	(TOC)	06:55	Sr-89/90 CONC. in µCi/L =		2.1894E+00
A HOLLIBAUGH	DATE OF COUNT	(DOC)	05/03/94			
Date						
05/03/94						
Time						
03:50						

Sample Count Rate (Rs) = (Total Counts (TC)) - Background in cpm (BKG)
Sr-89/90 µCi/L = Rs*1000mL/L *DF*DDF/
((C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) *SS*Rec*2220000dpm/µCi)
NOTE: 64.2 = Half Life for Y-90 and Rec = Fractional Carrier Recovery ((W2-W1) / (CVA x 0.1000))
Sr-89/90 µCi/mL = (Sr-89/90 µCi/L) / 1000mL/L
Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))
Percent Carrier Recovery = (Net Weight / Expected Weight) * 100
NOTE: Expected Weight = CVA * 0.1
Detection Levels and Less Than Values are determined from Procedure LA-508-002.
Delta Time (hours)=((DOC - SD) * 24) + (TOC - ST) /100

v RESULTS v

Sr-89/90 CONCENTRATION	=	2.19E+00	µCi/L
Sr-89/90 CONCENTRATION	=	2.19E-03	µCi/mL
RELATIVE COUNTING ERROR	=	0.7%	
PERCENT CARRIER RECOVERY	=	84.4%	

DETECTION LEVEL
6.93E-06 µCi/mL

Data Entry by:		Date:	07-May-94
Approved by:		Date:	9-May-94

Form X1 Rev. 1.1

Page 1 of 1

STRONTIUM 89\90 ANALYSIS - UNDIGESTED SAMPLE

12/2 5-3-94 ~~AJ~~ 06:55 ΔT= 5.75 1ml

18438/10 -14 K214-5886

Sr Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, I , on 05-03-1994 at 07:06:43
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : 1 mL Dilution : 1 Method : 1

Sample # K214-5886
Mount # 1 Decay time = 5.75 hrs

$$\frac{18438}{10} \cdot 14.0 = 1.8476E+00 \text{ uCi/L strontium}$$

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV 0

Lab Segment Serial No. K 209, K 210, K 211	Customer ID: STD, BLANK, C58S1
Analysis: SR 90	Sample Prep: ACID DIGEST

Instrument: ~~N/A~~ NB 26870	Procedure/ Rev: LA 220-101 / ~~D-0~~ SLP 8-10-94 D-1
Technologist: DC DUNHAM David C Dunham	Date: 08/03/94
Starting Time: 1900	Temperature N/A
Ending Time: 2300	Chemist: STANLY CATLOW

Comments: BATCH #4152

	Description	Lab ID		Description	Lab ID
1	LMCS STD	K 209-5586	11		
2	REAGENT BLANK	K 210-8686	12		
3	SAMPLE	K 211-8786	13		
4	SAMPLE DUPLICATE	K 211-8886	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	136B51 / 1 ml			
Sr CARRIER	30N16-C / 1 ml			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-079, REV. 0

METHOD: LA-220-101

DATE START: AUGUST 3, 1994

PREPARED BY: S.L. FITZGERALD 8.19.94

DATE COMPLETE: AUGUST 9, 1994

	UNITS:	uCi/g							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD 136B51	K209	SR	1.35E+00				99.7	6.30E-07	0.9
BLANK	K210	SR	1.17E+00					2.26E+00	58.5
C-111	K211	SR	4.22E+03	4.31E+03	4.27E+03	2.11		2.23E+00	0.3
								2.26E+00	0.3

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN BATCH # 4152

Serial No	Sample Point	Date	Time Issued	Priority
K 209.-5586	C-111	4-25-94	14:54	23

Determination	Method Standard	Result Units	Charge Code	Returns
Sr90	LA-220-101	% RECOVERY	N4C3B	1

Sample Size: ? 1ml + 1ml Sr Carrier #30N6-C

Customer ID: STD

Remarks, Calculations, Results:
COUNT ON DETECTOR#11
5376 ITS
STD# 136851 RESULT 1.34
STD VAL 1.3441 %REC 99.70%

SEPARATION DATE: 8-3-94
SEPARATION TIME: 2120

GROSS: 8.0139
TARE: 7.9209
NET: 0.0930

David C. Dunham

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date: 8-3-94	Time Completed: 2300	Lab Unit Mgr		

S4-6600-061 (R-10-93)

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS

Type	DETECTOR NUMBER		10	CARRIER ADDED in mL (CVA)	STANDARD 1.000
STANDARD	TOTAL COUNTS	(TC)	11631	GROSS WEIGHT (W2)	8.0139
Work List	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT (W1)	7.9209
4152	BACKGROUND in cpm	(BKG)	12	NET WEIGHT (W3)	0.0930
Test Code	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (hours) (DT)	1.90
Sr90	DILUTION FACTOR	(DF)	1		
Matrix	DIGEST DILUTION FACTOR	(DDF)	1		
LIQUID	SAMPLE COUNT RATE	(Rs)	1151.10	SR-90 EFFICIENCY FACTOR (C1)	0.4051
Sample #	CRITICAL LEVEL	(Lc)	2.56	Y-90 EFFICIENCY FACTOR (C2)	0.4503
K209-5586	SEPARATION TIME	(ST)	21:20	Rmax	N/A
Instrument Code	SEPARATION DATE	(SD)	08/03/94	DETECTION LIMIT (Ld)	5.38
WB26870	TIME OF COUNT	(TOC)	23:14	Sr-89/90 CONC in µCi/L =	1.3459E+00
Analyst	DATE OF COUNT	(DOC)	08/03/94		
D.C.DUNHAM					
Date					
08/03/94					
Time					
2300					

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)
Sr-89/90 µCi/L = Rs*1000mL/L *DF*DDF/
(C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) *SS*Rec.*2220000dpm/µCi)
NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA x 0.1000))
Sr-89/90 µCi/mL = (Sr-89/90 µCi/L) / 1000mL/L
Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))
Percent Carrier Recovery = (Net Weight / Expected Weight) * 100
NOTE: Expected Weight = CVA * 0.1
Detection Levels and Less Than Values are determined from Procedure LA-505-002.
Delta Time (hours)=((DOC - SD) * 24) + (TOC - ST) /100

v RESULTS v

Sr-89/90 CONCENTRATION =	1.35E+00	µCi/L	
Sr-89/90 CONCENTRATION =	1.35E-03	µCi/mL	
RELATIVE COUNTING ERROR =	0.9%		
PERCENT CARRIER RECOVERY =	93.0%		

