This document was too large to scan as a whole document, therefore it required breaking into smaller sections.

Document number: SD-WM-DP-170

Section 4 **of** 4

Title: Final Results for Tank 241BX112 Push Mode Cores 118 & 119 [Pgs 1801 Thru 2-17]

Date: 08/07/1996 **Revision:** R001

Originator: Conner JM
Co: WHC

Recipient:
Co:

References: ECN-633319

Pacific Northwest Laboratory 96096

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : ARF(SOW) : ASR 2785

A.L.O. No. 96-02619 Description : FIELD BLANK.F

DF ---- .09944

Dilution Factor = 1.0056E+01 +/- .50%

Instrument	ludlum 10
Eff. Factor	.4222
Date	2/ 7/ 96
Total counts	190
Count time	60
Bkg C/M	.292
Bkg cnt time	900
Corrected C/M	2.87

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	6.85E+01	15.9	5.74E+00
	uCi/ml	3.08E-05		2.59E-06

Data Entry by L R Greenwood Date 2-8-96

Calculation and Analytical Data Sheet Reviewed by T Trang-le Date 2/8/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02619 Description : FIELD BLANK F

Pipet Nos.: #8

DF .09944 --- --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/7/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum -10
Eff. Factor	0.50	0.38054	0.4 ~~222~~
Date	/ /	/ /	2/7/96
Total counts			190
Count time			60 TY 3/9/96
Bkg C/M			~~292~~
Bkg cnt time			9000

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Tvang-Le 2/7/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. STD-2785 Description : 200.15 dpm/ml

DF ---- .09944

Dilution Factor = 1.0056E+01 +/- 1.00%

Instrument	ludlum 2
Eff. Factor	.4186
Date	2/ 7/ 96
Total counts	615
Count time	60
Bkg C/M	.218
Bkg cnt time	900
Corrected C/M	10.03

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	2.41E+02	8.5	5.02E+00
	uCi/ml	1.09E-04		2.26E-06

120%

Data Entry by T Trang-Le Date 2/7/96

Calculation and Analytical Data Sheet Reviewed by L D Greenwood Date 2-9-96

Pacific Northwest Laboratory

Total Alpha.....PNL-ALO-420 & 421

K36459

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : STD-2785 Description : W-42-5 Pu 239 200.15 α/mg/ml 10/79

Pipet Nos.: #8

DF --- 09944 --- --- --- --- --- ---
ml

Pipet checks are recorded on labsheets by pipet number

Analyst La Pergal Date 2/7/96

Instrument	P.A.C. - ___	G.E. ASC..	Ludlum - 2
Eff. Factor	0.50	0.38054	0.4 186
Date	/ /	/ /	2/7/96
Total counts			615
Count time			60
Bkg C/M			.218
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/7/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. 96-02605BLK Description : PROCESS BLANK

DF ---- .14850 ---> 100.00000 ---- .05001

Dilution Factor = 1.3465E+04 +/- 1.14%

Instrument	ludlum 3
Eff. Factor	.4321
Date	2/ 8/ 96
Total counts	87
Count time	300
Bkg C/M	.280
Bkg cnt time	900
Corrected C/M	.01

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	3.12E+02	700.6	3.73E+03
	uCi/g	1.40E-04		1.68E-03 ✓

Data Entry by T Trang-le Date 2/8/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/4/96

Pacific Northwest Laboratory

Total Alpha.....PNL-ALO-420 & 421

K36499α

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02605BLK Description : PROCESS BLANK

Pipet Nos.: #15

DF ---.1485 g ADJ x2 → 100 ml --- .05001 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst La Pappel Date 2/7/96

Instrument	P.A.C. -	G.E. ASC.	Ludlum -3
Eff. Factor	0.50	0.38054	0.4321
Date	/ /	/ /	2/8/96
Total counts			87
Count time			300
Bkg C/M	.	.	.280
Bkg cnt time			900

Alpha Energy Analysis Det. # A

Filename

Analyst T Trang-le 2/8/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 .ARF(SOW) : ASR 2785

A.L.O. No. BLK-2785 Description :

DF ---- .09944

Dilution Factor = 1.0056E+01 +/- 1.00%

Instrument	Ludlum 1
Eff. Factor	.4227
Date	2/ 7/ 96
Total counts	63
Count time	420
Bkg C/M	.263
Bkg cnt time	900
Corrected C/M	-.11

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	-2.69E+00	44.3	2.46E+00
	uCi/ml	-1.21E-06		1.11E-06 ✓

$\times \frac{100 ml}{.17895 g} = 6.2E-4 \frac{\mu Ci}{g}$

LRG 2-9-96

Data Entry by T Trang-le Date 2/8/96

Calculation and Analytical Data Sheet Reviewed by LRGreenwood Date 2-8-96

Pacific Northwest Laboratory

Total Alpha.....PNL-ALO-420 & 421

K36459

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : BLK-2785 Description : D_2H_2O

Pipet Nos.:

DF --- 09944 --- --- --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/7/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 1
Eff. Factor	0.50	0.38054	0.4227
Date	/ /	/ /	2/7/96
Total counts			63
Count time			420
Bkg C/M	.	.	263
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/7/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. 96-02611BLK Description : PROCESS BLANK

DF ---- .17895 ---> 100.00000 ---- .05001

Dilution Factor = 1.1174E+04 +/- 1.14%

Instrument	ludlum 4
Eff. Factor	.4337
Date	2/ 8/ 96
Total counts	78
Count time	300
Bkg C/M	.342
Bkg cnt time	900
Corrected C/M	-.08

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	-2.11E+03	84.4	3.40E+03
	uCi/g	-9.52E-04		1.53E-03

Data Entry by T Trang-Le Date 2/8/96

Calculation and Analytical Data Sheet Reviewed by LR Greenwood Date 2-9-96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02611BLK Description : PROCESS BLANK

Pipet Nos.: #15

DF ---.17895 → 100 --- 05001 --- --- --- ---

g ml ml

Avg x2

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/7/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 4
Eff. Factor	0.50	0.38054	0.4337
Date	/ /	/ /	2/8/96
Total counts			78
Count time			300
Bkg C/M	.	.	.342
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/8/96

Pacific Northwest Laboratory 96099

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-02611BLK MS Description : Process Blank 200.15 dpm/ml

DF ---- .09944

Dilution Factor = 1.0056E+01 +/- 1.00%

Instrument	ludlum 5
Eff. Factor	.4174
Date	2/ 8/ 96
Total counts	426
Count time	60
Bkg C/M	.238
Bkg cnt time	900
Corrected C/M	6.86

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	1.65E+02	10.2	5.25E+00
	uCi/ml	7.45E-05		2.37E-06

83%
± 11%

Data Entry by T Trang-le Date 2/8/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 2-8-96

Pacific Northwest Laboratory

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02611BLK MS Description : PROCESS BLANK + Pu 237 W-42-5 200.15 ~~4/~~ 10/79

#8

Pipet Nos.: #15 + .09944 ml std

DF ....17895 → 100 ml ... .05001 ml ... ...

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/7/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 5
Eff. Factor	0.50	0.38054	0.4 174
Date	/ /	/ /	2/8/96
Total counts			426
Count time			60
Bkg C/M			238
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/8/96

Pacific Northwest Laboratory

96096

SAMPLE RECEIVING/LOG-IN INFORMATION

Customer : TWRS Date Received 02/ 07/ 96 Work order : ARF(SOW) : ASR 2785

ALO #	Customer ID	Total Alpha	U by laser fluor.	Total Beta	Sr-90	GEA
96-02619	FIELD BLANK.F					

Pacific Northwest Laboratory

96095

SAMPLE RECEIVING/LOG-IN INFORMATION

Customer : TWRS Date Received 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

ALO #	Customer ID	Total Alpha	GEA
96-02605	PROCESS BLANK		
96-02605	118.1AA.F		
96-02605	118.1AA.F DUPLICATE		
96-02607	118.2A.F		
96-02607	118.2A.F DUPLICATE		
96-02609	118.3A.F		
96-02609	118.3A.F DUPLICATE		
96-02611	PROCESS BLANK		
96-02611	119.1A.4		
96-02611	119.1A.F DUPLICATE		
96-02613	119.2A.4		
96-02613	119.2A.F DUPLICATE		
96-02615	119.3A.F		
96-02615	119.3A.F DUPLICATE		
STD-2785			
BLK-2785			

1024

Pacific Northwest Laboratory 96099

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-02605BLK-S Description : Pu-239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- .50%

Instrument	Ludlum 10
Eff. Factor	.4222
Date	2/ 9/ 96
Total counts	234
Count time	60
Bkg C/M	.304
Bkg cnt time	900
Corrected C/M	3.60

2-26-96

170 dpm/ml
− .520 dpm/ml (= 3.50E+2 × 1.9996E+1 / 1.3465E+4)
169 dpm/ml / 200.15 dpm/ml
= 85%

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	1.70E+02	14.2	1.16E+01
	uCi/ml	7.67E-05		5.25E-06

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D.L. Stacy Date 2/12/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02605BLK - 5 Description : PROCESS BLANK + W-42-5 Pu 239 200.15 α/m/ml

Pipet Nos.:

DF --- .1485 g → 100 ml --- .05001 ml #15 --- + .05001 ml #15 std --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst TA Pappel Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 19
Eff. Factor	0.50	0.38054	0.4222
Date	/ /	/ /	2/9/96
Total counts			234
Count time			60
Bkg C/M	.	.	.304
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. 96-02605BLK Description : PROCESS BLANK

DF .... .14850 ---> 100.00000 .... .05001

Dilution Factor = 1.3465E+04 +/- 1.14%

Instrument	Ludlum 7
Eff. Factor	.3971
Date	2/ 8/ 96
Total counts	107
Count time	600
Bkg C/M	.168
Bkg cnt time	900
Corrected C/M	.01

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	3.50E+02	417.3	2.53E+03
	uCi/g	1.58E-04		1.14E-03 ✓

Data Entry by T Trang-la Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D. K. Cady Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02605BLK Description : PROCESS BLANK

Pipet Nos.: #15

DF ---.1485 g → 100 ml ---.05001 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 7
Eff. Factor	0.50	0.38054	0.3971
Date	__/__/__	__/__/__	2/8/96
Total counts			107
Count time			600
Bkg C/M			.168
Bkg cnt time			900

TTL 3/4/96

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/8/96

Pacific Northwest Laboratory 96099

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/. 0 Work order : ARF(SOW) :

A.L.O. No. 96-02605-S Description : Pu-239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- .50%

Instrument	Ludlum 5
Eff. Factor	.4174
Date	2/ 8/ 96
Total counts	961
Count time	60
Bkg C/M	.238
Bkg cnt time	900
Corrected C/M	15.78

756 dpm
- 486 dpm
270 dpm / 200.15 dpm
= 135 % ±25%

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/ml	7.56E+02	6.9	1.04E+01
	uCi/ml	3.40E-04		4.70E-06

Data Entry by T Traing-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D.K. Fadg Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02605 -5 Description : 118.1AA.F W-112-5 Pu 239 200.15 d/m/ml

Pipet Nos.: #15 #15

DF ---1262 g → 100 ml --- .05001 ml --- + .05001 ml old --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum -5
Eff. Factor	0.50___	0.38054	0.4174
Date	__/__/__	__/__/__	2/8/96
Total counts			961
Count time			60
Bkg C/M	___.___	___.___	.238
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/8/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. 96-02605 Description : 118.1AA.F

DF .... .12620 ---> 100.00000 .... .05001

Dilution Factor = 1.5845E+04 +/- 1.14%

Instrument	Ludlum 5
Eff. Factor	.4174
Date	2/ 8/ 96
Total counts	623
Count time	60
Bkg C/M	.238
Bkg cnt time	900
Corrected C/M	10.15

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	3.85E+05	8.5	8.27E+03
	uCi/g	1.73E-01		3.73E-03

Data Entry by T Trang-Le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by [illegible] Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02605 Description : 118.1AA.F

#5

Pipet Nos.:

DF ---.1262 g → 100 ml --- .05001 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum -5
Eff. Factor	0.50	0.38054	0.4174
Date	/ /	/ /	2/8/96
Total counts			623
Count time			60
Bkg C/M	.	.	.238
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/8/96

Pacific Northwest Laboratory 96099

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-02605DUP-S Description : Pu-239 200.15 dpm

DF .... .05001

Dilution Factor = 1.9996E+01 +/- .50%

Instrument	Ludlum 1
Eff. Factor	.4227
Date	2/ 9/ 96
Total counts	1068
Count time	60
Bkg C/M	.290
Bkg cnt time	900
Corrected C/M	17.51

828 dpm
− 678 dpm
150 dpm | 200.15 dpm
±75 = 75%
±50%
JRH 2-9-96

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	8.28E+02	6.6	1.14E+01
	uCi/ml	3.73E-04		5.12E-06

Data Entry by T Trang-Le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D K. Sadey Date 2/9/96

Pacific Northwest Laboratory 9

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02605DUP-5 Description : 11B.1AA.F DUPLICATE - W-42-5 Pu 239 200.15 d/m/ml

Pipet Nos.:

DF --- .1708 g → 100 ml --- .05001 ml #15 --- .05001 ml #15 std --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 1
Eff. Factor	0.50	0.38054	0.4227
Date	/ /	/ /	2/9/96
Total counts			1068
Count time			60
Bkg C/M	.	.	.290
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Tizang-Le 2/9/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. 96-02605DUP Description : 118.1AA.F DUPLICATE

DF .... .17080 ---> 100.00000 .... .05001

Dilution Factor = 1.1707E+04 +/- 1.14%

Instrument	Ludlum 7
Eff. Factor	.3971
Date	2/ 8/ 96
Total counts	818
Count time	60
Bkg C/M	.168
Bkg cnt time	900
Corrected C/M	13.47

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/g	3.97E+05	7.5	5.42E+03
	uCi/g	1.79E-01		2.44E-03

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by UL Tidy Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02605DUP Description : 118.1AA.F DUPLICATE

#15

Pipet Nos.:

DF ---.1708 g → 100 ml --- .0504 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 7
Eff. Factor	0.50	0.38054	0.13971
Date	/ /	/ /	2/8/96
Total counts			518
Count time			60
Bkg C/M			.168
Bkg cnt time			900

LRB 2-9-96

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/8/96

Pacific Northwest Laboratory 96099

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) : ASR 0785

A.L.O. No. 96-02607-S Description : Pu-239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- .50%

Instrument	Ludlum 3
Eff. Factor	.4321
Date	2/ 9/ 96
Total counts	1017
Count time	60
Bkg C/M	.280
Bkg cnt time	900
Corrected C/M	16.67

771 dpm
− 635 dpm
136 dpm / 200.15 dpm
±72 = 68%
±52%
RJ 2-9-96

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	7.71E+02	6.8	1.09E+01
	uCi/ml	3.47E-04		4.92E-06

Data Entry by T Trang-Le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D. L. Sady Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

L36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02607-5 Description : 118.2A.F W-42-5 Pu 239

200.15 d/m/ml

Pipet Nos.:

DF --- .1688 g → 100 ml --- .05001 ml --- --- --- ---

#15 + .05001 ml

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/6/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum -3
Eff. Factor	0.50	0.38054	0.4321
Date	__/__/__	__/__/__	2/9/96
Total counts			1017
Count time			60
Bkg C/M			.280
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. 96-02607 Description : 118.2A.F

DF ---- .16880 ---> 100.00000 ---- .05001

Dilution Factor = 1.1846E+04 +/- 1.14%

Instrument	Ludlum 2
Eff. Factor	.4186
Date	2/ 9/ 96
Total counts	810
Count time	60
Bkg C/M	.214
Bkg cnt time	900
Corrected C/M	13.29

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	3.76E+05	7.5	5.85E+03
	uCi/g	1.69E-01 ✓		2.64E-03

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D. L. Stacy Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 K36499 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02607 Description : 118.2A.F

Pipet Nos.: #15

DF --- .1688 g → 100 ml --- .0500 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [illegible] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 2
Eff. Factor	0.50	0.38054	0.4186
Date	__/__/__	__/__/__	2/9/96
Total counts			810
Count time			60
Bkg C/M			.214
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/9/96

Pacific Northwest Laboratory 96099

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) : ASR 2785

A.L.O. No. 96-02607DUP-S Description : Pu-239 200.15 dpm/mL

DF .... .05001

Dilution Factor = 1.9996E+01 +/- .50%

Instrument	Ludlum 5
Eff. Factor	.4174
Date	2/ 9/ 96
Total counts	1113
Count time	60
Bkg C/M	.238
Bkg cnt time	900
Corrected C/M	18.31

877 dpm
−817 dpm ±RJ 2-9-96
260 dpm / 200.15 dpm
±74
= 130%
±29%
±RJ 2-9-96

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	8.77E+02	6.5	1.04E+01
	uCi/ml	3.95E-04		4.70E-06

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by S. K. Fadeg Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02607DUP-5 Description : 118.2A.F DUPLICATE Pu 239 W-N3-5