DETECTION LEVEL
6.30E-06 µCi/mL

Data Entry by: [signature] Date: 06-Aug-94
Approved by: [signature] Date: 7-Aug-94

Form X1 Rev. 1.1

10/2 8-3-94 @ 2314 Dm

ΔT= 1.90

K209-5586

$\frac{11631}{10}$ - 12

```
Sr Calculation          (CEPC_CAL 2.0)
By: RE BAKER,        on 06-04-1994 at 00:28:17
Det #10   2 -inch mount  Sr eff : .4051   Y eff : .4503
Sample size :  1 ml  Dilution :  1   Method :  1

 Sample # K-209
Mount # 1    Decay time = 1.90 hrs

  11631
-----------  -  12.0  =  1.2517E+00 uCi/L  strontium
    10
```

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 210.-8686	C-111	4-25-94	14:55	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/G Rec	N403B	1

Sample Size	Customer ID
? .050 ml - 10 ml - .050 ml + 1 ml Sr Carrier	BLANK

Remarks Calculations Results
REAGENT BLANK

SEPARATION DATE: 8-3-94
SEPARATION TIME: 0120

GROSS: 8.0396 g
TARE: 7.9456 g
NET: 0.0940 g

1.17 uci/g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Supt Mgr
8-3-94	2300	

84-6600-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

Sr-89/90 LA-220-101 (D-0) SOLIDS

						BLANK
Type	DETECTOR NUMBER		10	CARRIER ADDED in mL	(CVA)	1.000
BLANK	TOTAL COUNTS	(TC)	148	GROSS WEIGHT	(W2)	8.0396
Work List	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)	7.9456
4152	BACKGROUND in cpm	(BKG)	12	NET WEIGHT	(W3)	0.0940
Test Code	SAMPLE VOLUME in mL	(SS)	0.050	DELTA TIME (HOURS)	(DT)	2.08
Sr90	DILUTION FACTOR	(DF)	201			
Matrix	DIGEST g/l	(Dg/L)	11.072			
SOLID	SAMPLE COUNT RATE	(Rs)	2.80	SR-90 EFFICIENCY FACTOR	(C1)	0.4051
Sample #	CRITICAL LEVEL	(Lc)	2.56	Y-90 EFFICIENCY FACTOR	(C2)	0.4503
K210-8686	SEPARATION TIME	(ST)	21:20	Rmax		N/A
Instrument Code	SEPARATION DATE	(SD)	08/03/94	DETECTION LIMIT	(Ld)	5.38
WS26870	TIME OF COUNT	(TOC)	23:26	Sr-89/90 CONC. in µCi/g =		1.1736E+00
Analyst	DATE OF COUNT	(DOC)	08/03/94			
D.C.DUNHAM						
Date						
08/03/94						
Time						
2300						

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)
Sr-89/90 µCi/g = Rs*1000mL/L *DF/(C1 + C2 (1 - e to the power of ((-natural log 2) * DT / 64.2)) *SS*Rec *Dg/L*2220000dpm/µCi)
NOTE 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))
Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))
Percent Carrier Recovery = (Net Weight / Expected weight) * 100
NOTE Expected weight = CVA * 0.1
Detection Levels and Less Than Values are determined from Procedure LA-508-002.
Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100

▼ RESULTS ▼

Sr-89/90 CONCENTRATION	=	1.17E+00	µCi/g
RELATIVE COUNTING ERROR	=	58.5%	
PERCENT CARRIER RECOVERY	=	94.0%	

DETECTION LEVEL
2.26E+00 µCi/g

Data Entry by:		Date:	06-Aug-94
Approved by:		Date:	9-Aug-94

Form L2 Rev. 1.1

10/2 8-3-94 @ 2325 ~~D94~~

$\frac{148}{10}$ -12

K210-8486 ΔT= 2.08

4020

Sr Calculation (CRPC_CAL 2.0)
By: EN RAPELA, on 06-04-1994 at 00:28:58
Det #10 2 -inch mount Sr eff : .4051 Y eff : .4503
Sample size : 1 mL Dilution : 4020 Method : 1

Sample # K-210
Mount # 1 Decay time = 2.08 hrs

$$\frac{148}{10} \cdot 12.0 = 1.2214E+01 \text{ uCi/L strontium}$$

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-8756	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/G Rec	N4C3E	1

Sample Size	Customer ID
? .050 ml - 10ml - .050 ml + 1ml Sr Carrier	C5881

Remarks Calculations Results

SEPARATION DATE: 8-3-94
SEPARATION TIME: 2120

GROSS: 7.9237g
TARE: 7.8293g
NET: 0.0944g

4.22 E03 uci/g

David C. Dunham

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Chief Mgr	
8-3-94	2300		

94-6600-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

Sr-89/90 LA-220-101 (D-0) SOLIDS

Type					DUPLICATE
DUPLICATE	DETECTOR NUMBER		10	CARRIER ADDED in mL (CVA)	1.000
Work List	TOTAL COUNTS	(TC)	102744	GROSS WEIGHT (W2)	8.0429
4152	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT (W1)	7.9477
Test Code	BACKGROUND in cpm	(BKG)	12	NET WEIGHT (W3)	0.0952
Sr90	SAMPLE VOLUME in mL	(SS)	0.050	DELTA TIME (HOURS) (DT)	2.83
Matrix	DILUTION FACTOR	(DF)	201		
SOLID	DIGEST g/L	(Dg/L)	10.828		
Sample #	SAMPLE COUNT RATE	(Rs)	10262.40	SR-90 EFFICIENCY FACTOR (C1)	0.4051
K211-8886	CRITICAL LEVEL	(Lc)	2.66	Y-90 EFFICIENCY FACTOR (C2)	0.4503
Instrument Code	SEPARATION TIME	(ST)	21:20	Rmax	N/A
WB26870	SEPARATION DATE	(SD)	08/03/94	DETECTION LIMIT (Ld)	5.38
Analyst	TIME OF COUNT	(TOC)	00:10	Sr-89/90 CONC in µCi/g =	4.3059E+03
D.C.DUNHAM	DATE OF COUNT	(DOC)	08/04/94		
Date					
08/03/94					
Time					
2300					

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)
Sr-89/90 µCi/g = Rs*1000mL/L *DF/(C1 + C2 (1 - e to the power of ((-natural log 2) * DT / 64.2)) *SS*Rec.*Dg/L*2220000dpm/µCi)
NOTE 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))
Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))
Percent Carrier Recovery = (Net Weight / Expected weight) * 100
NOTE Expected weight = CVA * 0.1
Detection Levels and Less Than Values are determined from Procedure LA-508-002.
Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100

▼ RESULTS ▼

Sr-89/90 CONCENTRATION	=	4.31E+03	µCi/g
RELATIVE COUNTING ERROR	=	0.3%	
PERCENT CARRIER RECOVERY	=	95.2%	

DETECTION LEVEL
2.26E+00 µCi/g

Data Entry by:		Date:	06-Aug-94
Approved by:		Date:	4-Aug-94

Form L2 Rev. 1.1 Page 1 of 1

10/2 8-4-94 C0000 K211-8786 DT= 2.67

$\frac{101801}{10}$ -12

Sr Calculation (CEPC_CAL 2.0)
By: [illegible] on 06-04-1994 at 03:29:47
Det #10 2-inch mount Sr eff : .4051 Y eff : .4503
Sample size : 1 mL Dilution : 4020 Method : 1

Sample # K-211
Mount # 1 Decay time = 2.67 hrs

$\frac{101801}{10}$ - 12.0 = 4.4057E+04 uCi/L strontium

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

REPLIN

Serial No	Sample Point	Date	Time Issued	Priority
K 211.-8888	C-111	4-25-94	14:57	23

Determination	Method Standard	Result Units	Charge Code	Returns
Sr90	LA-220-101	uCi/G Rec	N4C3B	1

Sample Size	Customer ID
? .050 ml - 10ml - .050 ml + 1ml Sr Carrier	C5831

Remarks Calculations Results

DUPLICATE SAMPLE

SEPARATION DATE: 8-3-94
SEPARATION TIME: 2120

4.31 E03 uci/g

GROSS: 8.0429 g
TARE: 7.9477 g
NET: 0.0952 g

David C. Dunham

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Eng Bacon			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8-3-94	2300		

84-6850-061 (R-10-83)

Sr-89/90 LA-220-101 (D-0) SOLIDS

							SAMPLE
Type	DETECTOR NUMBER		10	CARRIER ADDED in mL	(CVA)	1.000
SAMPLE	TOTAL COUNTS	(TC)	101801	GROSS WEIGHT	(W2)	7.9237
Work List	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)	7.8293
4152	BACKGROUND in cpm	(BKG)	12	NET WEIGHT	(W3)	0.0944
Test Code	SAMPLE VOLUME in mL	(SS)	0.050	DELTA TIME (HOURS)	(DT)	2.67
Sr90	DILUTION FACTOR	(DF)	201			
Matrix	DIGEST g/L	(Dg/L)	11.072			
SOLID	SAMPLE COUNT RATE	(Rs)	10168.10	SR-90 EFFICIENCY FACTOR	(C1)	0.4061
Sample #	CRITICAL LEVEL	(Lc)	2.66	Y-90 EFFICIENCY FACTOR	(C2)	0.4503
K211-8786	SEPARATION TIME	(ST)	21:20	Rmax		N/A
Instrument Code	SEPARATION DATE	(SD)	08/03/94	DETECTION LIMIT	(LD)	5.38
WB26870	TIME OF COUNT	(TOC)	00:00	Sr-89/90 CONC in µCi/g =		4.2156E+03
Analyst	DATE OF COUNT	(DOC)	08/04/94			
D.C.DUNHAM						
Date						
08/03/94						
Time						
2300						

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)
Sr-89/90 µCi/g = Rs*1000mL/L *DF/(C1 + C2 (1 - e to the power of ((-natural log 2) * DT / 64.2)) *SS*Rec.*Dg/L*2220000dpm/µCi)
NOTE 64.2 = Half Life for Y-90 and Rec. = Practical Carrier Recovery ((W2-W1) / (CVA * 0.1000))
Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))
Percent Carrier Recovery = (Net Weight / Expected weight) * 100
NOTE Expected weight = CVA * 0.1
Detection Levels and Less Than Values are determined from Procedure LA-508-002.
Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100

▼ RESULTS ▼

Sr-89/90 CONCENTRATION	=	4.22E+03	µCi/g
RELATIVE COUNTING ERROR	=	0.3%	
PERCENT CARRIER RECOVERY	=	94.4%	

DETECTION LEVEL
2.23E+00 µCi/g

Data Entry by:		Date:	06-Aug-94
Approved by:		Date:	9-8-9-94

Form L2 Rev. 1.1 Page 1 of 1

10/2 8-4-94 e 0010/K 211-8886 ΔT = 2.83

$\frac{102744}{10}$ -12

Sr Calculation (CRPC_CAL 2.0)
By: RM BAIFIE, on 06-04-1994 at 00:29:24
Det #10 2 -incl mount Sr eff : .4051 Y eff : .4503
Sample size : 1 mL Dilution : 4020 Method : 1

Sample # I-211
Mount # 1 Decay time = 2.83 hrs

$\frac{102744}{10}$ - 12.0 = 4.4385E+04 uCi/L strontium

BEST AVAILABLE COPY

THE FOLLOWING ANALYSES ARE INCLUDED IN THE DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN REPORTED IN THE FINAL SUMMARY REPORTS.

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-079, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. K211	Customer ID: C585I
Analysis: Sr	Sample Prep: Acid Digest

Instrument: WB 27812	Procedure/ Rev: LA-220-101 / D-0
Technologist: R.D Meyers	Date: 7/27/94
Starting Time: 0130	Temperature
Ending Time: 0630	Chemist: Fitzgerald

Comments: OUT FOR RERUN

	Description	Lab ID		Description	Lab ID
1	LMCS	K209.5556	11		
2	BLK	K210.6696	12		
3	SAMPLE	K211.5785	13		
4	DUP	K211.9296	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS				

380

A-6000-881 (03/92)

STRONTIUM 90 ANALYSIS - ACID DIGESTION

Batch 3822

Serial No	Sample Point	Date	Time Issued	Priority
K 209.-5E8E	C-111	4-25-94	14:04	28

Determination	Method Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	% RECOVERY	N4C8B	0

Sample Size	Customer ID
3 ml	STD

OUT FOR RERUN

Remarks Calculations Results

COUNT ON DETECTOR#11
PAGE 1/2
STD# 136B51 REFUDT
STD VAL %REC

Scotime 0530
Date 7/27/94
G
T 7.8547

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
7/27/94	0630		

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
K 210.-5E8E	C-111	4-25-94	14:00	28

Determination	Method Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/G Rec	N4C8B	0