200.15 g/ml

Pipet Nos.:

DF ---.1570 g → 100 ml ---.05001 ml --- +.05001 ml 2ld --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 5
Eff. Factor	0.50	0.38054	0.4179
Date	__/__/__	__/__/__	2/9/96
Total counts			1113
Count time			60
Bkg C/M			.238
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/9/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. 96-02607DUP Description : 118.2A.F DUPLICATE

DF ---- .15700 ---> 100.00000 ---- .05001

Dilution Factor = 1.2736E+04 +/- 1.14%

Instrument	Ludlum 4
Eff. Factor	.4337
Date	2/ 9/ 96
Total counts	823
Count time	60
Bkg C/M	.342
Bkg cnt time	900
Corrected C/M	13.37

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/g	3.93E+05	7.5	7.65E+03
	uCi/g	1.77E-01 ✓		3.45E-03

Data Entry by T. Trang-Le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D. K. Fady Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02607DUP Description : 118.2A.F DUPLICATE

Pipet Nos.: #15

DF --- .1570 g → 100 ml --- .05001 ml --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. -	G.E. ASC.	Ludlum - 9
Eff. Factor	0.50	0.38054	0.4337
Date	/ /	/ /	2/9/96
Total counts			823
Count time			60
Bkg C/M	.	.	.342
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/9/96

Pacific Northwest Laboratory 96099

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-02609-S Description : Pu-239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- .50%

Instrument	Ludlum 7
Eff. Factor	.3971
Date	2/ 9/ 96
Total counts	847
Count time	60
Bkg C/M	.168
Bkg cnt time	900
Corrected C/M	13.95

702 dpm
− 382 dpm
320 dpm / 200.15 dpm
±63
= 160%
±20%

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	7.02E+02	7.3	9.25E+00
	uCi/ml	3.16E-04		4.17E-06

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D.K. Indy Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K 36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02609 -5 Description : 118.3A.F W-42-5 Pu 239 200.15 α/μ/mL

#15

Pipet Nos.: #15 .05001 ml old

DF ---.1130 → 100 ---.05001 --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

[signature] 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 7
Eff. Factor	0.50	0.38054	0.397
Date	/ /	/ /	2/9/96
Total counts			847
Count time			60
Bkg C/M	.	.	.168
Bkg cnt time			900

TTL 3/4/96

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/9/96

Pacific Northwest Laboratory

96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. 96-02609 Description : 118.3A.F

DF ---- .11300 ---> 100.00000 ---- .05001

Dilution Factor = 1.7696E+04 +/- 1.14%

Instrument	Ludlum 6
Eff. Factor	.4235
Date	2/ 9/ 96
Total counts	501
Count time	60
Bkg C/M	.257
Bkg cnt time	900
Corrected C/M	8.09

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	3.38E+05	9.5	9.46E+03
	uCi/g	1.52E-01 ✓		4.26E-03

Data Entry by T Trang-Le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by S. K. Fadeff Date 2/9/96

Pacific Northwest Laboratory

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02609 Description : 118.3A.F

#15

Pipet Nos.:

DF --- 1130 g → 100 ml --- .05001 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 6
Eff. Factor	0.50	0.38054	0.4235
Date	__/__/__	__/__/__	2/9/96
Total counts			501
Count time			60
Bkg C/M	.	.	.257
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/9/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. 96-02609DUP Description : 118.3A.F DUPLICATE

DF ---- .16120 ---> 100.00000 ---- .05001

Dilution Factor = 1.2404E+04 +/- 1.43%

Instrument	Ludlum 2
Eff. Factor	.4186
Date	2/ 9/ 96
Total counts	916
Count time	60
Bkg C/M	.214
Bkg cnt time	900
Corrected C/M	15.05

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/g	4.46E+05	7.2	6.13E+03
	uCi/g	2.01E-01 ✓		2.76E-03

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D.K. Adg Date 2/9/96

Pacific Northwest Laboratory

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02609DUP Description : 118.3A.F DUPLICATE

Pipet Nos.: #15

DF ---.1612 → 100 ml --- .05001 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ____	G.E. ASC.	Ludlum -2
Eff. Factor	0.50	0.38054	0.4186
Date	__/__/__	__/__/__	2/9/96
Total counts			916
Count time			60
Bkg C/M			.214
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96100

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) : ASR 2785

A.L.O. No. 96-02609DUP-S Description : Pu-239 200.15 dpm/ml

DF ---- .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	Ludlum 3
Eff. Factor	.4321
Date	2/ 9/ 96
Total counts	1256
Count time	60
Bkg C/M	.280
Bkg cnt time	900
Corrected C/M	20.65

956 dpm
− 719 dpm
237 dpm / 200.15 dpm
= 119%

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	9.56E+02	6.2	1.09E+01
	uCi/ml	4.31E-04		4.92E-06

Data Entry by T Trang-K Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D. K. Fadeff Date 2/9/96

Pacific Northwest Laboratory

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02609DUP - 5 Description : 118.3A.F DUPLICATE W-42-5 Pu 239 200.15 d/m/

Pipet Nos.:

DF ---.1612 g → 100 ml ← .05001 ml #15 + .05001 ml #15 ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 3
Eff. Factor	0.50	0.38054	0.4321
Date	/ /	/ /	2/9/96
Total counts			1256
Count time			60
Bkg C/M	.	.	.280
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96099

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : K36499 ARF(SOW) : AGR 2785

A.L.O. No. BLK-2785-1 Description :

DF .... .05001

Dilution Factor = 1.9996E+01 +/- .50%

Instrument	Ludlum 10
Eff. Factor	.4222
Date	2/ 8/ 96
Total counts	34
Count time	300
Bkg C/M	.304
Bkg cnt time	900
Corrected C/M	-.19

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	-9.03E+00	27.6	5.90E+00
	uCi/ml	-4.07E-06		2.66E-06 ✓

$\times \frac{100ml}{.1485g} = 1.79E-3 \frac{uCi}{g}$

Data Entry by T Tizang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by LRGreenwood Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

E36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : BLK-2785 -1 Description : Di H_2O

Pipet Nos.: #15

DF --- .05001 --- --- --- --- --- ---

ml

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 10
Eff. Factor	0.50	0.38054	0.4222
Date	__/__/__	__/__/__	2/8/96
Total counts			34
Count time			300
Bkg C/M	___.___	___.___	.304
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/8/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. BLK-2785 Description :

DF .... .09944

Dilution Factor = 1.0056E+01 +/- .50%

Instrument	Ludlum 3
Eff. Factor	.4321
Date	2/ 8/ 96
Total counts	119
Count time	600
Bkg C/M	.280
Bkg cnt time	900
Corrected C/M	-.08

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	-1.90E+00	60.8	2.22E+00
	uCi/ml	-8.56E-07		1.00E-06 ✓ X 100ml/1485g = 6.7E-4

TRL 2-9-96

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D.K. [illegible] Date 2/9/96

Pacific Northwest Laboratory

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 08/ 96 Work order : K36499 ARF(SOW) : STD-2785

A.L.O. No. : BLK-2785 Description : $DI H_2O$

Pipet Nos.: #8

DF --- .09944 --- --- --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst TG Pospal Date 2/8/96

Instrument	P.A.C. - ____	G.E. ASC.	Ludlum - 3
Eff. Factor	0.50	0.38054	0.4321
Date	__/__/__	__/__/__	2/8/96
Total counts			119
Count time			600
Bkg C/M			.280
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/8/96

Pacific Northwest Laboratory 96099

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. STD-2785-1 Description : Pu 239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- .50%

Instrument	Ludlum 7
Eff. Factor	.3971
Date	2/ 8/ 96
Total counts	268
Count time	60
Bkg C/M	.168
Bkg cnt time	900
Corrected C/M	4.30

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/ml	2.16E+02	12.7	9.25E+00
	uCi/ml	9.75E-05		4.17E-06

108%

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D.L. Fadeff Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

E36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : STD-2785 -1 Description : W-42-5 Pu 239 200.15 a/g/ml

Pipet Nos.: #15

DF --- .0500/ml --- --- --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst Ku Pappal Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 7
Eff. Factor	0.50	0.38054	0.43971
Date	/ /	/ /	2/8/96
Total counts			268
Count time			60
Bkg C/M	.	.	.168
Bkg cnt time			900

TTL 3/4/96

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/8/96

Pacific Northwest Laboratory 96100

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) : ASR 2785

A.L.O. No. 96-02619-S Description : Pu-239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	Ludlum 10
Eff. Factor	.4222
Date	2/ 9/ 96
Total counts	341
Count time	60
Bkg C/M	.304
Bkg cnt time	900
Corrected C/M	5.38

255 dpm
− 152 dpm
103 dpm / 200.15 dpm
±37
= 52%
±36%

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	2.55E+02	11.6	1.16E+01
	uCi/ml	1.15E-04		5.25E-06

Data Entry by T Trang-Le Date 8/9/96

Calculation and Analytical Data Sheet Reviewed by D. K. Jedy Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02619 -5 Description : FIELD BLANK.F W-N2-5 Pu 239 200.150 g/mL

Pipet Nos.: #15 #15 .05001 ml old

DF ---.05001 ml --- --- --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 10
Eff. Factor	0.50	0.38054	0.4222
Date	__/__/__	__/__/__	2/9/96
Total counts			341
Count time			60
Bkg C/M			.304
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Tiang-Le 2/9/96

Pacific Northwest Laboratory 96096

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : ARF(SOW) : ASR 2785

A.L.O. No. 96-02619 Description : FIELD BLANK.F

DF .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	Ludlum 8
Eff. Factor	.4355
Date	2/ 9/ 96
Total counts	219
Count time	60
Bkg C/M	.340
Bkg cnt time	900
Corrected C/M	3.31

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	1.52E+02	14.9	1.19E+01
	uCi/ml	6.85E-05		5.38E-06

Data Entry by T Trang-Le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by J. L. Fudge Date 2/9/96

Pacific Northwest Laboratory

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 07/ 96 Work order : L36499 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02619 Description : FIELD BLANK.F

Pipet Nos.: 715

DF .05001 --- --- --- --- ---

ml

Pipet checks are recorded on labsheets by pipet number

Analyst [illegible] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 8
Eff. Factor	0.50	0.38054	0.4355
Date	/ /	/ /	2/9/96
Total counts			219
Count time			60
Bkg C/M	.	.	.365
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/9/96

Pacific Northwest Laboratory 96099

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) : ASR 2785

A.L.O. No. 96-02611BLK-S Description : Pu 239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- .50%

Instrument	Ludlum 8
Eff. Factor	.4355
Date	2/ 9/ 96
Total counts	241
Count time	60
Bkg C/M	.340
Bkg cnt time	900
Corrected C/M	3.68

169 dpm
+ ~~5.43 dpm~~ 0 DK Fudge 2/9/96
174.43 dpm / 200.15 dpm
=

169/200.15 x100 = 84.4%

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	1.69E+02	14.1	1.19E+01
	uCi/ml	7.60E-05		5.38E-06

~~8~~ 8 ~~0~~ 0/0 TTL 2/9/96 JK 2/9/96

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D.K. Fudge Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02611BLK -5 Description : PROCESS BLANK + W-42-5 Pu 239 200.15 o/m/ml

#15

Pipet Nos.: #15 + .05001 old ml

DF ---.17895 → 100 --- .05001 --- --- --- ---

Avg x2 ml ml

Pipet checks are recorded on labsheets by pipet number

Analyst K G Poggard Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum -8
Eff. Factor	0.50	0.38054	0.4355
Date	__/__/__	__/__/__	2/9/96
Total counts			241
Count time			60
Bkg C/M	___.___	___.___	.340
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. 96-02611BLK Description : PROCESS BLANK

DF .... .17895 ---> 100.00000 .... .05001

Dilution Factor = 1.1174E+04 +/- 1.14%

Instrument	Ludlum 8
Eff. Factor	.4355
Date	2/ 8/ 96
Total counts	133
Count time	600
Bkg C/M	.340
Bkg cnt time	900
Corrected C/M	-.12

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	-3.04E+03	45.4	2.69E+03
	uCi/g	-1.37E-03		1.21E-03 ✓

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D.K. Jacobs Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K 36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02611BLK Description : PROCESS BLANK

Pipet Nos.: #5

DF ---.17895 → 100 --- 05001 --- --- --- ---

Avg ×2 ml ml

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 8
Eff. Factor	0.50	0.38054	0.4355
Date	__/__/__	__/__/__	2/8/96
Total counts			133
Count time			600
Bkg C/M	___.___	___.___	.340
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/8/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. 96-02611 Description : 119.1A.4

DF .... .18440 ---> 100.00000 .... .05001

Dilution Factor = 1.0844E+04 +/- 1.14%

Instrument	Ludlum 4
Eff. Factor	.4337
Date	2/ 9/ 96
Total counts	1058
Count time	60
Bkg C/M	.342
Bkg cnt time	900
Corrected C/M	17.29

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/g	4.32E+05	6.7	6.52E+03
	uCi/g	1.95E-01		2.94E-03

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D.K. Sedy Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 (K36499) ARF(SOW) : ASR 2785

A.L.O. No. : 96-02611 Description : 119.1A.4

Pipet Nos.: #15

DF --- .1844 g → 100 ml --- .05001 ml --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 4
Eff. Factor	0.50	0.38054	0.4337
Date	__/__/__	__/__/__	2/9/96
Total counts			1058
Count time			60
Bkg C/M			.342
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96100

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) : ASR 2785

A.L.O. No. 96-02611-S Description : Pu-239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	Ludlum 5
Eff. Factor	.4174
Date	2/ 9/ 96
Total counts	1612
Count time	60
Bkg C/M	.238
Bkg cnt time	900
Corrected C/M	26.63

1280 dpm
- 797 dpm
483 dpm / 200.15 dpm
±89
= 242%
±19%
JRL
2-9-96

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/ml	1.28E+03	5.6	1.04E+01
	uCi/ml	5.75E-04		4.70E-06

Data Entry by T Trang-Le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D.K. Fadeff Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02611 -5 Description : 119.1A.4 Pu 239 W-42-5 200.15 g/ml

#15 #15 .05001 ml std

Pipet Nos.:

DF --- .1844 g → 100 ml --- .05001 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 5
Eff. Factor	0.50	0.38054	0.4174
Date	__/__/__	__/__/__	2/9/96
Total counts			1612
Count time			60
Bkg C/M			.238
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96100

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) : ASR2785

A.L.O. No. 96-02611DUP-S Description : Pu-239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	Ludlum 3
Eff. Factor	.4321
Date	2/ 9/ 96
Total counts	1253
Count time	60
Bkg C/M	.280
Bkg cnt time	900
Corrected C/M	20.60

953 dpm
- 743.72 dpm
209.28 dpm / 200.15 dpm
= 105 %

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	9.53E+02	6.2	1.09E+01
	uCi/ml	4.29E-04		4.92E-06

Data Entry by T Trang-Le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D. K. Tady Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02611DUP - S Description : 119.1A.F DUPLICATE W-42-5 Pu 239 200.15 g/ml

#15

Pipet Nos.: #15 A .05001 ml old

DF --- .1735 g → 100 ml --- .05001 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 3
Eff. Factor	0.50	0.38054	0.4321
Date	/ /	/ /	2/9/96
Total counts			1253
Count time			60
Bkg C/M			.280
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trangle 2/9/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF JW) : ASR 2785

A.L.O. No. 96-02611DUP Description : 119.1A.F DUPLICATE

DF .... .17350 ---> 100.00000 .... .05001

Dilution Factor = 1.1525E+04 +/- 1.14%

Instrument	Ludlum 2
Eff. Factor	.4186
Date	2/ 9/ 96
Total counts	947
Count time	60
Bkg C/M	.214
Bkg cnt time	900
Corrected C/M	15.57

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	4.29E+05	7.0	5.70E+03
	uCi/g	1.93E-01 ✓		2.57E-03

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D.L. Fadeyi Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02611DUP Description : 119.1A.F DUPLICATE

#15

Pipet Nos.:

DF --- .1735 g → 100 ml --- .05001 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [illegible] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 2
Eff. Factor	0.50	0.38054	0.4186
Date	__/__/__	__/__/__	2/9/96
Total counts			947
Count time			60
Bkg C/M	.	.	.214
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02613-5 Description : 119.2A.4 W-42-5 Pu-239 200.15 d/m/ml

Pipet Nos.:

DF ---.1544 → 100 ml ---.05001 ml #15 ---+ .05001 ml #15 std ---

Pipet checks are recorded on labsheets by pipet number

Analyst K L Poppe Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 8
Eff. Factor	0.50	0.38054	0.4355
Date	__/__/__	__/__/__	2/9/96
Total counts			1181
Count time			60
Bkg C/M			.349
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-6 2/9/96

Pacific Northwest Laboratory 96100

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) : ASR 2785

A.L.O. No. 96-02613-S Description : Pu-239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	Ludlum 8
Eff. Factor	.4355
Date	2/ 9/ 96
Total counts	1181
Count time	60
Bkg C/M	.340
Bkg cnt time	900
Corrected C/M	19.34