Sample Size	Customer ID
3.100 ml	BLANK

OUT FOR RERUN

Remarks Calculations Results

REAGENT BLANK

Scotime 0530
Date 7/27/94
G
T 7.8760

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
7/27/94	0630		

54-6800-061 (R-10-83)

STRONTIUM 90 ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
N 211.-6786	C-111	4-28-94	14:57	28

Determination	Method Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/G Rec	N4C3B	0

Sample Size	Customer ID
2.100-10-.100ml	5681

OUT FOR RERUN

Remarks Calculations Results

Septimc 0530
Date 7/27/94
G
T7.9441

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
7/27/94	0630	

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
N 211.-6880	C-111	4-28-94	14:57	28

Determination	Method Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/G Rec	N4C3B	0

Sample Size	Customer ID
2.100-10-.100ml	5681

OUT FOR RERUN

Remarks Calculations Results

INTERLOCATE SAMPLE

Septimc 0530
Date 7/27/94
G
T7.9470

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
7/27/94	0630	

54-6800-061 (R-10-83)

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY WHC-SD-WM-DP-079, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. K212-214	Customer ID: C-111 ~~FB~~ C58FB 5-18-99 LAD
Analysis: AT	Sample Prep: DIRECT

Instrument:	Procedure/ Rev: LA-508-101
Technologist: ALETA K LEWIS	Date: 05/05/94
Starting Time: 12:00	Temperature 25 C
Ending Time: 14:30	Chemist: S. FITZGERALD

Comments: BATCH# 3274

OUT FOR [illegible]

	Description	Lab ID		Description	Lab ID
1	LMCS	K212-5525	11		
2	BLANK	K213-5625	12		
3	SAMPLE	K214-5725	13		
4	SAMPLE DUP	K214-5825	14		
5	SAMPLE SPIKE	K214-5925	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
EV-CRB	142B51	10ML		

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-508-101

DATE START: MAY 5, 1994

PREPARED BY: S.L. FITZGERALD

DATE COMPLETE: MAY 9, 1994

	UNITS:	uCi/mL							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD 142B51	K212	ALPHA	9.91E-03				95.3	2.01E-07	5.0
BLANK	K213	ALPHA	<1.48E-06					4.01E-06	138.6
108-AP COMP	K214	ALPHA	<1.48E-06	<3.06E-06				4.01E-06	138.6
								4.01E-06	105.4
108-AP COMP	K214/SPK	ALPHA					96.5		

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

No replicate sample run, rerun requested.

5-9-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3274

Serial No	Sample Point	Date	Time Issued	Priority
K 212.-5525	C-111	4-27-94	10: 2	21

Determination	Method Standard	Result Units	Charge Code	Returns
AT	LA-508-101	% RECOVERY	N4C3B	0

Sample Size	Customer ID
~~500 ml~~ 10 ml	STD

Remarks Calculations Results

S510 EV-CKB

STD# 142 B5 RESULT 9.91E-03

STD VAL 1.0398E-02 %REC. 95.3

OUT FOR RERUN

Alda Lewis

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D.H. Milian			
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Mgr		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) LIQUIDS

			STANDARD	REPLICATE
Type	DETECTOR NUMBER		13	N/A
STANDARD	DISH SIZE 1, 2, or 5	(MS)	2	N/A
Work List	TOTAL COUNTS	(TC)	1544	N/A
3274	COUNT TIME in MINUTES	(CT)	30	N/A
AT or TB ?	BACKGROUND in cpm	(BKG)	0.4	N/A
AT	SAMPLE SIZE in mL	(SS)	10.000	N/A
Test Code	DILUTION FACTOR	(DF)	1	N/A
AT	DIGEST DILUTION FACTOR	(DDF)	1	N/A
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	N/A
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		51.067	N/A
Sample #	SAMPLE CONCENTRATION in µCi/L		9.91E-03	N/A
K212-5525	µCi/L in SAMPLE =			9.9065E-03
Instrument Code				
	Rs (Sample Count Rate) = (TC / CT) - BKG			
Analyst	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)			
A LEWIS	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L			
Date	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100			
05/05/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
Time				
14:30	v RESULTS v			

ALPHA TOTAL	in µCi/L	=	9.91E-03	DETECTION LEVEL 2.01E-07 µCi/mL
ALPHA TOTAL	in µCi/mL	=	9.91E-06	
RELATIVE COUNTING ERROR	=		5.0%	

Data Entry by:		Date:	07-May-94
Approved by:		Date:	9-May-94

Form L1 Rev. 2.1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

2

Serial No	Sample Point	Date	Time Issued	Priority
K 213.-5625	C-111	4-27-94	10: 7	21

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	N4C3B	0

Sample Size	Customer ID
500 ml	BLANK

Remarks Calculations Results

COUNT AS uCI/L
USE 13,14,15 OR 16

< 1.48E-06 uci/ml

OUT FOR RERUN

Alta Lewis

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D.H. Milicia			
Hrs	Hrs	Hrs	Hrs	Hrs
		Sabyte		
Date	Time Completed	Lab Analyst Mgr		

54-6800-0E1 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Type	DETECTOR NUMBER		13	N/A
SAMPLE	DISH SIZE 1, 2, or 5	(MS)	2	N/A
Work List	TOTAL COUNTS	(TC)	6	N/A
3274	COUNT TIME in MINUTES	(CT)	30	N/A
AT or TB ?	BACKGROUND in cpm	(BKG)	0.4	N/A
AT	SAMPLE SIZE in mL	(SS)	0.500	N/A
Test Code	DILUTION FACTOR	(DF)	1	N/A
AT	DIGEST DILUTION FACTOR	(DDF)	1	N/A
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	N/A
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		0.381	N/A
Sample #	SAMPLE CONCENTRATION in µCi/L		1.48E-03	N/A
K213-5625	µCi/L in SAMPLE =		<	1.4784E-03
Instrument Code				
	Rs (Sample Count Rate) = (TC / CT) - BKG			
Analyst	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)			
A LEWIS	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L			
Date	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100			
05/05/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
Time				
14:30	v RESULTS v			

ALPHA TOTAL	in µCi/L	=	< 1.48E-03	DETECTION LEVEL
ALPHA TOTAL	in µCi/mL	=	< 1.48E-06	
LESS Than Value was Determined from Lc.				4.01E-06 µCi/mL
RELATIVE COUNTING ERROR		=	138.6%	

Data Entry by:		Date:	07-May-94
Approved by:		Date:	9-may-94

Form L1 Rev. 2.1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5725	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	N4C3B	0