888 dpm
− 685 dpm
203 dpm / 200.15 dpm
= 102%

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	8.88E+02	6.4	1.19E+01
	uCi/ml	4.00E-04		5.38E-06

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D.K. Sadey Date 2/9/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. 96-02613 Description : 119.2A.4

DF ---- .15440 ---> 100.00000 ---- .05001

Dilution Factor = 1.2951E+04 +/- 1.43%

Instrument	Ludlum 7
Eff. Factor	.3971
Date	2/ 9/ 96
Total counts	826
Count time	60
Bkg C/M	.168
Bkg cnt time	900
Corrected C/M	13.60

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	4.43E+05	7.5	5.99E+03
	uCi/g	2.00E-01 ✓		2.70E-03

Data Entry by T Trang-Le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D.K. Fadzy Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K30499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02613 Description : 119.2A.4

Pipet Nos.: #15

DF ---.1544 g → 100 ml --- .05001 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst K G Pospal Date 2/6/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum -7
Eff. Factor	0.50	0.38054	0.43971 TTL 3/4/96
Date	__/__/__	__/__/__	2/9/96
Total counts			826
Count time			60
Bkg C/M			.168
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/9/96

Pacific Northwest Laboratory 96 00

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. STD-2785-2 Description : Pu-239 200.15 dpm/ml

DF .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	Ludlum 1
Eff. Factor	.4227
Date	2/ 9/ 96
Total counts	269
Count time	60
Bkg C/M	.290
Bkg cnt time	900
Corrected C/M	4.19

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	1.98E+02	13.1	1.14E+01
	uCi/ml	8.94E-05		5.12E-06

<9%

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D. K. Shelly Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : STD-2785 -2 Description : W-42-5 Pu 234 200.15 α/m/ml

Pipet Nos.: #15

DF --- .05001 --- --- --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 1
Eff. Factor	0.50	0.38054	0.4227
Date	__/__/__	__/__/__	2/9/96
Total counts			269
Count time			60
Bkg C/M			.290
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96099

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. BLK-2785-2 Description :

DF .... .05001

Dilution Factor = 1.9996E+01 +/- .50%

Instrument	Ludlum 5
Eff. Factor	.4174
Date	2/ 8/ 96
Total counts	92
Count time	600
Bkg C/M	.238
Bkg cnt time	900
Corrected C/M	-.08

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	-4.06E+00	52.9	4.22E+00
	uCi/ml	-1.83E-06		1.90E-06 ✓ $\times \frac{100\,ml}{0.17895\,g} = 1.1E-3\ \frac{uCi}{g}$

JRM 2-9-96

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by D. L. Fady Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421 2/8/96

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : BLK-2785 -2 Description : N.H2O

Pipet Nos.: #15

DF --- 05001 --- --- --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [illegible] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 5
Eff. Factor	0.50	0.38054	0.4174
Date	__/__/__	__/__/__	2/8/96
Total counts			92
Count time			600
Bkg C/M			.238
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/8/96

Pacific Northwest Laboratory 96099

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 8/ 96 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. 96-2848BLK Description : PROCESS BKANK

DF .... .09944

Dilution Factor = 1.0056E+01 +/- 1.00%

Instrument	Ludlum 4
Eff. Factor	.4337
Date	2/ 8/ 96
Total counts	234
Count time	600
Bkg C/M	.342
Bkg cnt time	900
Corrected C/M	.05

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/ml	1.11E+00	131.1	2.44E+00
	uCi/ml	5.01E-07		1.10E-06 ✓

Avg.

$X \sim \frac{14.3}{3.4} \frac{ml}{g} = 4.63E-6 \frac{\mu Ci}{g}$

LRG 2-21-96

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by LRGreenwood Date 2-9-96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 08/ 96 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. : 96-2848BLK Description : PROCESS BKANK

#8

Pipet Nos.:

DF --- see hot cell prep --- .09944 ml ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 4
Eff. Factor	0.50	0.38054	0.4337
Date	/ /	/ /	2/8/96
Total counts			234
Count time			600
Bkg C/M	.	.	.342
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/8/96

Pacific Northwest Laboratory 96100

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2848BLK-S Description : Pu-239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	Ludlum 7
Eff. Factor	.3971
Date	2/ 9/ 96
Total counts	242
Count time	60
Bkg C/M	.168
Bkg cnt time	900
Corrected C/M	3.87

195 dpm
− 1.11 dpm
194 dpm / 200.15 dpm
= 97%

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	1.95E+02	13.4	9.25E+00
	uCi/ml	8.77E-05		4.17E-06

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by LRGreenwood Date 2-9-96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36455

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02513 Description : 119.2A.4

Pipet Nos.: #15

DF ---.1544 g → 100 ml --- .06001 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst KG Poppel Date 2/5/96

Instrument	P.A.C. -	G.E. ASC.	Ludlum -7	TR 3/4/96
Eff. Factor	0.50	0.38054	0.13971	
Date	/ /	/ /	2/9/96	
Total counts			826	
Count time			60	
Bkg C/M	.	.	.168	
Bkg cnt time			900	

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang.le 2/9/96

Pacific Northwest Laboratory 96099

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 8/ 96 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. 96-2848 Description : 118.ADL.D

DF .... 3.21450 ...> ~~14.48640~~ .... .09944 -+-> 5.04743 .... .05001
g 14.5722
JRG 2-26-96

Dilution Factor = 4.6641E+03 +/- 1.81%

Instrument	Ludlum 8
Eff. Factor	.4355
Date	2/ 9/ 96
Total counts	28
Count time	60
Bkg C/M	.340
Bkg cnt time	900
Corrected C/M	.13

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	1.36E+03	139.8	2.78E+03
	uCi/g	6.11E-04		~~1.25E-03~~ 1.26E-3 JRG 2-26-96

Data Entry by T Tsang-Lo Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by J R Greenwood Date 2/9/96

Pacific Northwest Laboratory

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 08/ 96 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. : 96-2848 Description : 118.ADL.D

Pipet Nos.:	4.69X	#8	#16	#15
DF	see hot cell prep	.09944 ml	5.04743 ml	.05001 ml

Pipet checks are recorded on labsheets by pipet number

Analyst K C Pippel Date 2/8/96

Instrument	P.A.C. -	G.E. ASC.	Ludlum -8
Eff. Factor	0.50	0.38054	0.4358
Date	/ /	/ /	2/9/96
Total counts			28
Count time			60
Bkg C/M			.360
Bkg cnt time			900

Alpha Energy Analysis Det. # A

Filename

Analyst T Trangle 2/9/96

Pacific Northwest Laboratory 96100

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) : ASR 2785

A.L.O. No. 96-2848-S Description : Pu-239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	Ludlum 10
Eff. Factor	.4222
Date	2/ 9/ 96
Total counts	292
Count time	60
Bkg C/M	.304
Bkg cnt time	900
Corrected C/M	4.56

216 dpm
− 5.82 dpm
210 dpm / 200.15 dpm
= 105 %

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/ml	2.16E+02	12.6	1.16E+01
	uCi/ml	9.73E-05		5.25E-06

Data Entry by T Tuang-La Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by LRGreenwood Date 2-9-96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 08/ 96 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. : 96-2848 -5 Description : 118.ADL.D W-42-5 Pu 239 200.15 a/-1 ml

Pipet Nos.: 4.69 X #8 #16 #15 #15 .05001 ml

DF see hot cell prep .09944 ml → 5.04743 ml - .05001 ml

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 19
Eff. Factor	0.50	0.38054	0.4222
Date	/ /	/ /	2/9/96
Total counts			292
Count time			60
Bkg C/M			.304
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96100

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2850 Description :

DF .... 3.59540 ---> ~~14.28520~~ .... .09944 -+-> 5.04743 .... .05001

g 14.5822 JRG 2-26-96

Dilution Factor = 4.1121E+03 +/- 1.81%

Instrument	Ludlum 3
Eff. Factor	.4321
Date	2/ 9/ 96
Total counts	33
Count time	60
Bkg C/M	.280
Bkg cnt time	900
Corrected C/M	.27

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/g	2.57E+03	70.7	2.25E+03
	uCi/g	1.16E-03		~~1.01E-03~~ ✓ 1.03E-3 JRG 2-26-96

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by LR Greenwood Date 2-10-96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 08/ 96 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. : 96-4850 a TTL 2/9/96 Description : 118.3DL.D

Pipet Nos.: 4.25 X #8 #16 #15

DF see hot cell prep .09944 → 5.04743 .05001

Pipet checks are recorded on labsheets by pipet number

Analyst Ta Poppel Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 3
Eff. Factor	0.50	0.38054	0.4321
Date	__/__/__	__/__/__	2/9/96
Total counts			~~29~~ 33 TTL 2/9/96
Count time			60
Bkg C/M			.280
Bkg cnt time			~~200~~ 900 TTL 2/9/96

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96100

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-02850-S Description : Pu-239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	Ludlum 4
Eff. Factor	.4334
Date	2/ 9/ 96
Total counts	311
Count time	60
Bkg C/M	.342
Bkg cnt time	900
Corrected C/M	4.84

223 dpm
− 12.49 dpm
210.51 dpm / 200.15 dpm
= 106%

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	2.23E+02	12.2	1.20E+01
	uCi/ml	1.01E-04		5.42E-06

Data Entry by T Tuang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by L A Sherwood Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

K36499

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02615DUP -5 Description : 119.3A.F DUPLICATE W-42-5 Pm 239 200.15 [illegible]

Pipet Nos.: #15 #15

DF --- .1607 g → 100 ml --- .05001 ml --- + .05001 ml std --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 7
Eff. Factor	0.50	0.38054	0.43971
Date	__/__/__	__/__/__	2/9/96
Total counts			810
Count time			60
Bkg C/M	___.___	___.___	.168
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 08/ 96 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. : 96-2848BLK -5 Description : PROCESS BKANK W-42-5 Pu 239 200.15 -1 mg/ml

#15

Pipet Nos.: A .05001 std ml

DF ---see hot cell prep --- .09944 ml --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum -7
Eff. Factor	0.50	0.38054	0.43971
Date	/ /	/ /	2/9/96
Total counts			242
Count time			60
Bkg C/M			.168
Bkg cnt time			900

TTL 3/4/96

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 08/ 96 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. : 96-~~4~~850-5 2 TTC 2/9/96 Description : 118.3DL.D W-43-5 Pu 239 200.15 a/m/ml #15

Pipet Nos.: 425 x #8 #16 #15 + .05001 ml std

DF see hot cell prep _ .09944 → 5.04743 _ .05001 ml

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 4
Eff. Factor	0.50	0.38054	0.4337
Date	__/__/__	__/__/__	2/9/96
Total counts			~~300~~ 311 TTC 2/9/96
Count time			60
Bkg C/M			.342
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96100

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2850DUP Description :

DF ---- 3.59540 ---> ~~14.28520~~ ---- .09944 -+-> 5.04743 ---- .05001

8 14.5822 JRG 2-26-96

Dilution Factor = 4.1121E+03 +/- 1.81%

Instrument	Ludlum 1
Eff. Factor	.4227
Date	2/ 9/ 96
Total counts	26
Count time	60
Bkg C/M	.290
Bkg cnt time	900
Corrected C/M	.14

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/g	1.39E+03	118.8	2.34E+03
	uCi/g	6.28E-04		~~1.05E-03~~ ✓ 1.07E-3 JRG 2-26-96

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by LR Greenwood Date 2-9-96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 08/ 96 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. : 96-4850 Description : 118.3DL.D Duplicate

2 TTL 2/9/96

Pipet Nos.: 4.25X #8 #14 #15

DF --- see hot cell prep ---.09944 ml → 5.04743 ml --.05001 ml

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 1
Eff. Factor	0.50	0.38054	0.4227
Date	__/__/__	__/__/__	2/9/96
Total counts			26
Count time			60
Bkg C/M			.290
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96100

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-02850DUP-S Description : Pu-239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	Ludlum 2
Eff. Factor	.4186
Date	2/ 9/ 96
Total counts	277
Count time	60
Bkg C/M	.290
Bkg cnt time	900
Corrected C/M	4.33

207 dpm
− 6.78 dpm
200.12 dpm / 200.15 dpm
= 100%

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	2.07E+02	12.9	1.15E+01
	uCi/ml	9.31E-05		5.17E-06

Data Entry by T Trang-le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by L R Sherwood Date 2-9-96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 08/ 96 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. : 96-4850 -5 Description : 118.3DL.D W-42-5 Pu 239 200.15 cm/min

Dup 2 TTL 2/9/96

Pipet Nos.: 4.25 x #18 #14 #15 #15

DF see hot cell prep -.09944 +> 5.04743 -.05001 +.05001

Pipet checks are recorded on labsheets by pipet number

Analyst K.A. Poppel Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 2
Eff. Factor	0.50	0.38054	0.4186
Date	__/__/__	__/__/__	2/9/96
Total counts			~~266~~ 277 TTL 2/9/96
Count time			60
Bkg C/M			.290
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 2/9/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. STD-2785 Description : Pu-239 200.15 dpm/ml

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	Ludlum 6
Eff. Factor	.4235
Date	2/ 9/ 96
Total counts	268
Count time	60
Bkg C/M	.257
Bkg cnt time	900
Corrected C/M	4.21

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/ml	1.99E+02	13.0	1.07E+01
	uCi/ml	8.95E-05		4.82E-06

100%

Data Entry by T Trang-Le Date 2/9/96

Calculation and Analytical Data Sheet Reviewed by L R Sherwood Date 2/9/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 02/ 08/ 96 Work order : K36499 ARF(SOW) : STD-2785

A.L.O. No. : STD-2785 Description : W-42-S Pu 239 200.15 a/m/ml

#15

Pipet Nos.:

DF --- .0500/ ml --- --- --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 2/8/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 6
Eff. Factor	0.50___	0.38054	0.4235
Date	__/__/__	__/__/__	2/9/96
Total counts			268
Count time			60
Bkg C/M	___.___	___.___	.257
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 2/9/96

Hot Cell Dilution Check

96-2850

Sample = 3.5954 g = 3.0995 ml (SpG = 1.16)

DIW + Acid = 15.2783 g

DIW = 10.9822 g = 10.9822 ml (SpG = 1.00)

HNO_3 Acid = 0.7007 g = ~~0.4810~~ 0.5005 ml (SpG = 1.40) HNO_3

11.4827 ml

14.5822 ml

96-2848	g	ml	(SpG)
Sample =	3.2145 g	= 2.8959	(1.11)
DIW =	11.1782	= 11.1782	1.00
HNO_3 =	0.6973	= 0.4981	1.40
	15.0900 g	14.5722 ml	

Values can be corrected for mixed soln.

J Sherwood
2-9-96

Batch 3

Matrix Spikes

96-2848 Blk 97 %

96-2848 105 %

96-2850 106 %

96-2850 Dup 100 %

mean = 102 %

std Dev = ± 5 %

Battelle Pacific Northwest Laboratories
Analytical Chemistry Laboratory
Shielded Analytical Laboratory

Shielded Analytical Laboratory
Bench Sheet

Client: KL SILVERS WP Number: K28794

TI#/ARF: TI96-PM-06/ASR 2785 Procedure: BENCH INSTRUCTION

96-02848 DRAINABLE LIQUD; 96-02850 DRAINABLE LIQUID
SAMPLE IDENTIFICATION

Acidification for total alpha and ICP

Sample Id	Gross Vial Tare	Gross DIW wgt	Gross Sample wgt	Gross Acid Wgt
96-02848-BLK	13.1041	27.2721	XXX	27.9572
96-02848	13.1752	24.3534	27.5679	28.2652
96-02850	13.2247	24.2069	27.8023	28.5030

Weighed all additions of DIW, sample & acid. Mixed well and took out all of sample to labs 309, and 405 for Rad chem & ICP analyses.

HNO_3 Acid sp. gr. = 1.40 C118 Seg 1 ADL = 1.11 T=25°C

DIW SpG = 1.00 C118 Seg 3 DL = 1.16

M&TE:

X Mettler AE160 (360-06-01-016) Mettler AE200 (362-06-01-038) ___

___ Sartorius R200D (360-06-01-024) Corning pH Meter Model 240 S/N 6629 ___

Analyst: Date: 2/7/96 Reviewer: Date: 2/7/96

D3 - GEA

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DATE TO QC: 03/20/96 WHC-SD-WM-DP-170, REV. 1

DATA QUALITY REVIEW

I have reviewed the following data for completeness and for compliance with project requirements.

Analyte - GEA

Data Package/Report - BX-112

Project No. - 22762

ACL Numbers - 96-2617, 96-2618, 96-2619

PNL ~~ACL~~ Quality Representative

3/28/96

Date

3/28/96

DATE TO QC: 03/19/96

DATA QUALITY REVIEW

I have reviewed the following data for completeness and for compliance with project requirements.