Sample Size	Customer ID
.500 ml	C58FB

Remarks Calculations Results

COUNT AS uCI/L
USE 13,14,15 OR 16

< 1.48E-06 uci/ml

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D.H. Milkie			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Type	DETECTOR NUMBER		13	N/A
SAMPLE	DISH SIZE 1, 2, or 5	(MS)	2	N/A
Work List	TOTAL COUNTS	(TC)	7	N/A
3274	COUNT TIME in MINUTES	(CT)	30	N/A
AT or TB ?	BACKGROUND in cpm	(BKG)	0.4	N/A
AT	SAMPLE SIZE in mL	(SS)	0.500	N/A
Test Code	DILUTION FACTOR	(DF)	1	N/A
AT	DIGEST DILUTION FACTOR	(DDF)	1	N/A
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	N/A
LIQUID	Lc Rmax or Rs (SAMPLE RATE) as APPROPRIATE		0.381	N/A
Sample #	SAMPLE CONCENTRATION in µCi/L		1.48E-03	N/A
K214-5725	µCi/L in SAMPLE =		<	1.4784E-03

Instrument Code

Analyst: A LEWIS

Date: 05/05/94

Time: 14:30

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

v RESULTS v

ALPHA TOTAL	in µCi/L	=	< 1.48E-03	DETECTION LEVEL
ALPHA TOTAL	in µCi/mL	=	< 1.48E-06	4.01E-06 µCi/mL

LESS Than Value was Determined from Lc.

RELATIVE COUNTING ERROR = 170.9%

Data Entry by:		Date:	07-May-94
Approved by:		Date:	11-MAY-94

Form L1 Rev. 2.1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

4

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5825	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	N4C3B	0

Sample Size: 500 ml

Customer ID: C58FB

Remarks Calculations Results

COUNT AS uCi/L
USE 13,14,15 OR 16

< 3.06 E-06 uci/ml

OUT FOR RERUN

Alita Lewis

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D.H. Wilkins			
His	His	His	His	His

Date	Time Completed	Lab Asst Mgr

54-6800-061 (R-10-83)

WRC-SD-WM-DP-079, REV. 0

AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Type	DETECTOR NUMBER		13	N/A
DUPLICATE	DISH SIZE 1, 2, or 5	(MS)	2	N/A
Work List	TOTAL COUNTS	(TC)	23	N/A
3274	COUNT TIME in MINUTES	(CT)	30	N/A
AT or TB ?	BACKGROUND in cpm	(BKG)	0.4	N/A
AT	SAMPLE SIZE in mL	(SS)	0.500	N/A
Test Code	DILUTION FACTOR	(DF)	1	N/A
AT	DIGEST DILUTION FACTOR	(DDF)	1	N/A
Matrix	EFFICIENCY FACTOR	(EFF)	0.2322	N/A
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		0.789	N/A
Sample #	SAMPLE CONCENTRATION in µCi/L		3.06E-03	N/A
K214-5825	µCi/L in SAMPLE =		<	3.0617E-03
Instrument Code				
	Rs (Sample Count Rate) = (TC / CT) - BKG			
Analyst	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)			
A LEWIS	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L			
Date	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100			
05/05/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
Time				
14:30	v RESULTS v			

ALPHA TOTAL	in µCi/L	=	< 3.06E-03	DETECTION LEVEL
ALPHA TOTAL	in µCi/mL	=	< 3.06E-06	
LESS THAN Value was Determined from Rmax.				4.01E-06 µCi/mL
RELATIVE COUNTING ERROR		=	105.4%	

Data Entry by:		Date:	07-May-94
Approved by:		Date:	9-May-94

Form L1 Rev. 2.1

5

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5925	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	N4C3B	0

Sample Size	Customer ID
.500 ml	C58FB

Remarks Calculations Results

SAMPLE SPIKED ID
SPIKE ID 1163551
SPIKE VOLUME 10 ml
Spike value 1.04E-02 mci/L

96.5% Rec.

OUT FOR RERUN

Alita Lewis

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D.H. McKain			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-078, REV. C

AT: LA-508-101 (D-0) SPIKED SAMPLE

Type			SPIKE	REPLICATE
SPIKE	DETECTOR NUMBER		13	N/A
	DISH SIZE 1, 2, or 5	(MS)	2	N/A
Work List	TOTAL COUNTS	(TC)	1564	N/A
3274	COUNT TIME in MINUTES	(CT)	30	N/A
AT or TB ?	BACKGROUND in cpm	(BKG)	0.4	N/A
AT	SAMPLE VOLUME in mL (Spiked Vial)	(SS)	0.500	N/A
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial)	(DF)	1	N/A
AT	SPIKE VOLUME in mL	(SVol)	10.000	N/A
Matrix	SPIKE DILUTION FACTOR	(SDF)	1	N/A
LIQUID	SPIKE VALUE in µCi/L	(SVal)	0.0104	N/A
Sample #	INSTRUMENT EFFICIENCY FACTOR	(EFF)	0.2322	N/A
K214-5925	SAMPLE + SPIKE µCi/L	(S+S)	2.01E-01	N/A
Instrument Code	SAMPLE or DIGEST µCi/L from FORM #1		<1.48E-03	
Analyst	Rs (Sample Count Rate) = (TC / CT) - BKG			
A LEWIS	SAMPLE + SPIKE µCi/L = Rs * 1000mL/L * DF / (EFF * SS * 2220000dpm/µCi)			
Date	PERCENT SPIKE RECOVERY = (((S+S µCi/L - SAMPLE µCi/L) * ((SDF/SVol)/(DF/SS)))/SVal)*100			
05/05/94				
Time	NOTE: Original Sample result was a LESS THAN value. Zero (0) was subtracted from the spiked value for percent recovery calculation.			
14:30				

RESULT **PERCENT SPIKE RECOVERY = 96.5%**

Date Entry by:		Date:	07-May-94
Approved by:		Date:	9-may-94

Form L3 Rev. 2.1

Page 1 of 1

13/2
1544/30 -.4

K212-5525

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 05-06-1994 at 02:22:59
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 10 mL Dilution : 1

Sample # K-212 Mount # 1

1544/30 - 0.4 = 9.9065E-03 uCi/L alpha

13/2
7/30 -.4

K214-5725

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, , on 05-06-1994 at 02:24:10
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .5 mL Dilution : 1