Analyte - Total Alpha

Data Package/Report - BX-112

Project No. - 22762

ACL Numbers - 96-2617, 96-2618, 96-3365

PNL ACL Quality Representative

3/28/96
Date

3/28/96

Table 3.1: Tank 241-BX-112 Cores 118,119 Total Alpha Results

ALO #	CORE ID	Total Alpha uCi/g	+/-% Error	Spike Recovery %	95% Confidence Value, uCi/g (1)
96-2617	PROCESS BLANK	<5.7E-4		61%	
96-2617	118.COMP.F	2.45E-01	13%	85%	3.25E-01
96-2617-DUP	118.COMP.F DUP	2.15E-01	14%	83%	
	RPD	13.0%			
96-2618	119.COMP.F	2.42E-01	13%	85%	3.01E-01
96-2618-DUP	119.COMP.F DUP	2.58E-01	12%	103%	
	RPD	6.4%			
96-3365	118.1A.F	1.82E-01	6%	70%	2.41E-01
96-3365-DUP	118.1A.F DUP	1.98E-01	5%	61%	
	RPD	8.4%			
	LAB BLANK	<6.8E-4			
	LAB STANDARD	85%			

Note (1) Notification Limit = 41 uCi/g

Table 3.2: Tank 241-BX-112 Cores 118,119 Total Alpha Results

ALO #	CORE ID	ANALYSIS BATCH	Total Alpha uCi/g	+/-% Error	95% Confidence Value, uCi/g (1)
96-2605	PROCESS BLANK	1	<2.E-3		
96-2605	118.1AA.F	1	1.52E-01	14%	1.67E-01
96-2605	118.1AA.F DUP	1	1.56E-01	15%	
	RPD		2.6%		
96-2607	118.2A.F	1	1.65E-01	8%	1.80E-01
96-2607	118.2A.F DUP	1	1.69E-01	8%	
	RPD		2.4%		
96-2609	118.3A.F	1	1.79E-01	15%	2.38E-01
96-2609	118.3A.F DUP	1	1.95E-01	8%	
	RPD		8.6%		
	LAB BLANK	1	<2.E-3		
	LAB STANDARD	1	114%		
	SAMPLE SPIKE	1	85%		
96-2611	PROCESS BLANK	2	<2.E-3		
96-2611	119.1A.4	2	1.92E-01	7%	2.13E-01
96-2611	119.1A.4 DUP	2	1.84E-01	7%	
	RPD		4.3%		
96-2613	119.2A.4	2	1.89E-01	8%	1.89E-01
96-2613	119.2A.4 DUP	2	1.89E-01	8%	
	RPD		0.0%		
96-2615	119.3A.F	2	1.61E-01	8%	2.12E-01
96-2615	119.3A.F DUP	2	1.75E-01	8%	
	RPD		8.3%		
	LAB BLANK	2	<2.E-3		
	LAB STANDARD	2	110%		
	AVERAGE SPIKE	2	108%		
96-2619	FLD-BLANK.F	1	5.00E-5	38%	
96-2848	PROCESS BLANK	3	<2.E-6		
96-2848	118.1ADL.D	3	<2.E-3		
96-2850	118.3DL.D	3	<2.E-3		
96-2850	118.3DL.D DUP	3	<2.E-3		
	LAB STANDARD	3	100%		
	AVERAGE SPIKE	3	102%		

Note (1) Notification Limit = 41 uCi/g

Pacific Northwest Laboratory 96123

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SDW) : ASR 2785 (2889)

A.L.O. No. 96-2617B Description : PROCESS BLANK

DF ---- .22530 ---> 100.00000 ---- .09944

Dilution Factor = 4.4635E+03 +/- 1.43%

Instrument	Ludlum 3
Eff. Factor	.4321
Date	3/ 15/ 96
Total counts	40
Count time	180
Bkg C/M	.192
Bkg cnt time	900
Corrected C/M	.03

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	3.12E+02	246.8	1.25E+03
	uCi/g	1.41E-04		5.65E-04

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Sheerwood Date 3/15/96

Pacific Northwest Laboratory

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order K36499 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2617B Description : PROCESS BLANK

Pipet Nos.: #8

DF --- .2253 g Avg X2 → 100 ml --- .09944 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst Ta Pappal Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 3
Eff. Factor	0.50	0.38054	0.4321
Date	__/__/__	__/__/__	3/15/96
Total counts			40
Count time			180
Bkg C/M			.192
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-Le 3/15/96

Pacific Northwest Laboratory 96125

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : K36499ARF(SOW) : ASR 2785

A.L.O. No. 96-2617B + STD Description : 1.424 E5 dpm/ml

DF .... .09944 ---> 10.00000 .... .09944

Dilution Factor = 1.0113E+03 +/- 1.73%

Instrument	Ludlum 4
Eff. Factor	.4337
Date	3/ 15/ 96
Total counts	2248
Count time	60
Bkg C/M	.321
Bkg cnt time	900
Corrected C/M	37.15

8.66E4 / 1.0113E3 = 8.56E1
− 3.12E2 / 4.4635E3 = 6.99E-2
8.55E1 ✓
1.0113E3
8.65E4 /
1.424E5
61 %

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	8.66E+04	5.2	5.89E+02
	uCi/ml	3.90E-02		2.65E-04

Data Entry by T Trang Le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by LR Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order K36499 ARF(SOW) : ASR 2785 (2889)

Std +

A.L.O. No. : 96-2617B Description : PROCESS BLANK + W-92-2 Pu 239 1.424E5 d/m/ml

Pipet Nos.:

#8 #8

DF ---, 2253 → 100 --- .09944 + .09944 → 10 - .09944

g ml ml ml ml ml std

Avg x̄ 2 sample

Pipet checks are recorded on labsheets by pipet number

Analyst Ya Pappal Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 4
Eff. Factor	0.50	0.38054	0.4337
Date	/ /	/ /	3/15/96
Total counts			2248
Count time			60
Bkg C/M			.321
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 3/15/96

Pacific Northwest Laboratory 96125

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : K3699 ARF(SOW) : ASR 2785

A.L.O. No. 96-2617 Description :

DF .... .21180 ---> 100.00000 .... .09944 -+-> .99492 .... .09944

Dilution Factor = 5.2253E+04 +/- 2.01%

Instrument	Ludlum 5
Eff. Factor	.4174
Date	3/ 15/ 96
Total counts	274
Count time	60
Bkg C/M	.227
Bkg cnt time	900
Corrected C/M	4.34

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	5.43E+05	12.9	2.67E+04
	uCi/g	2.45E-01		1.20E-02

Data Entry by T Trang-Le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order : K36499 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2617 Description : 118.COMP.F

Pipet Nos.: #18 #14 #18 ~~#14 3/14/96~~

DF ... .2118 g → 100 µl ... .09944 µl → .99492 µl .09944 µl ~~.09944~~

sample

Pipet checks are recorded on labsheets by pipet number

Analyst Ya Poeppel Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 5
Eff. Factor	0.50	0.38054	0.4174
Date	/ /	/ /	3/15/96
Total counts			274
Count time			60
Bkg C/M			227
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 3/15/96

Pacific Northwest Laboratory 96125

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : K36499 ARF(SOW) : ASK 2785

A.L.O. No. 96-2617 + STD Description : 1.424E5 dpm/ml

DF .... .09944 ---> 10.00000 .... .09944

Dilution Factor = 1.0113E+03 +/- 1.73%

Instrument	Ludlum 6
Eff. Factor	.4235
Date	3/ 15/ 96
Total counts	3307
Count time	60
Bkg C/M	.233
Bkg cnt time	900
Corrected C/M	54.88

1.31E5 / 1.0113E3 = 1.30E2
-5.43E5 / 5.2253E4 = 1.04E1
1.20E2 *
1.0113E3
1.21E5 /
1.424E5
85%

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	1.31E+05	4.6	5.15E+02
	uCi/ml	5.90E-02		2.32E-04

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Sherwood Date 3/15/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order : K36499 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2617 Description : 118.COMP.F std + W-92-2 Pu 239 1.424E5 d/m/ml

Pipet Nos.: #8 #14 #8 #14 #8

DF ---.2118 g → 100 ml --- .09944 ml → .99492 ml .09944 ml sample + .09944 ml → 10 ml - .09944 ml std

Pipet checks are recorded on labsheets by pipet number

Analyst Ka Poeppel Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum -6
Eff. Factor	0.50	0.38054	0.4235
Date	__/__/__	__/__/__	3/15/96
Total counts			3307
Count time			60
Bkg C/M			.233
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 3/15/96

Pacific Northwest Laboratory 96123

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 3/ 11/ 96 Work order : K3649 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2617D Description : 118.COMP.F DUPLICATE

DF .... .23880 ---> 100.00000 .... .09944 -+-> .99492 .... .09944

Dilution Factor = 4.6345E+04 +/- 2.01%

Instrument	Ludlum 7
Eff. Factor	.3971
Date	3/ 15/ 96
Total counts	254
Count time	60
Bkg C/M	.150
Bkg cnt time	900
Corrected C/M	4.08

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	4.77E+05	13.2	2.03E+04
	uCi/g	2.15E-01		9.13E-03

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/15/96

Pacific Northwest Laboratory

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order : K36499 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2617D Description : 118.COMP.F DUPLICATE

Pipet Nos.:

DF ---.2388 g → 100 ml --- .09944 ml → .99492 ml .09944 ml ---

#8 #14 #8 sample

Pipet checks are recorded on labsheets by pipet number

Analyst K A Pappel Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum -7
Eff. Factor	0.50	0.38054	0.43971 TTL 3/15/96
Date	__/__/__	__/__/__	3/15/96
Total counts			254
Count time			60
Bkg C/M			.150
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 3/15/96

Pacific Northwest Laboratory 96125

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : K3649 99 ARF(SOW) : ASR 2785

A.L.O. No. 96-2617D + STD Description : 1.424 E5 dpm/ml

DF .... .09944 ---> 10.00000 .... .09944

Dilution Factor = 1.0113E+03 +/- 1.73%

Instrument	Ludlum 8
Eff. Factor	.4355
Date	3/ 15/ 96
Total counts	3290
Count time	60
Bkg C/M	.279
Bkg cnt time	900
Corrected C/M	54.55

1.27E5 / 1.0113E3 = 1.26 E2
− 4.77 E5 / 4.6345 E4 = 1.03 E1
1.16 E2 *
1.0113 E3
1.17 E5 /
1.424 E5
83%

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	1.27E+05	4.6	5.47E+02
	uCi/ml	5.71E-02		2.47E-04

Data Entry by T Trang-Le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Freeman Date 3/15/96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order : K36499 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-26170 +STD Description : 118.COMP.F DUPLICATE W-93-2 Pu 239 1.424E5 d/-

Pipet Nos.: #8 #14 #8 + #8 #8

DF ---.2388 g → 100 ml ---.09944 ml → .99492 ml .09944 ml sample ---.09944 ml --- → 10 ml - .09944 ml std

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum -8
Eff. Factor	0.50	0.38054	0.4355
Date	/ /	/ /	3/15/96
Total counts			3290
Count time			60
Bkg C/M			279
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 3/15/96

Pacific Northwest Laboratory 96123

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 3/ 11/ 96 Work order : K3649 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2618 Description : 119.COMP.F

DF .... .21260 ---> 100.00000 .... .09944 -+-> .99492 .... .09944

Dilution Factor = 5.2056E+04 +/- 2.01%

Instrument	Ludlum 8
Eff. Factor	.4355
Date	3/ 15/ 96
Total counts	286
Count time	60
Bkg C/M	.279
Bkg cnt time	900
Corrected C/M	4.49

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	5.36E+05	12.7	2.82E+04
	uCi/g	2.42E-01		1.27E-02

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order : ~~M33K-0~~ K36499 3/14/96 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2618 Description : 119.COMP.F

Pipet Nos.: #8 #14 #8

DF ... .2126 g → 100 ml ... .09944 ml → .99492 ml .09944 ml ... ---

Pipet checks are recorded on labsheets by pipet number

Analyst Ka Peppel Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum -8
Eff. Factor	0.50	0.38054	0.4355
Date	__/__/__	__/__/__	3/15/96
Total counts			286
Count time			60
Bkg C/M			.279
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 3/15/96

Pacific Northwest Laboratory 96125

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. 96-2618 + STD Description : 1.424 E5 dpm/ml

DF .... .09944 ---> 10.00000 ---- .09944

Dilution Factor = 1.0113E+03 +/- 1.73%

Instrument	Ludlum 10
Eff. Factor	.4222
Date	3/ 15/ 96
Total counts	3272
Count time	60
Bkg C/M	.310
Bkg cnt time	900
Corrected C/M	54.22

1.30 E5 / 1.0113 E3 = 1.29 E2
− 5.36 E5 / 5.2056 E4 = 1.03 E1
1.19 E2 *
1.0113 E3
1.20 E5 /
1.424 E5
85%

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/ml	1.30E+05	4.6	5.95E+02
	uCi/ml	5.85E-02		2.68E-04

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order K36499 3/14/96 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2618 Std + 3/14/96 Description : 119.COMP.F W-92-2 1.424ES d/m/ml Pu 239

Pipet Nos.:

DF --- .2126 g → 100 ml --- .09944 ml #8 → .99492 ml #14 --- .09944 ml #8 sample --- + .09944 #8 → 10 --- - .09944 ml #8 std

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 10
Eff. Factor	0.50	0.38054	0.4222
Date	/ /	/ /	3/15/96
Total counts			3272
Count time			60
Bkg C/M			.310
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 3/15/96

Pacific Northwest Laboratory 96123

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 3/ 11/ 96 Work order : C36499 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2618D Description : 119.COMP.F DUPLICATE

DF ---- .26070 ---> 100.00000 ---- .09944 -+-> .99492 ---- .09944

Dilution Factor = 4.2452E+04 +/- 2.01%

Instrument	Ludlum 9
Eff. Factor	.4282
Date	3/ 15/ 96
Total counts	367
Count time	60
Bkg C/M	.333
Bkg cnt time	900
Corrected C/M	5.78

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	5.73E+05	11.3	2.55E+04
	uCi/g	2.58E-01		1.15E-02

Data Entry by T Trang-Le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order : K36499 ~~A LD~~ 3/14/96 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2618D Description : 119.COMP.F DUPLICATE

Pipet Nos.: #8 #14 #8

DF --- .2607 → 100 --- .09944 → .99492 — .09944 --- ---

g ml ml ml ml

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 9
Eff. Factor	0.50	0.36054	0.4282
Date	/ /	/ /	3/15/96
Total counts			367
Count time			60
Bkg C/M			.333
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 3/15/96

Pacific Northwest Laboratory 96125

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. 96-2618D + STD Description : 1.424 E5 dpm/ml

DF .... .09944 ---> 10.00000 .... .09944

Dilution Factor = 1.0113E+03 +/- 1.73%

Instrument	Ludlum 10
Eff. Factor	.4222
Date	3/ 15/ 96
Total counts	4014
Count time	60
Bkg C/M	.310
Bkg cnt time	900
Corrected C/M	66.59

1.60E5 / 1.0113E3 = 1.58 E2
-5.73E5 / 4.2452 E4 = 1.35 E1

1.45 E2 *
1.0113 E3

1.46 E5 /
1.424 E5

103%

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	1.60E+05	4.3	5.95E+02
	uCi/ml	7.18E-02		2.68E-04

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order : K36499 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2618D Std + Description : 119.COMP.F DUPLICATE W-92-2 Pu 239 1.424ES d/m/m

Pipet Nos.:

DF ... .2607 g → 100 — .09944 ml #8 → .99492 ml #14 — .09944 ml #8 sample ... + .09944 ml #8 → 10 ml — .09944 ml #8 std

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 10
Eff. Factor	0.50	0.38054	0.4222
Date	/ /	/ /	3/15/96
Total counts			4014
Count time			60
Bkg C/M	.	.	.310
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 3/15/96

Pacific Northwest Laboratory 96123

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-3365 Description : 118.1A.F

DF .... .21230 ---> 100.00000 .... .09944

Dilution Factor = 4.7368E+03 +/- 1.43%

Instrument	Ludlum 1
Eff. Factor	.4227
Date	3/ 15/ 96
Total counts	2181
Count time	60
Bkg C/M	.354
Bkg cnt time	900
Corrected C/M	36.00

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/g	4.03E+05	5.1	2.97E+03
	uCi/g	1.82E-01		1.34E-03

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order : K36499 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-3365 Description : 118.1A.F

Pipet Nos.: #8

DF ---.2123 g → 100 ml ---.09944 ml --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [illegible] Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 1
Eff. Factor	0.50	0.38054	0.4227
Date	__/__/__	__/__/__	3/15/96
Total counts		TTL 3/15/96	~~2243~~ ~~2190~~
Count time			60
Bkg C/M			.354
Bkg cnt time			900