Sample # K-214-5725 Mount # 1

7/30 - 0.4 < 1.0439E-03 uCi/L alpha

13/2
23/30 -.4

K214-5825

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, , on 05-06-1994 at 02:24:46
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .5 mL Dilution : 1

Sample # K-214-5825 Mount # 1

23/30 - 0.4 = 1.4226E-03 uCi/L alpha

13/2
6/30 -.4

K213-5625

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, , on 05-06-1994 at 02:23:39
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .5 mL Dilution : 1

Sample # K-213 Mount # 1

6/30 - 0.4 < 1.0439E-03 uCi/L alpha

K214-5825

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, , on 05-06-1994 at 02:25:10
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .5 mL Dilution : 1

Sample # K-214-5825 Mount # 1

1564/30 - 0.4 = 2.0072E-01 uCi/L alpha

13/2
1564/30 -.4

BATCH # 3275

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-079, REV. 0

Lab Segment Serial No.: K-214	Customer ID: C58FB C111
Analysis: TOTAL ORGANIC CARBON	Sample Prep: DIRECT

Instrument: WC16130	Procedure/ Rev: LA-344-105 B-2
Technologist: E.H. COLVIN E.H. Colvin	Date: 05/03/94
Starting Time: 0630	Temperature 25C OUT FOR RERUN
Ending Time: 1500	Chemist: R.W. SCHROEDER

Comments: Rerun, Blank value is too high and need to run a separate blank for standard and one for reagent blank request.

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	K-212-5526	11		
2	REAGENT BLANK	K-213-5626	12		
3	SAMPLE	K-214-5726	13		
4	SAMPLE DUPLICATE	K-214-5826	14		
5	SAMPLE + SPIKE	K-214-5926	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	10N12C .200ML			
TOC SPIKE	11N12C .200ML			
		391		

A-6000-881 (03/92)

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3275

Serial No	Sample Point	Date	Time Issued	Priority
K 212.-5526	C-111	4-27-94	10: 2	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	% RECOVERY	N4C3B	0

Sample Size	Customer ID
.200mL - 2mL - .200mL	STD

Remarks, Calculations, Results

S356 CO3TOC

STD# 10N12C RESULT 3.11

STD VAL 3.00g/L %REC 103.7

OUT FOR RERUN

E.H. Colvin

WR# 5669

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
		D. Orth		Gary Hammett

Date	Time Completed	Lab Unit Mgr
5-3-94	1500	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

TOC: LA-344-105 (B-2) LIQUIDS

			STANDARD
Type	Sample Volume in mL	(SS)	0.200
STANDARD	H2SO4 Volume in mL	(VR)	2.000
Work List	Volume Injected in mL	(VI)	0.200
3275	Dilution Factor	(DF)	11
Test Code	Digest Dilution Factor	(DDF)	1
TOC	µg of Carbon in Sample	(C1)	64.9
Matrix	µg of Carbon in Blank	(C2)	8.4
LIQUID	g of Carbon/L	=	3.11E+00

Sample #
K212-5526
Instrument Code
WC16130
Analyst
E COLVIN
Date
05/03/94
Time
15:00

g of Carbon/L = $\frac{(C1-C2) * DF * DDF}{VI * 1000}$

µg of Carbon/mL = g of Carbon/L * 1000000 µg/g / 1000 mL/L

Detection Level (µg/mL) = $\frac{1\ \mu g\ C * DF * DDF}{VI}$

µg Carbon/mL =	3.11E+03	DETECTION LEVEL in µg/mL
		5.50E+01

Data Entry by:	Gary Hammett	Date:	07-May-94
Approved by:	D. Orth	Date:	11-MAY-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 213.-5626	C-111	4-27-94	10: 7	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	uG C/ML	N4C3B	0

Sample Size	Customer ID
.200mL	BLANK

Remarks Calculations Results

REAGENT BLANK

OUT FOR RERUN

E.N. Colvin

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-3-94	1500	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

TOC: LA-344-105 (B-2) LIQUIDS

Type			BLANK
BLANK	Sample Volume in mL	(SS)	0.200
	H2SO4 Volume in mL	(VR)	1.000
Work List	Volume Injected in mL	(VI)	0.200
3275	Dilution Factor	(DF)	1
Test Code	Digest Dilution Factor	(DDF)	1
TOC	µg of Carbon in Sample	(C1)	8.4
Matrix	µg of Carbon in Blank	(C2)	7
LIQUID	g of Carbon/L	=	7.00E-03

Sample #
K213-5626
Instrument Code
WC16130
Analyst
E COLVIN
Date
05/03/94
Time
15:00

g of Carbon/L = $\frac{(C1-C2) * DF * DDF}{VI * 1000}$

µg of Carbon/mL = g of Carbon/L * 1000000 µg/g / 1000 mL/L

Detection Level (µg/mL) = $\frac{1 \text{ µg C} * DF * DDF}{VI}$

µg Carbon/mL =	7.00E+00	DETECTION LEVEL in µg/mL
		5.00E+00

Data Entry by:	Gary Hammond	Date:	07-May-94
Approved by:	R Ahrle	Date:	11-MAY-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5726	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	uG C/ML	N4C3B	0

Sample Size	Customer ID
2mL + .200mL 5% H_2SO_4 - .200mL	C58FB

Remarks Calculations Results

OUT FOR RERUN

E H. Colvin

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-3-94	1500	Dekstu	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

TOC: LA-344-105 (B-2) LIQUIDS

			SAMPLE
Sample Volume in mL	(SS)		2.000
H2SO4 Volume in mL	(VR)		0.200
Volume Injected in mL	(VI)		0.200
Dilution Factor	(DF)		1.1
Digest Dilution Factor	(DDF)		1
µg of Carbon in Sample	(C1)		11.3
µg of Carbon in Blank	(C2)		8.4
g of Carbon/L		=	1.60E-02

Type	SAMPLE
Work List	3275
Test Code	TOC
Matrix	LIQUID
Sample #	K214-5726
Instrument Code	WC16130
Analyst	E COLVIN
Date	05/03/94
Time	15:00

g of Carbon/L = $\frac{(C1-C2) * DF * DDF}{VI * 1000}$

µg of Carbon/mL = g of Carbon/L * 1000000 µg/g / 1000 mL/L

Detection Level (µg/mL) = $\frac{1\ \mu g\ C * DF * DDF}{VI}$

µg Carbon/mL =	1.60E+01	DETECTION LEVEL in µg/mL
		5.50E+00

Data Entry by:	[signature]	Date:	07-May-94
Approved by:	P Ahola	Date:	11-May-94

Form 1 Rev. 1.0

:394

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5826	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	uG C/ML	N4C3B	0