TTL 3/15/96 2181

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang.le 3/15/96

Pacific Northwest Laboratory 96125

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS TTL 3/15/96 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-3365~~DUP~~ + STD Description : 1.424 E5 dpm/ml

DF .... .09944 ---> 10.00000 .... .09944

Dilution Factor = 1.0113E+03 +/- 1.73%

Instrument	Ludlum 4
Eff. Factor	.4337
Date	3/ 15/ 96
Total counts	4786
Count time	60
Bkg C/M	.321
Bkg cnt time	900
Corrected C/M	79.45

1.85E5 / 1.0113E3 = 1.83E2
-4.03E5 / 4.7368E3 = 8.51E1
9.79E1 *
1.0113E3
9.90E4 /
1.424E5
70%
± 11%
LRG
3-15-96

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/ml	1.85E+05	4.2	5.89E+02
	uCi/ml	8.34E-02		2.65E-04

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by LR Greenstreet Date 3/15/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order : K36499 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-3365 Description : 118.1A.F W-92-2 1.424E5 d/m/ml Pu 239

Pipet Nos.:

DF --- .0123 → 100 ml --- .09944 ml sample --- + .09944 ml ~~std~~ 3/14/96 --- → 10 - .09944 ml std ---

Pipet checks are recorded on labsheets by pipet number

Analyst Y A Poeppel Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 4
Eff. Factor	0.50	0.38054	0.4337
Date	/ /	/ /	3/15/96
Total counts			~~2196~~ ~~2243~~ TTL 3/15/96 4786
Count time		TTL 3/15/96	60
Bkg C/M			.324
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trangle 3/15/96

Pacific Northwest Laboratory 96125

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : K36499ARF(SOW) : ASK2785

A.L.O. No. 96-3365 DUP Description : 118.1A.F Duplicate

DF .... .22990 ---> 100.00000 .... .09944

Dilution Factor = 4.3742E+03 +/- 1.43%

Instrument	Ludlum 6
Eff. Factor	.4235
Date	3/ 15/ 96
Total counts	2572
Count time	60
Bkg C/M	.233
Bkg cnt time	900
Corrected C/M	42.63

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/g	4.40E+05	4.8	2.23E+03
	uCi/g	1.98E-01		1.00E-03

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order : K36499 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : ~~96-3365d~~ 3365 Dup Description : 118.1A.F DUPLICATE

LRB 3-27-96

Pipet Nos.: #8

DF --- .2299 g → 100 ml --- .09944 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 6
Eff. Factor	0.50	0.38054	0.4235
Date	__/__/__	__/__/__	3/15/96
Total counts			2572
Count time			60
Bkg C/M			.233
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 3/15/96

Pacific Northwest Laboratory 96125

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 0/ 0/ 0 Work order : K36499 ARF(SOW) : ASR 2785

A.L.O. No. 96-3365DUP + STD Description : 1.424 E5 dpm/ml

DF .... .09944 ---> 10.00000 .... .09944

Dilution Factor = 1.0113E+03 +/- 1.73%

Instrument	Ludlum 7
Eff. Factor	.3971
Date	3/ 15/ 96
Total counts	4436
Count time	60
Bkg C/M	.150
Bkg cnt time	900
Corrected C/M	73.78

1.88E5/1.0113E3 = 1.86E2
-4.40E5/4.3742E3 = 1.01E2
TL 3/15/96 8.54E1 *
1.0113E3
8.64E4/
1.424E5
61%
±11%
JRL 3-15-96

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	1.88E+05	4.2	4.42E+02
	uCi/ml	8.46E-02		1.99E-04

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by LR Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order : K36499 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : ~~96-2265d~~ 3365 Dup Description : 118.1A.F DUPLICATE W-92-2 1.424 ES d/m/ml

Pipet Nos.:

DF --- .2299 → 100 — .09944 --- #8 + .09944 → 10 - .09944 --- #8 #8 ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 7
Eff. Factor	0.50	0.38054	0.43971 TTL 3/15/96
Date	__/__/__	__/__/__	3/15/96
Total counts			4436
Count time			60
Bkg C/M			150
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trang-le 3/15/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. BLK-2785 Description :

DF ---- .09944

Dilution Factor = 1.0056E+01 +/- 1.00%

Instrument	Ludlum 2
Eff. Factor	.4186
Date	3/ 15/ 96
Total counts	25
Count time	180
Bkg C/M	.261
Bkg cnt time	900
Corrected C/M	-.12

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Alpha	dpm/ml	-2.93E+00	52.4	3.39E+00
	uCi/ml	-1.32E-06		1.53E-06 ✓ $\times \frac{100ml}{.2253g} = 6.8E-9 \frac{\mu Ci}{g}$

JRH 3-15-96

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order : K36499 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : BLK-2785 Description : D. H_2O

Pipet Nos.: #8

DF .09944 --- --- --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst TG Poppel Date 3/14/96

Instrument	P.A.C. -	G.E. ASC.	Ludlum -2
Eff. Factor	0.50	0.38054	0.4186
Date	/ /	/ /	3/15/96
Total counts			25
Count time			180
Bkg C/M	.	.	.261
Bkg cnt time			900

Alpha Energy Analysis Det. # A

Filename

Analyst T Trang-Le 3/15/96

Pacific Northwest Laboratory 96095

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. STD-2785 Description : 1.424 E5 dpm/ml

DF ---- .09944 ---> 10.00000 ---- .09944

Dilution Factor = 1.0113E+03 +/- 1.73%

Instrument	Ludlum 1
Eff. Factor	.4227
Date	3/ 15/ 96
Total counts	3030
Count time	60
Bkg C/M	.354
Bkg cnt time	900
Corrected C/M	50.15

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Alpha	dpm/ml	1.20E+05	4.7	6.34E+02
	uCi/ml	5.40E-02		2.86E-04

85%

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Total Alpha.....PNL-ALO-420 & 421

Customer : TWRS Date Received : 03/ 11/ 96 Work order K36499 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : STD-2785 Description : W-92-2 1.424 ES d/m/ml Pu 239

Pipet Nos.: #8 #8

DF .09944 ml → 10 ml .09944 ml --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst T A Poeppel Date 3/14/96

Instrument	P.A.C. - ___	G.E. ASC.	Ludlum - 1
Eff. Factor	0.50	0.38054	0.4227
Date	__/__/__	__/__/__	3/15/96
Total counts			3030
Count time			60
Bkg C/M			.354
Bkg cnt time			900

Alpha Energy Analysis Det. # A_____

Filename _____

Analyst T Trangle 3/15/96

Samples: 96-2617 B; 2617 B + std; 2617; 2617 + std; 2617 D; 2617 D + std; 2618; 2618 + std; 2618 D; 2618 D + std; ~~K-96~~ 3/14/96 3365; 3365 + std; 3365 D; 3365 D + std; Std; BLK.

DATE TO QC: 02/13/96

DATA QUALITY REVIEW

I have reviewed the following data for completeness and for compliance with project requirements.

Analyte - Gross Alpha, GEA

Data Package/Report - BX-112

Project No. - 22762

ACL Numbers - 96-2605, 96-2607, 96-2609, 96-2611, 96-2613, 96-2615, 96-2619, 96-2848, 96-2850

PNL ACL Quality Representative

2/13-27/96
Date

Tank 241-BX-112 Cores 118,119 Gamma Energy Analysis Results

ALO #	CORE ID	Co-60 uCi/g	Cs-134 uCi/g	Cs-137 uCi/g	+/-% Error	Eu-154 uCi/g	Eu-155 uCi/g	Am-241 uCi/g
96-2605	PROCESS BLANK	<7.E-4	<2.E-3	1.77E-01	3%	<3.E-3	<4.E-3	<5E-3
96-2607	118.2A.F	<3.E-3	<3.E-2	5.49E+01	2%	<5.E-2	<8.E-2	<1.E-1
96-2607	118.2A.F DUP	<2.E-3	<3.E-2	5.37E+01	2%	<5.E-2	<8.E-2	<1.E-1
	RPD			2.2%				
96-2611	PROCESS BLANK	<2.E-3	<1.E-3	1.44E-01	3%	<2.E-3	<3.E-3	<4.E-3
96-2615	119.3A.F	<2.E-3	<3.E-2	3.97E+01	2%	<4.E-2	<7.8-2	<9.E-2
96-2615	119.3A.F DUP	<3.E-3	<3.E-2	3.91E+01	2%	<4.E-2	<7.E-2	<9.E-2
	RPD			1.5%				
Note:	Reference date 02/07/1996 for samples 96-2605 thru 2615.							
96-2849BLK	PROCESS BLANK	<2.E-3	<9.E-4	2.21E-02	4%	<3.E-3	<3.E-3	<5.E-3
96-2849	118.2AH.4	<6.E-3	<6.E-2	5.42E+01	2%	<3.E-2	<2.E-1	<3.E-1
96-2849DUP	118.2AH.4 DUP	<8.E-3	<6.E-2	5.36E+01	2%	<2.E-2	<2.E-1	<3.E-1
	RPD			1.1%				
96-2851	118.3AH.F	<6.E-3	<5.E-2	3.79E+01	2%	<2.E-2	<2.E-1	<3.E-1
96-2851DUP	118.3AH.F DUP	<7.E-3	<5.E-2	3.79E+01	3%	<2.E-2	<2.E-1	<3.E-1
	RPD			0.0%				
Note:	Reference date 02/14/1996 for samples 96-2849 and 2851.							

RTR 2/16/96

Review: LRGreenwood 2-16-96

RT RS 2/7/96

Battelle / Pacific Northwest Laboratories
Analytical Chemistry Laboratory

7-FEB-1996 13:37:33.27
Gamma Energy Analysis (GEA)

Sample Title: 96-2605 BLK TWRS K41903

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_G0294.CNF;1
Analys. File: ND_SC_ASF:SST.asf

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_G0GSV5MLW_M
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_G0GSV10MLW.CNF;1 - 29-JAN-1996 12:

Acquisition time : 7-FEB-1996 13:07:20.
Sample (EOI) time: 7-FEB-1996 13:07:20.
Elapsed live time: 0 00:30:00.00
Elapsed real time: 0 00:30:00.39 0.0%

Sample quantity: 7.50000E-03 g
Sample geometry: P0-GSV-5ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	3.844E+00	1.774E-01	1.774E-01	2.43	OK

Final Mean for 1 Valid Peaks = 1.774E-01+/- 4.307E-03 (2.43%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2605 BLK TW

Acquisition date : 7-FEB-1996 13:07:20

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.68	2902	1.77	1765.43	1753	21	1.9		CS-137	0.177

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	21.	1460.83	2.2555E-02
CO-60	2.	1332.50	6.8228E-04
SR-85	57.	514.00	1.4976E-03
RU-103	77.	497.05	1.8295E-03
RU-106	32.	621.92	1.3140E-02
CD-109	95.	88.03	2.3445E-02
SB-125	86.	427.88	5.0729E-03
CS-134	25.	604.71	1.1264E-03
CE-139	130.	165.85	1.1372E-03
CE-144	99.	133.54	6.7126E-03
EU-152	2.	1408.01	3.4778E-03
EU-154	122.	123.07	2.0386E-03
EU-155	93.	105.31	3.5135E-03
HG-203	90.	72.87	1.6677E-02
TH-228	116.	238.58	2.4498E-03
U-235	146.	185.74	1.9208E-03
U-238	8.	1001.00	1.5877E-01
AM-241	88.	59.54	4.5014E-03

Pacific Northwest Laboratory 96

Gamma-Spectroscopy.....PNL-ALO-450

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02605BLK Description : PROCESS BLANK

Pipet Nos.: #6

DF --- .1485 g AVG. x2 → 100 ml --- 5.04743 ml --- --- ---

Pipet checks are recorded on labsheets by pipet number

Data Path: _____ Direct to customer _____ Hold for Radioanalytical

Storage Path: _____ Direct to A.L.O.

Analyst [illegible] Date 2/7/96

Counting Information:

Detector: B-ASCP C-70% D-70% E-100% FOG G-40% H-40% I-LEPS J-LEPS K-60% N-NaI TRACK X-Well Y-Well

File: G0294

7.50 E-3 g

Analyst T Trang-Le Date 2/7/96

RI RS 2/7/96

Battelle / Pacific Northwest Laboratories
Analytical Chemistry Laboratory

7-FEB-1996 12:35:34.28
Gamma Energy Analysis (GEA)

Sample Title: 96-02607 TWRS K41903

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_G0291.CNF;1
Analys. File: ND_SC_ASF:SST.asf

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_G0GSV5MLW_M
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_G0GSV10MLW.CNF;1 - 29-JAN-1996 12:

Acquisition time : 7-FEB-1996 12:24:56.
Sample (EOI) time: 7-FEB-1996 12:24:56.
Elapsed live time: 0 00:10:00.00
Elapsed real time: 0 00:10:24.29 3.9%

Sample quantity: 8.52000E-03 g
Sample geometry: P0-GSV-5ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	3.844E+00	5.493E+01	5.493E+01	1.55	OK

Final Mean for 1 Valid Peaks = 5.493E+01+/- 8.509E-01 (1.55%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-02607 TWRS

Acquisition date : 7-FEB-1996 12:24:56

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.69	340230	1.79	1765.47	1753	24	0.2		CS-137	54.9

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	8.	1460.83	3.6764E-02
CO-60	4.	1332.50	2.5481E-03
SR-85	5536.	514.00	3.8941E-02
RU-103	6566.	497.05	4.4487E-02
RU-106	2095.	621.92	2.8135E-01
CD-109	6095.	88.03	4.9562E-01
SB-125	10090.	427.88	1.4496E-01
CS-134	2197.	604.71	2.8158E-02
CE-139	7381.	165.85	2.2667E-02
CE-144	7193.	133.54	1.5148E-01
EU-152	1.	1408.01	6.0358E-03
EU-154	7045.	123.07	4.0842E-02
EU-155	6445.	105.31	7.7244E-02
HG-203	5835.	72.87	3.5466E-01
TH-228	8699.	238.58	5.5911E-02
U-235	10057.	185.74	4.2141E-02
U-238	13.	1001.00	5.3847E-01
AM-241	5739.	59.54	9.6033E-02

Pacific Northwest Laboratory 96

Gamma-Spectroscopy.....PNL-ALO-450

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02607 Description : 118.2A.F

Pipet Nos.: #16

DF ---.1688 g → 100 ml – 5.04743 ml --- --- ---

Pipet checks are recorded on labsheets by pipet number

Data Path: _____ Direct to customer _____ Hold for Radioanalytical

Storage Path: _____ Direct to A.L.O.

Analyst K G Pepple Date 2/7/96

Counting Information:

Detector: B-ASCP C-70% D-70% E-100% FOG G-40% H-40% I-LEPS J-LEPS K-60% N-NaI TRACK X-Well Y-Well

File: G0290 1 TTL 2/7/96

8.52 E-3 g

Analyst T Trang-le Date 2/7/96

.1688 g x 5.04743 ml = / 100 ml

 RT RS 2/7/96

Battelle / Pacific Northwest Laboratories 7-FEB-1996 12:21:12.56
Analytical Chemistry Laboratory Gamma Energy Analysis (GEA)

Sample Title: 96-02607D TWRS K41903

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_G0290.CNF;1
Analys. File: ND_SC_ASF:SST.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_G0GSV5MLW_M
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_G0GSV10MLW.CNF;1 - 29-JAN-1996 12:

Acquisition time : 7-FEB-1996 12:03:05. Sample quantity: 7.92000E-03 g
Sample (EOI) time: 7-FEB-1996 12:03:04. Sample geometry: P0-GSV-5ML-W
Elapsed live time: 0 00:10:00.00
Elapsed real time: 0 00:10:22.05 3.5%

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 70.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	3.844E+00	5.373E+01	5.373E+01	1.55	OK

Final Mean for 1 Valid Peaks = 5.373E+01+/- 8.327E-01 (1.55%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-02607D TWRS

Acquisition date : 7-FEB-1996 12:03:05

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.68	309346	1.79	1765.44	1753	25	0.2		CS-137	53.7

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	8.	1460.83	3.9549E-02
CO-60	2.	1332.50	1.9383E-03
SR-85	4835.	514.00	3.9150E-02
RU-103	6079.	497.05	4.6049E-02
RU-106	1836.	621.92	2.8332E-01
CD-109	5452.	88.03	5.0424E-01
SB-125	9025.	427.88	1.4748E-01
CS-134	1996.	604.71	2.8867E-02
CE-139	6636.	165.85	2.3122E-02
CE-144	6561.	133.54	1.5564E-01
EU-152	2.	1408.01	9.7757E-03
EU-154	6571.	123.07	4.2433E-02
EU-155	5818.	105.31	7.8951E-02
HG-203	5280.	72.87	3.6295E-01
TH-228	7813.	238.58	5.7003E-02
U-235	9035.	185.74	4.2968E-02
U-238	10.	1001.00	4.9282E-01
AM-241	5354.	59.54	9.9783E-02

Pacific Northwest Laboratory

96

Gamma-Spectroscopy.....PNL-ALO-450

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-026070UP Description : 118.2A.F DUPLICATE

Pipet Nos.:

DF ---.1570 g → 100 ml --- 5.04743 ml --- --- ---

Pipet checks are recorded on labsheets by pipet number

Data Path: _____ Direct to customer _____ Hold for Radioanalytical

Storage Path: _____ Direct to A.L.O.

Analyst [signature] Date 2/7/96

TTL 2/7/96

Counting Information:

Detector: B-ASCP C-70% D-70% E-100% FOG G-40% H-40% I-LEPS J-LEPS K-60% N-NaI TRACK X-Well Y-Well

File: G0290

7.92E-3 g

Analyst T Trang-Le Date 2/7/96

RTR 2/2/96

Battelle / Pacific Northwest Laboratories
Analytical Chemistry Laboratory

7-FEB-1996 14:12:22.32
Gamma Energy Analysis (GEA)

TTC 2/7/96

Sample Title: 96-0261BLK

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_G0295.CNF;1
Analys. File: ND_SC_ASF:SST.asf

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_G0GSV5MLW_M
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_G0GSV10MLW.CNF;1 - 29-JAN-1996 12:

Acquisition time : 7-FEB-1996 13:42:08.
Sample (EOI) time: 7-FEB-1996 13:42:07.
Elapsed live time: 0 00:30:00.00
Elapsed real time: 0 00:30:00.37 0.0%

Sample quantity: 9.03000E-03 g
Sample geometry: P0-GSV-5ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	3.844E+00	1.438E-01	1.438E-01	2.45	OK

Final Mean for 1 Valid Peaks = 1.438E-01+/- 3.527E-03 (2.45%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-0261BLK

Acquisition date : 7-FEB-1996 13:42:08

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	352.53*	45	1.16	941.02	936	10	27.8			
0	661.65	2832	1.80	1765.37	1753	20	1.9		CS-137	0.144

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	17.	1460.83	1.6881E-02
CO-60	8.	1332.50	1.1334E-03
SR-85	66.	514.00	1.3337E-03
RU-103	65.	497.05	1.3910E-03
RU-106	18.	621.92	8.2786E-03
CD-109	82.	88.03	1.8030E-02
SB-125	91.	427.88	4.3196E-03
CS-134	26.	604.71	9.6354E-04
CE-139	106.	165.85	8.5370E-04
CE-144	105.	133.54	5.7650E-03
EU-152	4.	1408.01	4.0418E-03
EU-154	106.	123.07	1.5746E-03
EU-155	99.	105.31	3.0043E-03
HG-203	81.	72.87	1.3146E-02
TH-228	113.	238.58	2.0075E-03
U-235	154.	185.74	1.6388E-03
U-238	4.	1001.00	9.3247E-02
AM-241	85.	59.54	3.6860E-03

Pacific Northwest Laboratory 96

Gamma-Spectroscopy.....PNL-ALO-450

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02611BLK Description : PROCESS BLANK

Pipet Nos.: #16

DF ---.17895 → .50 --- 5.04743 --- --- ---

ADG X2 ml ml

Pipet checks are recorded on labsheets by pipet number

Data Path: _____ Direct to customer _____ Hold for Radioanalytical

Storage Path: _____ Direct to A.L.O.

Analyst [signature] Date 2/7/96

Counting Information:

Detector: B-ASCP C-70% D-70% E-100% FOG G-40% H-40% I-LEPS J-LEPS K-60% N-NaI TRACK X-Well Y-Well

File: G0295

Analyst T Trang-Le Date 2/7/95

9.03E-3 g

RT RS 2/7/96

Battelle / Pacific Northwest Laboratories
Analytical Chemistry Laboratory

7-FEB-1996 13:04:33.33
Gamma Energy Analysis (GEA)

Sample Title: 96-02615

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_G0293.CNF;1
Analys. File: ND_SC_ASF:SST.asf

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_G0GSV5MLW_M
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_G0GSV10MLW.CNF;1 - 29-JAN-1996 12:

Acquisition time : 7-FEB-1996 12:54:06. Sample quantity: 7.63000E-03 g
Sample (EOI) time: 7-FEB-1996 12:54:06. Sample geometry: P0-GSV-5ML-W
Elapsed live time: 0 00:10:00.00
Elapsed real time: 0 00:10:15.67 2.5%

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 70.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	3.844E+00	3.965E+01	3.965E+01	1.55	OK

Final Mean for 1 Valid Peaks = 3.965E+01+/- 6.164E-01 (1.55%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-02615

Acquisition date : 7-FEB-1996 12:54:06

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.69	219943	1.79	1765.47	1753	25	0.2		CS-137	39.7

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	13.	1460.83	5.2331E-02
CO-60	1.	1332.50	1.4227E-03
SR-85	3481.	514.00	3.4484E-02
RU-103	4222.	497.05	3.9834E-02
RU-106	1327.	621.92	2.4999E-01
CD-109	3997.	88.03	4.4818E-01
SB-125	6525.	427.88	1.3017E-01
CS-134	1467.	604.71	2.5693E-02
CE-139	4826.	165.85	2.0468E-02
CE-144	4657.	133.54	1.3611E-01
EU-152	1.	1408.01	7.1752E-03
EU-154	4661.	123.07	3.7095E-02
EU-155	4098.	105.31	6.8780E-02
HG-203	3964.	72.87	3.2643E-01
TH-228	5715.	238.58	5.0607E-02
U-235	6435.	185.74	3.7640E-02
U-238	9.	1001.00	5.0303E-01
AM-241	3737.	59.54	8.6528E-02

Pacific Northwest Laboratory 96

Gamma-Spectroscopy.....PNL-ALO-450

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02615 Description : 119.3A.F

Pipet Nos.: #/L

DF ---.1512 g → 100 ml --- 5.04743 ml --- --- ---

Pipet checks are recorded on labsheets by pipet number

Data Path: _____ Direct to customer _____ Hold for Radioanalytical

Storage Path: _____ Direct to A.L.O.

Analyst [signature] Date 2/7/96

Counting Information:

Detector: B-ASCP C-70% D-70% E-100% FOG G-40% H-40% I-LEPS J-LEPS K-60% N-NaI TRACK X-Well Y-Well

File: G0293

Analyst T Trang-Le Date 2/7/96

7.63 E-3 g

RT RS 2/7/96

Battelle / Pacific Northwest Laboratories
Analytical Chemistry Laboratory

7-FEB-1996 12:50:36.10
Gamma Energy Analysis (GEA)

Sample Title: 96-2615D TWRS K41903

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_G0292.CNF;1
Analys. File: ND_SC_ASF:SST.asf

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_G0GSV5MLW_M
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_G0GSV10MLW.CNF;1 - 29-JAN-1996 12:

Acquisition time : 7-FEB-1996 12:40:09.
Sample (EOI) time: 7-FEB-1996 12:40:09.
Elapsed live time: 0 00:10:00.00
Elapsed real time: 0 00:10:16.35 2.7%

Sample quantity: 8.11000E-03 g
Sample geometry: P0-GSV-5ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	3.844E+00	3.909E+01	3.909E+01	1.55	OK

Final Mean for 1 Valid Peaks = 3.909E+01+/- 6.074E-01 (1.55%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2615D TWRS

Acquisition date : 7-FEB-1996 12:40:09

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.69	230487	1.79	1765.47	1753	24	0.2		CS-137	39.1

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	7.	1460.83	3.6128E-02
CO-60	4.	1332.50	2.6769E-03
SR-85	3576.	514.00	3.2878E-02
RU-103	4375.	497.05	3.8149E-02
RU-106	1313.	621.92	2.3395E-01
CD-109	4093.	88.03	4.2666E-01
SB-125	6816.	427.88	1.2517E-01
CS-134	1444.	604.71	2.3977E-02
CE-139	4886.	165.85	1.9375E-02
CE-144	4829.	133.54	1.3039E-01
EU-152	3.	1408.01	1.1692E-02
EU-154	4712.	123.07	3.5091E-02
EU-155	4209.	105.31	6.5579E-02
HG-203	4029.	72.87	3.0963E-01
TH-228	5894.	238.58	4.8351E-02
U-235	6769.	185.74	3.6320E-02
U-238	8.	1001.00	4.4690E-01
AM-241	3988.	59.54	8.4102E-02

Pacific Northwest Laboratory 96

Gamma-Spectroscopy.....PNL-ALO-450

Customer : TWRS Date Received : 02/ 07/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02615DUP Description : 119.3A,F DUPLICATE

Pipet Nos.:

DF --- .1607 g → 100 ml --- 5.04743 ml --- --- ---

Pipet checks are recorded on labsheets by pipet number

Data Path: _____ Direct to customer _____ Hold for Radioanalytical

Storage Path: _____ Direct to A.L.O.

Analyst [signature] Date 2/7/96

Counting Information:

Detector: B-ASCP C-70% D-70% E-100% FOG G-40% H-40% I-LEPS J-LEPS K-60% N-NaI TRACK X-Well Y-Well

File: G0292

8.11E-3 g

Analyst T Trang-le Date 2/7/96

DATE TO QC: 2/16/95

DATA QUALITY REVIEW

I have reviewed the following data for completeness and for compliance with project requirements.

Analyte - GEA

Data Package/Report - BX-112

Project No. - 22762

ACL Numbers - 96-2849, 96-2851

PNL ACL Quality Representative

2/27/96
Date

.e Pacific Northwest Laboratories
Analytical Chemistry Laboratory
325 Shielded Analytical Laboratory

SAMPLE PREP SHEET
(325 SHIELDED ANALYTICAL LABORATORY)

TI NO.: TI96-PM-06/ASR 2785 PROJECT NO.: 22762 WBS NO.: _____ SAMPLE TYPE: SLUDGE

ISSUED BY: Rick T. Steele DATE: 2/1/96 PREP TYPE: Ni/KOH FUSION

ANALYST: Lori P. Darnell DATE: 2-13-96 CONTROLLING PROCEDURE: PNL-ALO-010

REVIEW: [illegible] DATE: 2-14-96 QA PLAN: MCS 033 IMPACT LEVEL: II

CORE ID: 118/119 TANK ID: BX112

WORK PACKAGE NUMBER	ALO NUMBER	SAMPLE IDENTIFICATION	ANALYTE OR ANALYSIS	SAMPLE WT	WATER WT (g)	TOTAL VOL (mL)	SPIKE ID	SPIKE VOL (mL)	DILUTION FACTOR	DILUTION MATRIX	PIPET CALIB (mL)	ORDER NUMBER
K41903	96-02849-BLK	PROCESS BLANK	GEA NSM	~~7.2~~	.1582	100 ml						
	96-02849	118.2AH.F	NSM	0.1542		↓						38726
	96-02849-DUP	118.2AH.F	NSM	0.1623								
	96-02851	119.3AH.F	NSM	0.1710								38727
	96-02851-DUP	119.3AH.F	NSM	0.1611		↓						

REQUIRED PROCEDURE(S) BY ANALYTE:
GEA PNL-ALO-450

1054

Battelle Pacific Northwest Laboratories
Analytical Chemistry Laboratory
Shielded Analytical Laboratory

PNL-ALO-115 Solubilization of Metals from Solids Using a KOH-KNO3 Fusion

Client name: Kurt Silvers
Work Auth. Doc (WAD): TI96-PM-06 / ASR #2785
Tank/Core/Project: BX-112 Core's 118 and 119
Special instructions:

Work package number: K36491
Project number: 22762
PNL QA plan: MCS-033
PNL impact level: 2
Prep. lab (SAL/SRPL/other): SRPL
Preparation batch number:

	ACL Sample ID	ACL order number or Client sample ID	Crucible identifier	Crucible weight (g)	Crucible + sample weight (g)	Sample weight (g)	Spike added Vol. (ml)	Spike added Weight. (g)	Final solution Volume (ml)	Process Factor (1)
1	96-02849-BLK	Process Blank	1	32.3084					100 ml	
2	96-02849	118.2AH.F	2	32.7159	32.8701	0.1542				
3	96-02849-DUP	118.2AH.F	3	31.9836	32.1459	0.1623				
4	96-02851	119.3AH.F	4	32.4736	32.6446	0.1710				
5	96-02851-DUP	119.3AH.F	5	32.7053	32.8664	0.1611				
6	SRM2709	LCS BX112/HOMO	6	32.2106	32.3654	0.1548				
7										
8		# H30754	(10 mls)	23°C						
9		10.0127								
10		10.0069	X =	10.0165	g.					
11		10.0161	S =	0.0073						
12		10.0258	% RSD =	0.0729						
13		10.0212	Delv. =	10.0412	ml					
14										

Analyst's sample preparation comments:

DOSE RATE:

Spike source:
PNL spike ID number:
Anal. balance M&TE: 310-06-01-037

HCl volume added (ml): DONE
Solution heated (yes/no):
Sample filtered (yes/no):

(1) Process factor = Final volume (ml) / [Crucible & sample weight (g) - Crucible weight (g)]

Other sample preparation worksheets may be substituted at the discretion of the Cognizant Scientist. Use one worksheet per client.

Analyst/Date: Lori P. Darnell 2-13-96
Reviewer/Date: [signature] 2-14-96

Rev. 2.0 7-28-95 JMR

1055

WHC-SD-WM-DP-170, REV. 1

RT RS 2/16/96

Battelle / Pacific Northwest Laboratories
Analytical Chemistry Laboratory

16-FEB-1996 11:42:18.24
Gamma Energy Analysis (GEA)

Sample Title: 96-2849BLK Process Blank TWRS/Silvers K41903

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_H0181.CNF;1
Analys. File: ND_SC_ASF:SST.asf

Effic. File : DKA200:[USER.SCUSR.EFF]~~EFF_H3GSV2MLW_T~~
Library File: nd_sc_lib:common.nlb

EFF_H3GSH9MLW_N RR 2/16/96

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_H.CNF;14 - 12-JAN-1996 20:47:59

Acquisition time : 14-FEB-1996 13:48:18
Sample (EOI) time: 14-FEB-1996 13:48:18
Elapsed live time: 0 08:00:00.00
Elapsed real time: 0 08:17:01.61 3.4%

Sample quantity: 1.59701E-02 g
Sample geometry: P3-GSV-10ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: natural

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
K-40	1460.83	10.67*	2.413E-01	1.307E-02	1.307E-02	44.35	OK

Final Mean for 1 Valid Peaks = 1.307E-02+/- 5.795E-03 (44.35%)

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	4.275E-01	2.209E-02	2.209E-02	3.63	OK

Final Mean for 1 Valid Peaks = 2.209E-02+/- 8.020E-04 (3.63%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2849BLK Pro

Acquisition date : 14-FEB-1996 13:48:18

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	185.42*	131	0.89	488.94	484	11	43.5			
0	608.82*	11	1.18	1611.92	1604	18	346.0			
0	661.32	1369	1.59	1751.22	1740	20	3.4		CS-137	2.209E-02
0	1460.49*	57	2.52	3872.68	3860	27	44.3		K-40	1.307E-02
2	2611.56	65	3.64	6932.00	6918	28	19.5	8.64E-01		
2	2613.83*	18	3.36	6938.02	6918	28	62.1			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
FE-59	93.	1099.25	1.6316E-03
CO-60	114.	1332.50	1.1559E-03
SR-85	444.	514.00	1.1619E-03
RU-103	263.	497.05	9.4484E-04
RU-106	181.	621.92	8.3641E-03
CD-109	529.	88.03	1.8396E-02
SB-125	319.	427.88	2.8158E-03
CS-134	179.	604.72	8.1724E-04
CE-139	724.	165.85	8.6976E-04
CE-141	740.	145.44	1.3966E-03
CE-144	690.	133.54	5.7373E-03
EU-152	62.	1408.01	4.1959E-03
EU-154	76.	1274.44	2.6343E-03
EU-155	574.	105.31	2.8328E-03
HG-203	594.	72.87	1.5328E-02
TH-228	804.	238.58	2.0448E-03
U-235	867.	185.74	1.5120E-03
U-238	122.	1001.00	1.5092E-01
AM-241	420.	59.54	4.1071E-03

Pacific Northwest Laboratory 96

Gamma-Spectroscopy.....PNL-ALO-450

Customer : TWRS/SILVERS Date Received : 02/ 14/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-2849BLK Description : PROCESS BLANK

Pipet Nos.:

DF ---.1582 g Avg x2 → 100 ml --- 2(5.04743) ml --- --- ---

Pipet checks are recorded on labsheets by pipet number

Data Path: _____ Direct to customer _____ Hold for Radioanalytical

Storage Path: _____ Direct to A.L.O.