Sample Size	Customer ID
2mL+.200mL 5M H_2SO_4 - 200mL	C58FB

Remarks Calculations Results

DUPLICATE SAMPLE

OUT FOR RERUN

E.H. Colvin

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-3-94	1500	Rokita	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

TOC: LA-344-105 (B-2) LIQUIDS

			DULPICATE
Type	Sample Volume in mL	(SS)	2.000
DULPICATE	H2S04 Volume in mL	(VR)	0.200
Work List	Volume Injected in mL	(VI)	0.200
3275	Dilution Factor	(DF)	1.1
Test Code	Digest Dilution Factor	(DDF)	1
TOC	µg of Carbon in Sample	(C1)	11.2
Matrix	µg of Carbon in Blank	(C2)	8.4
LIQUID	g of Carbon/L	=	1.54E-02

Sample #
K214-5826
Instrument Code
WC16130
Analyst
E COLVIN
Date
05/03/94
Time
15:00

g of Carbon/L = $\frac{(C1-C2) * DF * DDF}{VI * 1000}$

µg of Carbon/mL = g of Carbon/L * 1000000 µg/g / 1000 mL/L

Detection Level (µg/mL) = $\frac{1\ \mu g\ C * DF * DDF}{VI}$

µg Carbon/mL =	1.54E+01	DETECTION LEVEL in µg/mL
		5.50E+00

Data Entry by:	Gary Hammitt	Date:	07-May-94
Approved by:	R Okita	Date:	11-MAY-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
K 214.-5926	C-111	4-27-94	10:17	21

Determination	Method Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	% RECOVERY	N4C3B	0

Sample Size	Customer ID
.200mL, .100mL, .5mL H_2SO_4, .200mL	C58FB

Remarks, Calculations, Results

SPIKE-.200mL

SAMPLE SPIKED ID
SPIKE ID
SPIKE VOLUME
.200mL

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-3-93	1500	

54-6600-061 (R-10-83)

WHC-SD-WM-DP-079, REV. 0

TOC: LA-344-105 SPIKED SAMPLE

Type
SPIKE
Work List
3275
Test Code
TOC
Matrix
LIQUID
Sample #
K214-5926
Instrument Code
WC16130
Analyst
E COLVIN
Date
05/03/94
Time
15:00

>>>>>> Sample Vial Data <<<<<<	
Sample Volume in mL	2.000
H2SO4 Volume in mL	0.200
Volume Injected in mL	0.200
µg of Carbon in Sample	11.3
µg of Carbon in Blank	8.4

SPIKE	
>>>>> Spiked Vial Data <<<<<	
Sample Size in mL (SS)	0.200
Spike Volume in mL	0.200
H2SO4 Volume in mL	0.100
Volume Injected in mL	0.200
Sample Dilution Factor (DF) **	1
Spike Value (µg/ml)	750
µg C in Sample + Spike	68.6
µg C in Blank	8.4

** NOTE: Sample Dilution Factor does not include amount sample is diluted in Spiked Vial.

$$\text{PERCENT SPIKE RECOVERY} = \frac{\text{µg Carbon Recovered from Spike} * 100}{\text{µg Carbon in Spike}}$$

WHERE : µg Carbon Recovered from Spike =
[(µgC in sample + spike − µgC in blank) * (Spike Correction Factor)]
− [(µgC sample − µgC blank) * (Sample Correction Factor) * (Sample Size Correction Factor)]

$$\text{Spike Correction Factor} = \frac{\text{Total volume in spiked sample vial (mL)}}{\text{Volume injected (mL)}}$$

$$\text{Sample Correction Factor} = \frac{\text{Total volume in sample vial (mL)}}{\text{Volume injected (mL)}}$$

$$\text{Sample Size Correction Factor} = \frac{\text{Sample size in (mL) in spiked vial}}{\text{Sample size (mL) in sample * Spiked Vial DF}}$$

Percent Spike Recovery = 98.2%

Data Entry by:		Date:	07-May-94
Approved by:		Date:	11-MAY-94

Form 2 Rev. 1.0

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>>

Sample: K-213 BLANK Date: 05/03/94 Time: 08:27:26

Sample Size = 200 uL Analyst : EH COLVIN
Dil Factor = 1 Min Readings = 14
Blank ID # = K-213 BLANK Max Readings = 14
Blank Value = N/A % Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	1.00	0.00
2	1.01	1.40	28.57
3	1.51	1.90	26.32
4	2.01	2.30	17.39
5	2.51	3.20	28.1
6	3.01	3.60	11.11
7	3.51	4.00	10.00
8	4.01	4.90	18.37
9	4.50	5.70	10.71
10	5.00	6.20	11.29
[illegible]	5.50	6.20	0.00
[illegible]	[illegible]	6.70	1.[illegible]
13	6.50	[illegible]	5.[illegible]
14	[illegible]	8.40	11.[illegible]

BLANK VALUE = 8.4 micrograms carbon
BLANK FACTOR = 8.4 / 7.00483E2 = +1.2E+00 ug/min Carbon

Sample run by: _____
EH COLVIN (0000)

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: K-214 Date: 03/03/94 Time: 09:10:16

Sample Size = 200 uL
Dil Factor = 1.1
Blank ID # = K-213 BLANK
Blank Value = 1.199169 ug/minute C

Analyst : EH COLVIN
Min Readings = 14
Max Readings = 14
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	1.00	0.00
2	1.01	2.50	60.00
3	1.51	3.90	35.90
4	2.01	4.50	15.38
5	2.51	5.70	21.05
6	3.01	6.40	10.94
7	3.50	6.80	6.08
8	4.00	7.40	8.11
9	4.50	8.10	8.64
10	5.00	8.80	7.95
11	5.50	9.50	7.37
12	6.00	10.10	6.94
13	6.50	10.60	5.37
14	7.01	11.30	6.60

BLANK VALUE = 8.4 micrograms carbon
BLANK FACTOR = 8.4 / 7.004852 = +1.2E+00 ug/min Carbon

SAMPLE RESULTS:
(11.3 - 8.396792)(1.1)/(200) = +1.60E-02 g/L Carbon
(11.3 - 8.396792)(1.1)/(200)(12) = +1.33E-03 Molar Carbon

Sample Run By: EH COLVIN 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: K-214 DUP Date: 05/03/94 Time: 09:18:13