Analyst [signature] Date 2/14/96

Counting Information:

Detector: B-ASCP C-70% D-70% E-100% FOG G-40% H-40% I-LEPS J-LEPS K-60% N-NaI TRACK X-Well Y-Well

File: #0181

Sample size 1.59701E-2g

Analyst K. Thomas Date 2/14/96

RJ RS 2/16/96

Battelle / Pacific Northwest Laboratories
Analytical Chemistry Laboratory

16-FEB-1996 11:39:46.77
Gamma Energy Analysis (GEA)

Sample Title: 96-2849 118.2AH.4 TWRS/Silvers K41903

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_H0177.CNF;1
Analys. File: ND_SC_ASF:SST.asf

Effic. File : DKA200:[USER.SCUSR.EFF]~~EFF_H3GSV2MLW~~_T
Library File: nd_sc_lib:common.nlb

H3GS+10ML_N RJR 2/16/96

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_H.CNF;14 - 12-JAN-1996 20:47:59

Acquisition time : 14-FEB-1996 12:12:35
Sample (EOI) time: 14-FEB-1996 12:12:34
Elapsed live time: 0 00:15:00.00
Elapsed real time: 0 00:15:35.47 3.8%

Sample quantity: 1.55663E-02 g
Sample geometry: P3-GSV-10ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	4.274E-01	5.421E+01	5.421E+01	1.34	OK

Final Mean for 1 Valid Peaks = 5.421E+01+/- 7.286E-01 (1.34%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2849 118.2A

Acquisition date : 14-FEB-1996 12:12:35

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.41	102329	1.78	1751.46	1739	23	0.3		CS-137	54.2

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	6.	1460.83	8.5340E-02
FE-59	7.	1099.25	1.4674E-02
CO-60	2.	1332.50	5.0268E-03
SR-85	1690.	514.00	7.4258E-02
RU-103	2093.	497.05	8.7285E-02
RU-106	587.	621.92	4.9482E-01
CD-109	1955.	88.03	1.1608E+00
SB-125	3448.	427.88	3.0371E-01
CS-134	646.	604.72	5.0981E-02
CE-139	2874.	165.85	5.6852E-02
CE-141	2880.	145.44	9.0112E-02
CE-144	2695.	133.54	3.7218E-01
EU-152	2.	1408.01	2.4779E-02
EU-154	5.	1274.44	2.2124E-02
EU-155	2259.	105.31	1.8442E-01
HG-203	1783.	72.87	8.6953E-01
TH-228	3066.	238.58	1.3105E-01
U-235	4096.	185.74	1.0790E-01
U-238	5.	1001.00	1.0043E+00
AM-241	1649.	59.54	2.6724E-01

Pacific Northwest Laboratory 96

Gamma-Spectroscopy.....PNL-ALO-450

Customer : TWRS/SILVERS Date Received : 02/ 14/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-2849 Description : 118.2AH.4

Pipet Nos.: #14

DF .1542 g → 100 ml --- 2(5.04743) ml --- --- ---

Pipet checks are recorded on labsheets by pipet number

Data Path: _____ Direct to customer _____ Hold for Radioanalytical

Storage Path: _____ Direct to A.L.O.

Analyst [signature] Date 2/14/96

Counting Information:

Detector: B-ASCP C-70% D-70% E-100% FOG G-40% (H-40%) I-LEPS J-LEPS K-60% N-NaI TRACK X-Well Y-Well

File: H0177

sample size 1.555663E-2 g

Analyst [signature] Date 2/14/96

BTR 2/16/96

Battelle / Pacific Northwest Laboratories
Analytical Chemistry Laboratory

16-FEB-1996 11:40:29.22
Gamma Energy Analysis (GEA)

Sample Title: 96-2849DUP 118.2AH.F Duplicate TWRS/Silvers K41903

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_H0178.CNF;1
Analys. File: ND_SC_ASF:SST.asf

Effic. File : DKA200:[USER.SCUSR.EFF]~~EFF_H3GSV2MLW_T~~
Library File: nd_sc_lib:common.nlb

H3GSV 10MLW_W BTR 2/16/96

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_H.CNF;14 - 12-JAN-1996 20:47:59

Acquisition time : 14-FEB-1996 12:31:24
Sample (EOI) time: 14-FEB-1996 12:31:24
Elapsed live time: 0 00:15:00.00
Elapsed real time: 0 00:15:37.44 4.0%

Sample quantity: 1.63840E-02 g
Sample geometry: P3-GSV-10ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	4.274E-01	5.360E+01	5.360E+01	1.34	OK

Final Mean for 1 Valid Peaks = 5.360E+01+/- 7.199E-01 (1.34%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2849DUP 118

Acquisition date : 14-FEB-1996 12:31:24

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.44	106486	1.78	1751.54	1739	23	0.3		CS-137	53.6

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	8.	1460.83	9.3872E-02
FE-59	8.	1099.25	1.4904E-02
CO-60	5.	1332.50	7.5513E-03
SR-85	1695.	514.00	7.0650E-02
RU-103	2129.	497.05	8.3638E-02
RU-106	638.	621.92	4.8986E-01
CD-109	2117.	88.03	1.1480E+00
SB-125	3555.	427.88	2.9299E-01
CS-134	698.	604.72	5.0358E-02
CE-139	2987.	165.85	5.5074E-02
CE-141	2879.	145.44	8.5602E-02
CE-144	2920.	133.54	3.6804E-01
EU-152	0.	1408.01	0.0000E+00
EU-154	4.	1274.44	1.8800E-02
EU-155	2419.	105.31	1.8133E-01
HG-203	1846.	72.87	8.4055E-01
TH-228	3080.	238.58	1.2480E-01
U-235	4206.	185.74	1.0388E-01
U-238	3.	1001.00	7.3910E-01
AM-241	1681.	59.54	2.5635E-01

Pacific Northwest Laboratory 96

Gamma-Spectroscopy.....PNL-ALO-450

Customer : TWRS/SILVERS Date Received : 02/ 14/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-2849DUP Description : 118.2AH.F DUPLICATE

Pipet Nos.: #14

DF --- .1623 g → 100 ml --- 3(5.04743) ml --- --- ---

Pipet checks are recorded on labsheets by pipet number

Data Path: _____ Direct to customer _____ Hold for Radioanalytical

Storage Path: _____ Direct to A.L.O.

Analyst K G Parzyck Date 2/14/96

Counting Information:

Detector: B-ASCP C-70% D-70% E-100% FOG G-40% (H-40%) I-LEPS J-LEPS K-60% N-NaI TRACK X-Well Y-Well

File: H0178

samples size 1.6384 E-2 g

Analyst [illegible] Date 2/14/96

RTR 2/16/96

Battelle / Pacific Northwest Laboratories
Analytical Chemistry Laboratory

16-FEB-1996 11:41:42.65
Gamma Energy Analysis (GEA)

Sample Title: 96-2851 118.3AH.F TWS/Silvers K41903

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_H0179.CNF;1
Analys. File: ND_SC_ASF:SST.asf

Effic. File : DKA200:[USER.SCUSR.EFF]~~EFF_H3GSV2MLW_T~~ EFF_H3GS410MLW_N RTR 2/16/96
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_H.CNF;14 - 12-JAN-1996 20:47:59

Acquisition time : 14-FEB-1996 13:01:27
Sample (EOI) time: 14-FEB-1996 13:01:26
Elapsed live time: 0 00:15:00.00
Elapsed real time: 0 00:15:36.68 3.9%

Sample quantity: 1.72622E-02 g
Sample geometry: P3-GSV-10ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	4.274E-01	3.793E+01	3.793E+01	1.36	OK

Final Mean for 1 Valid Peaks = 3.793E+01+/- 5.142E-01 (1.36%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2851 118.3A

Acquisition date : 14-FEB-1996 13:01:27

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.47	79392	1.78	1751.61	1739	24	0.4		CS-137	37.9

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	11.	1460.83	1.0420E-01
FE-59	8.	1099.25	1.4146E-02
CO-60	3.	1332.50	5.5516E-03
SR-85	1356.	514.00	5.9973E-02
RU-103	1591.	497.05	6.8628E-02
RU-106	460.	621.92	3.9478E-01
CD-109	1526.	88.03	9.2510E-01
SB-125	2655.	427.88	2.4030E-01
CS-134	531.	604.72	4.1702E-02
CE-139	2196.	165.85	4.4816E-02
CE-141	2199.	145.44	7.1012E-02
CE-144	2115.	133.54	2.9727E-01
EU-152	2.	1408.01	2.2344E-02
EU-154	2.	1274.44	1.3748E-02
EU-155	1752.	105.31	1.4648E-01
HG-203	1475.	72.87	7.1311E-01
TH-228	2297.	238.58	1.0229E-01
U-235	3205.	185.74	8.6062E-02
U-238	5.	1001.00	9.2689E-01
AM-241	1236.	59.54	2.0859E-01

Pacific Northwest Laboratory 96

Gamma-Spectroscopy.....PNL-ALO-450

Customer : TWRS/SILVERS Date Received : 02/ 14/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-2851 Description : 118.3AH.F

Pipet Nos.:

DF --- .1710 g → 100 ml --- 2(5.04743 ml) --- --- ---

Pipet checks are recorded on labsheets by pipet number

Data Path: _____ Direct to customer _____ Hold for Radioanalytical

Storage Path: _____ Direct to A.L.O.

Analyst [illegible] Date 2/14/96

Counting Information:

Detector: B-ASCP C-70% D-70% E-100% FOG G-40% (H-40%) I-LEPS J-LEPS K-60% N-NaI TRACK X-Well Y-Well

File: H0179

sample size 1.726222 E-2 g

Analyst [illegible] Date 2/14/96

RTR 2/16/96

Battelle / Pacific Northwest Laboratories
Analytical Chemistry Laboratory

16-FEB-1996 11:41:59.08
Gamma Energy Analysis (GEA)

Sample Title: 96-2851DUP 118.3AH.F Duplicate TWRS/Silvers K41903

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_H0180.CNF;1
Analys. File: ND_SC_ASF:SST.asf

Effic. File : DKA200:[USER.SCUSR.EFF]~~EFF_H3GSV2MLW_T~~
Library File: nd_sc_lib:common.nlb EFF_H3GSV10MLW_N RTR 2/16/96

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_H.CNF;14 - 12-JAN-1996 20:47:59

Acquisition time : 14-FEB-1996 13:28:56
Sample (EOI) time: 14-FEB-1996 13:28:56
Elapsed live time: 0 00:15:00.00
Elapsed real time: 0 00:15:36.88 3.9%

Sample quantity: 1.62628E-02 g
Sample geometry: P3-GSV-10ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	4.274E-01	3.785E+01	3.785E+01	1.36	OK

Final Mean for 1 Valid Peaks = 3.785E+01+/- 5.143E-01 (1.36%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2851DUP 118

Acquisition date : 14-FEB-1996 13:28:56

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.47	74633	1.81	1751.62	1739	24	0.4		CS-137	37.8

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	6.	1460.83	8.1974E-02
FE-59	5.	1099.25	1.1870E-02
CO-60	4.	1332.50	6.8044E-03
SR-85	1324.	514.00	6.2917E-02
RU-103	1594.	497.05	7.2907E-02
RU-106	429.	621.92	4.0477E-01
CD-109	1459.	88.03	9.5996E-01
SB-125	2421.	427.88	2.4360E-01
CS-134	480.	604.72	4.2047E-02
CE-139	2095.	165.85	4.6458E-02
CE-141	2063.	145.44	7.3006E-02
CE-144	1991.	133.54	3.0621E-01
EU-152	1.	1408.01	1.6771E-02
EU-154	4.	1274.44	1.9807E-02
EU-155	1643.	105.31	1.5055E-01
HG-203	1316.	72.87	7.1519E-01
TH-228	2145.	238.58	1.0492E-01
U-235	2980.	185.74	8.8100E-02
U-238	3.	1001.00	7.4461E-01
AM-241	1177.	59.54	2.1612E-01

Pacific Northwest Laboratory 96

Gamma-Spectroscopy.....PNL-ALO-450

Customer : TWRS/SILVERS Date Received : 02/ 14/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. : 96-2851DUP Description : 118.3AH.F DUPLICATE

Pipet Nos.:

DF --- .1611 g → 100 ml --- 2(5.04743 ml) --- --- ---

#16

Pipet checks are recorded on labsheets by pipet number

Data Path: _____ Direct to customer _____ Hold for Radioanalytical

Storage Path: _____ Direct to A.L.O.

Analyst [signature] Date 2/14/96

Counting Information:

Detector: B-ASCP C-70% D-70% E-100% FOG G-40% H-40% I-LEPS J-LEPS K-60% N-NaI TRACK X-Well Y-Well

File: H0180

Sample size
1.62628E-2g

Analyst [signature] Date 2/14/96

D4 - TOTAL BETA

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DATE TO QC: 03/19/96

DATA QUALITY REVIEW

I have reviewed the following data for completeness and for compliance with project requirements.

Analyte - Total Beta

Data Package/Report - BX-112

Project No. - 22762

ACL Numbers - 96-2617, 96-2618, 96-2619

PNL ACL Quality Representative

3/28/96
Date

3/28/96

Table 3.3: Tank 241-BX-112 Cores 118,119 Total Beta, Sr-90, and Uranium Results

ALO #	CORE ID	Total Beta uCi/g	+/-% Error	Sr-90 uCi/g	+/-% Error	Uranium ug/g	+/-% Error
96-2617	PROCESS BLANK	4.26E-02	36%	<3.6E-2		<3.6E+0	
96-2617	118.COMP.F	6.97E+01	4%	5.68E+00	9%	9.79E+02	7%
96-2617-DUP	118.COMP.F DUP	6.86E+01	4%	4.92E+00	9%	1.05E+03	7%
	RPD	1.6%		14.3%		7.0%	
96-2618	119.COMP.F	6.33E+01	4%	9.69E+00	8%	1.09E+03	7%
96-2618-DUP	119.COMP.F DUP	6.41E+01	4%	7.62E+00	8%	1.01E+03	7%
	RPD	1.3%		23.9%		7.6%	
	MD			2.10			
96-2619	FIELD BLANK	7.63E+00	3%	7.86E-01	14%	<8.3E-1	
96-2619-DUP	FIELD BLANK DUP	7.50E+00	3%	7.15E-01	14%	<4.6E-1	
	RPD	1.7%		9.5%			
	LAB BLANK	<2.2E-3		<1.7E-2		<2.0E-2	
	LAB STANDARD	105%		81%		101%	
	SAMPLE SPIKE	88%		99%			

Pacific Northwest Laboratory 96123

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2617B Description : PROCESS BLANK

DF ---- .22530 ---> 100.00000 ---- .09944

Dilution Factor = 4.4635E+03 +/- 1.43%

Instrument	P.B.C. - 2	d/c SrY90 1.8900

Date	3 / 14 / 96
Total counts	388
Count time	10
Bkg C/M	27.590
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Beta	dpm/g	9.46E+04	35.8	4.88E+04
	uCi/g	4.26E-02		2.20E-02

Data Entry by T Trang-Le Date 3/14/96

Calculation and Analytical Data Sheet Reviewed by L A Greenwood Date 3/14/96

Pacific Northwest Laboratory 96

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received : 03/ 11/ 96 Work order : M23196 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2617B Description : PROCESS BLANK

Pipet Nos.:

DF ....2253 → 100 ... .09944 ... --- --- ---

g ml ml

Avg x̄2

#18

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 3/14/96

Instrument	P.B.C. - 2	d/c SrY90 1.89
Date	/ /	3/14/96
Total counts		388
Count time		10
Bkg C/M		27.59
Bkg cnt time		100

Analyst T Trang-le 3/14/96

Pacific Northwest Laboratory 96123

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2617 Description : 118.COMP.F

DF .... .21180 ---> 100.00000 .... .09944 -+-> .99492 .... .09944

Dilution Factor = 5.2253E+04 +/- 2.01%

Instrument	P.B.C. - 2	d/c SrY90 1.8900

Date	3 / 14 / 96
Total counts	15934
Count time	10
Bkg C/M	27.590
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Beta	dpm/g	1.55E+08	3.6	5.71E+05
	uCi/g	6.97E+01		2.57E-01

Data Entry by T Trang-le Date 3/14/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/14/96

Pacific Northwest Laboratory 96

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received : 03/ 11/ 96 Work order : M23/96 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2617 Description : 118.COMP.F

Pipet Nos.: #8 #14 #8

DF --- .2118 → 100 — .09944 → .99492 — .09944 ---
S ml ml ml ml

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 3/14/96

Instrument	P.B.C. - 2	d/c SrY90 1.89
Date	/ /	3/14/96
Total counts		15934
Count time		10
Bkg C/M		27.59
Bkg cnt time		100

Analyst T Trang-le 3/14/96

Pacific Northwest Laboratory 96123

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2617D Description : 118.COMP.F DUPLICATE

DF ---- .23880 ---> 100.00000 ---- .09944 -+-> .99492 ---- .09944

Dilution Factor = 4.6345E+04 +/- 2.01%

Instrument	P.B.C. - 2	d/c SrY90 1.8900

Date	3 / 14 / 96
Total counts	17668
Count time	10
Bkg C/M	27.590
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Beta	dpm/g	1.52E+08	3.5	5.06E+05
	uCi/g	6.86E+01 ✓		2.28E-01

Data Entry by T Trang-le Date 3/14/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/14/96

Pacific Northwest Laboratory 96

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received : 03/ 11/ 96 Work order : M23196 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2617D Description : 118.COMP.F DUPLICATE

Pipet Nos.:

			#8	#14	#8	
DF	---.2388 →	100	..09944 →	.99492	.09944	---
	g	ml	ml	ml	ml	

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 3/14/96

Instrument	P.B.C. - 2	d/c SrY90 1.89
Date	/ /	3/14/96
Total counts		17668
Count time		10
Bkg C/M		27.59
Bkg cnt time		100

Analyst T Trang-le 3/14/96

Pacific Northwest Laboratory 96123

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2618 Description : 119.COMP.F

DF .... .21260 ---> 100.00000 .... .09944 -+-> .99492 .... .09944

Dilution Factor = 5.2056E+04 +/- 2.01%

Instrument	P.B.C. - 2	d/c SrY90 1.8900

Date	3 / 14 / 96
Total counts	14565
Count time	10
Bkg C/M	27.590
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Beta	dpm/g	1.41E+08	3.6	5.69E+05
	uCi/g	6.33E+01 ✓		2.56E-01

Data Entry by T Trang-le Date 3/14/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/14/96

Pacific Northwest Laboratory 96

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received : 03/ 11/ 96 Work order : M23196 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2618 Description : 119.COMP.F

Pipet Nos.: #8 #14 #8

DF ....2124 → 100 ... .09944 → .99492 .09944 ...