Sample Size = 200 uL Analyst : EH COLVIN
Dil Factor = 1.1 Min Readings = 14
Blank ID # = K-213 BLANK Max Readings = 14
Blank Value = 1.199169 ug/minute C % Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.40	0.00
2	1.01	2.40	83.33
3	1.51	3.40	29.41
4	2.01	4.30	27.17
5	2.51	5.40	11.11
6	3.01	6.00	10.00
7	3.51	6.80	11.76
8	4.01	7.70	11.69
9	4.51	8.20	6.10
10	5.01	9.10	9.89
11	5.51	9.60	5.21
12	6.01	10.30	6.80
13	6.50	11.00	6.36
14	7.00	11.20	1.79

BLANK VALUE = 8.4 micrograms carbon
BLANK FACTOR = 8.4 / 7.004852 = +1.2E+00 ug/min Carbon

SAMPLE RESULTS:
(11.1 - 8.399962)(1.1)/(200) = +1.34E-02 ug/L Carbon
(11.2 - 8.399962)(1.1)/(200)(12) = +1.28E-05 Molar Carbon

Sample Run By: _____
EH COLVIN 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: K-214 + SP Date: 05/03/94 Time: 09:41:22

Sample Size = 200 uL Analyst : EH CULVIN
Dil Factor = 2.5 Min Readings = 14
Blank ID # = K-213 BLANK Max Readings = 14
Blank Value = 1.199169 ug/minute C % Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.60	0.00
2	1.01	35.30	98.30
3	1.51	52.60	32.89
4	2.01	58.40	9.93
5	2.51	61.40	4.89
6	3.01	63.00	2.54
7	3.51	63.70	1.10
8	4.01	64.90	1.85
9	4.51	65.50	0.92
10	5.01	66.00	0.76
11	5.51	66.50	0.75
12	6.01	67.00	0.75
13	6.51	67.70	1.04
14	7.00	68.30	1.34

BLANK VALUE = 8.4 micrograms carbon
BLANK FACTOR = 8.4 / 7.004852 = +1.2E+00 ug/min Carbon

SAMPLE RESULTS:
(68.6 - 8.399962)(2.5)/(200) = +7.53E-01 g/L Carbon
(68.6 - 8.399962)(2.5)/(200)(12) = +6.27E-02 Molar Carbon

Sample Run By: EH Culvin 5-3-94
EH CULVIN 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: K-212 SID Date: 05/03/94 Time: 08:41:08

Sample Size = 200 uL Analyst : EH COLVIN
Dil Factor = 11 Min Readings = 14
Blank ID # = K-213 BLANK Max Readings = 14
Blank Value = 1.199169 ug/minute C % Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.50	0.00
2	1.01	55.30	98.53
3	[illegible]	51.40	11.32
4	2.06	55.40	7.22
[illegible]	2.30	57.50	3.65
6	3.04	59.[illegible]	[illegible]
7	3.53	60.30	2.16
8	4.03	61.10	1.31
9	4.50	61.70	[illegible].97
10	[illegible]	62.20	0.8[illegible]
11	[illegible]	62.[illegible]	1.1[illegible]
12	6.03	63.20	1.13
13	6.53	63.50	1.09
14	7.03	64.[illegible]6	0.72

BLANK VALUE = 8.4 micrograms carbon
BLANK FACTOR = 8.4 / 7.004852 = +1.25+00 ug/min Carbon

SAMPLE RESULTS:
(44.9 - 8.398438)(11)/(200) = +9.112+00 g/L Carbon
(44.9 - 8.398438)(11)/(200)(12) = +2.59E-01 Molar Carbon

Sample Run by: EH Colvin 5-3-94
EH COLVIN 03/00

DISTRIBUTION SHEET

To	From	Page 1 of 2
DISTRIBUTION	ANALYTICAL SERVICES	Date: 12/05/94
Project Title/Work Order WHC-SD-WM-DP-079, Rev. 0 216-Day Report for Tank 241-C-111, Cores 58 and 59		EDT NO.: EDT-140746 ECN NO.: N/A

Name	MSIN	Text With all Attach	Text w/o Attach	EDT/ECN Only
ONSITE				
Pacific Northwest Laboratory				
S. F. Bobrowski	K7-28		X	
S. J. Harris	K7-22			X
P. G. Heasler	K5-12			X
S. G. McKinley	P7-22		X	
J. L. Scott	R3-87			X
U.S. Department of Energy, RL				
J. M. Clark	S7-54			X
J. Noble-Dial	S7-54			X
Westinghouse Hanford Company				
J. N. Appel	G3-21			X
H. Babad	S7-30	X		
D. R. Bratzel	S7-31			X
R. J. Cash	S7-15	X		
J. L. Deichman	H4-19		X	
G. T. Dukelow	S7-15		X	
C. E. Golberg	H5-49			X
J. M. Henderson	R3-85			X
D. C. Hetzer	S6-31			X
J. G. Hill	K7-97	X		
L. Jensen	T6-07	X		
T. J. Kelley	S7-30		X	
N. W. Kirch	R2-11		X	
J. G. Kristofzski	T6-06	X		
J. E. Meacham	S7-15	X		
P. M. Morant	H4-25		X	
A. F. Noonan	K9-81	X		
A. D. Rice	T6-06	X		
P. Sathyanarayana	R2-12	X		
R. D. Schreiber	R2-12	X		
B. C. Simpson	R2-12			X
M. J. Sutey	T4-07			X
D. A. Turner	S7-15			X
J. A. Voogd	R4-01			X
O. S. Wang	S7-15			X
E. T. Weber	H5-27			X
W. I. Winters	T6-50			X
Central Files	L8-04	2		
EDMC	H6-08	X		
LTIC	T6-06			X
OSTI	L8-07	2		
TFIC (Tank Farm Information Center)	R1-20			X

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DISTRIBUTION SHEET

To	From	Page 2 of 2
DISTRIBUTION	ANALYTICAL SERVICES	Date: 12/05/94
Project Title/Work Order WHC-SD-WM-DP-079, Rev. 0 216-Day Report for Tank 241-C-111, Cores 58 and 59		EDT NO.: EDT-140746 ECN NO.: N/A

Name	MSIN	Text With all Attach	Text w/o Attach	EDT/ECN Only
OFFSITE				
Washington State Department of Ecology Single-Shell Tank Unit Manager S. E. McKinney P.O. Box 47600 Olympia, Washington 98504-7600				X
Environmental Protection Agency Single-Shell Tank Unit Manager D. R. Sherwood 712 Swift Boulevard, Suite 5 Richland, Washington 99352				X

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