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 3/14/96

Instrument	P.B.C. - 2	d/c SrY90 1.89
Date	/ /	3/14/96
Total counts		14565
Count time		10
Bkg C/M		27.59
Bkg cnt time		100

Analyst T Trang-le 3/14/96

Pacific Northwest Laboratory 96123

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2618D Description : 119.COMP.F DUPLICATE

DF ---- .26070 ---> 100.00000 ---- .09944 -+-> .99492 ---- .09944

Dilution Factor = 4.2452E+04 +/- 2.01%

Instrument	P.B.C. - 2	d/c SrY90 1.8900

Date	3 / 14 / 96
Total counts	18001
Count time	10
Bkg C/M	27.590
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Beta	dpm/g	1.42E+08	3.5	4.64E+05
	uCi/g	6.41E+01 ✓		2.09E-01

Data Entry by T Trang-le Date 3/14/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwald Date 3/14/96

Pacific Northwest Laboratory

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received : 03/ 11/ 96 Work order : M23/56 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2618D Description : 119.COMP.F DUPLICATE

Pipet Nos.: #8 #4 #8

DF --- .2607 g → .00 ml --- .09944 ml → .99492 ml --- .09944 ml ---

Pipet checks are recorded on labsheets by pipet number

Analyst TG Peppard Date 3/14/96

Instrument | P.B.C. - 2 | d/c SrY90 1.89

Date	/ /	3/14/96
Total counts		18001
Count time		10
Bkg C/M		27.59
Bkg cnt time		100

Analyst T Trang-le 3/14/96

Pacific Northwest Laboratory 96096

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received 2/ 7/ 96 Work order : ARF(SOW) : ASR 2785

A.L.O. No. 96-02619 Description : FIELD BLANK.F

DF .... .49715

Dilution Factor = 2.0115E+00 +/- 1.00%

Instrument	P.B.C. - 2	d/c SrY90 1.8900

Date	3 / 14 / 96
Total counts	100543
Count time	10
Bkg C/M	27.590
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Beta	dpm/ml	3.81E+04	2.8	2.20E+01
	uCi/ml	1.72E-02 ✓		9.90E-06

$\frac{\times 100ml}{0.2253g} = 7.63 \mu Ci/g$

LRJ 3-18-96

Data Entry by T Trang-le Date 3/14/96

Calculation and Analytical Data Sheet Reviewed by LRGreenwood Date 3/14/96

Pacific Northwest Laboratory 96

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received : 02/ 07/ 96 Work order : M83/96 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02619 Description : FIELD BLANK,F

Pipet Nos.: #82

DF --- .49715 --- --- --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [illegible] Date 3/14/96

Instrument	P.B.C. - 2	d/c SrY90 1.89
Date	/ /	3/14/96
Total counts		100543
Count time		10
Bkg C/M		27.59
Bkg cnt time		100

Analyst T Trang-le 3/14/96

Pacific Northwest Laboratory 96125

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-02619 DUP Description :

DF .49715

Dilution Factor = 2.0115E+00 +/- 1.00%

Instrument	P.B.C. - 2	d/c SrY90 1.8900

Date	3 / 14 / 96
Total counts	98924
Count time	10
Bkg C/M	27.590
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Beta	dpm/ml	3.75E+04	2.8	2.20E+01
	uCi/ml	1.69E-02 ✓		9.90E-06

$\frac{X\,100\,ml}{0.2253\,g} = 7.50\,\mu Ci/g$

3-18-96

Data Entry by T Tuang-le Date 3/14/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/14/96

Pacific Northwest Laboratory 96

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received : 02/ 07/ 96 Work order : M23-96 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02619 Dup Description : FIELD BLANK.F

Pipet Nos.: .82

DF --- .49715 --- --- --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 3/14/96

Instrument	P.B.C. - 2	d/c SrY90 1.89
Date	/ /	3/14/96
Total counts		98924
Count time		10
Bkg C/M		27.59
Bkg cnt time		100

Analyst T Trang-le 3/14/96

Pacific Northwest Laboratory 96125

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received 0/ 0/ 0 Work order : M23196 ARF(SOW) :

A.L.O. No. 96-2619 + STD Description : 3.66 E6 dpm/ml

DF .... .09944 ---> 10.00000 .... .09944

Dilution Factor = 1.0113E+03 +/- 1.73%

Instrument	P.B.C. - 2	d/c SrY90 1.8900
Date	3 / 14 / 96	
Total counts	116725	
Count time	10	
Bkg C/M	27.590	
Bkg cnt time	100	

2.23E7 / 1.0113E3 = 2.21E4
− 3.81E4 | 2.0115E0 = 1.89E4
3.16E3
1.0113E3
3.20E6
3.66E6
88%

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Beta	dpm/ml	2.23E+07	3.1	1.10E+04
	uCi/ml	1.00E+01		4.98E-03

Data Entry by T Trang-le Date 3/14/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/14/96

Pacific Northwest Laboratory 96

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received : 02/ 07/ 96 Work order M23/94 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02619 + STD Description : FIELD BLANK.F + RS-11-13 S/4 90 2.216 SEG d/m/

Pipet Nos.: #82 #8 #8

DF .49715 + .09944 → 10 - .09944

Pipet checks are recorded on labsheets by pipet number

Analyst [signature] Date 3/14/96

Instrument	P.B.C. - 2	d/c SrY90 1.89
Date	/ /	3/14/96
Total counts		116725
Count time		10
Bkg C/M		21.59
Bkg cnt time		100

Analyst T Trang-le 3/14/96

Pacific Northwest Laboratory 96095

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. STD-2785 Description : 3.66 E6 dpm/ml

DF .... .09944 ---> 10.00000 .... .09944

Dilution Factor = 1.0113E+03 +/- 1.73%

Instrument | P.B.C. - 2 | d/c SrY90 1.8900 |

Date	3 / 14 / 96
Total counts	20297
Count time	10
Bkg C/M	27.590
Bkg cnt time	100

Calculation and Results

105%

		Activity	Uncertainty.%	MDA
Total Beta	dpm/ml	3.83E+06	3.3	1.10E+04
	uCi/ml	1.72E+00		4.98E-03

Data Entry by T Trang-le Date 3/14/96

Calculation and Analytical Data Sheet Reviewed by L D Greenwood Date 3/14/96

Pacific Northwest Laboratory 96

Total Beta.....PNL-ALO-430 & 431

Customer : TWRS Date Received : 03/ 11/ 96 Work order : M23/96 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : BLK-2785 Description : D_1H_2O

Pipet Nos.: #14

DF --- 99492 --- --- --- --- --- ---
ml

Pipet checks are recorded on labsheets by pipet number

Analyst KG Pepper Date 3/14/96

Instrument	P.B.C. - 2	d/c SrY90 1.89
Date	/ /	3/14/96
Total counts		271
Count time		10
Bkg C/M		27.59
Bkg cnt time		100

Analyst T Trang-le 3/14/96

D5 - STRONTIUM-90 ANALYSIS

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DATE TO QC: 03/20/96

DATA QUALITY REVIEW

I have reviewed the following data for completeness and for compliance with project requirements.

Analyte - Sr-90

Data Package/Report - BX-112

Project No. - 22762

ACL Numbers - 96-2617, 96-2618, 96-2619

PNL ACL Quality Representative

3/28/96
Date

3/28/96

Table 3.3: Tank 241-BX-112 Cores 118,119 Total Beta, Sr-90, and Uranium Results

ALO #	CORE ID	Total Beta uCi/g	+/-% Error	Sr-90 uCi/g	+/-% Error	Uranium ug/g	+/-% Error
96-2617	PROCESS BLANK	4.26E-02	36%	<3.6E-2		<3.6E+0	
96-2617	118.COMP.F	6.97E+01	4%	5.68E+00	9%	9.79E+02	7%
96-2617-DUP	118.COMP.F DUP	6.86E+01	4%	4.92E+00	9%	1.05E+03	7%
	RPD	1.6%		14.3%		7.0%	
96-2618	119.COMP.F	6.33E+01	4%	9.69E+00	8%	1.09E+03	7%
96-2618-DUP	119.COMP.F DUP	6.41E+01	4%	7.62E+00	8%	1.01E+03	7%
	RPD	1.3%		23.9%		7.6%	
	MD			2.10			
96-2619	FIELD BLANK	7.63E+00	3%	7.86E-01	14%	<8.3E-1	
96-2619-DUP	FIELD BLANK DUP	7.50E+00	3%	7.15E-01	14%	<4.6E-1	
	RPD	1.7%		9.5%			
	LAB BLANK	<2.2E-3		<1.7E-2		<2.0E-2	
	LAB STANDARD	105%		81%		101%	
	SAMPLE SPIKE	88%		99%			

Pacific Northwest Laboratory 96123

Strontium-90.....PNL-ALO-433 & 431

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2617B Description : PROCESS BLANK

DF ---- .22530 ---> 100.00000 ---- .49715 ---> 10.00000 ---- .99492

Dilution Factor = 8.9735E+03 +/- 1.81%

Analysts Historical Yield .9800 +/- 7.0%

To (separation) 3 / 15 / 96 PST 10 : 30

Instrument	P.B.C. - 1	P.B.C - 1
d/c Y-90	1.7900	1.7900

Date	3 / 15 / 96	3 / 18 / 96
Time(PST)	13 : 40	8 : 40
Total counts	305	317
Count time	10	10
Bkg C/M	30.050	30.040
Bkg cnt time	100	100

Calculation and Results

		Activity	Uncertainty,%	MDA*
Strontium-90	dpm/g	3.98E+04	827.1	7.83E+04
	uCi/g	1.79E-02		3.53E-02 ✓

Data Entry by T Trang-le Date 3/18/96

Calculation and Analytical Data Sheet Reviewed by LR Greenwood Date 3/18/96

WHC-SD-WM-DP-170, Rev 1

Pacific Northwest Laboratory 96

Strontium-90.....PNL-ALO-433 & 431 96123

Customer : TWRS Date Received : 03/ 11/ 96 Work order : 103195 ARF(SOW) : ASR 2785 (2889)

A.L.D. No. : 96-2617B Description : PROCESS BLANK

Pipet Nos.:

DF --- .2253 ⇒ 100 — .49715 → 10 --- .99492 --- ---

#82 #14

g ml ml ml

avg x̄2

Pipet checks are recorded on labsheets by pipet number

Std_____ LRB BNW_____ Page(s) No._____

Standard card ID 96123 Blank card ID 96123

Analyst [signature] Date 3/15/96

To (separation) 3/15/96 PST 10:30

Instrument | P.B.C. - 1 | d/c Y-90 1.79

Date	3/15/96	3/18/96
Time(PST) TTL 3/15/96	13:40	8:40
Total counts	305	317
Count time	10	10
Bkg C/M	30.05	30.04
Bkg cnt time	100	100

Analyst T Trang-le 3/15/96
T Trang-le 3/18/96

Pacific Northwest Laboratory 96123

Strontium-90.....PNL-ALO-433 & 431

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2617 Description : 118.COMP.F

DF .... .21180 ---> 100.00000 .... .49715 ---> 10.00000 .... .99492

Dilution Factor = 9.5455E+03 +/- 1.81%

Analysts Historical Yield .9800 +/- 7.0%

To (separation) 3 / 15 / 96 PST 10 : 30

Instrument	P.B.C. - 1	P.B.C - 1
d/c Y-90	1.7900	1.7900

Date	3 / 15 / 96	3 / 18 / 96
Time(PST)	13 : 50	8 : 50
Total counts	7654	11252
Count time	10	10
Bkg C/M	30.050	30.040
Bkg cnt time	100	100

Calculation and Results

		Activity	Uncertainty.%	MDA
Strontium-90	dpm/g	1.26E+07	8.2	8.34E+04
	uCi/g	5.68E+00 ✓		3.76E-02

Data Entry by T Trang-le Date 3/18/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/18/96

Pacific Northwest Laboratory 96

Strontium-90.....PNL-ALO-433 & 431 96123

Customer : TWRS Date Received : 03/ 11/ 96 Work order M23195 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2617 Description : 118.COMP.F

Pipet Nos.: #82 #14

DF --- .2118 → 100 — .49715 → 10 --- .99492 ---
g ml ml ml ml

Pipet checks are recorded on labsheets by pipet number

Std_____ LRB BNW_____ Page(s) No._____

Standard card ID 96123 Blank card ID 96123

Analyst [signature] Date 3/15/96

To (separation) 3/15/96 PST 10:30

Instrument | P.B.C. - 1 | d/c Y-90 1.79 |

Date	3/15/96	3/18/96
Time(PST)	13:50	8:50
Total counts	7654	11252
Count time	10	10
Bkg C/M	30.05	30.04
Bkg cnt time	100	100

Analyst T Trang-le 3/15/96
T Trang-le 3/18/96

Pacific Northwest Laboratory 96123

Strontium-90.....PNL-ALO-433 & 431

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2617D Description : 118.COMP.F DUPLICATE

DF .... .23880 ---> 100.00000 .... .49715 ---> 10.00000 .... .99492

Dilution Factor = 8.4662E+03 +/- 1.81%

Analysts Historical Yield .9800 +/- 7.0%

To (separation) 3 / 15 / 96 PST 10 : 30

Instrument	P.B.C. - 2	P.B.C - 2
d/c Y-90	1.8400	1.8400

Date	3 / 15 / 96	3 / 18 / 96
Time(PST)	13 : 51	8 : 50
Total counts	6585	9998
Count time	10	10
Bkg C/M	28.120	28.160
Bkg cnt time	100	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Strontium-90	dpm/g	1.09E+07	8.3	7.16E+04
	uCi/g	4.92E+00 ✓		3.23E-02

Data Entry by T Tirang-le Date 3/18/96

Calculation and Analytical Data Sheet Reviewed by LRGreenwood Date 3/18/96

Pacific Northwest Laboratory 96

96123

Strontium-90.....PNL-ALO-433 & 431

Customer : TWRS Date Received : 03/ 11/ 96 Work order M23195 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2617D Description : 118.COMP.F DUPLICATE

Pipet Nos.: #182 #114

DF ---.2388 → 100 --- .49715 → 10 --- .99492 --- ---

Pipet checks are recorded on labsheets by pipet number

Std_____ LRB BNW_____ Page(s) No._____

Standard card ID 96123 Blank card ID 96123

Analyst [signature] Date 3/15/96

To (separation) 3/15/96 PST 10:30

Instrument	P.B.C. - 2	d/c Y-90 1.89
Date	3/15/96	3/18/96
Time(PST)	13:51	8:50
Total counts	65805	9998
Count time	10	10
Bkg C/M	28.12	28.16
Bkg cnt time	100	100

Analyst T Trang-le 3/15/96
T Trang-le 3/18/96

Pacific Northwest Laboratory 96123

Strontium-90.....PNL-ALO-433 & 431

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2618 Description : 119.COMP.F

DF .... .21260 ---> 100.00000 .... .49715 ---> 10.00000 .... .99492

Dilution Factor = 9.5096E+03 +/- 1.81%

Analysts Historical Yield .9800 +/- 7.0%

To (separation) 3 / 15 / 96 PST 10 : 30

Instrument	P.B.C. - 1	P.B.C - 1
d/c Y-90	1.7900	1.7900
Date	3 / 15 / 96	3 / 18 / 96
Time(PST)	14 : 0	9 : 0
Total counts	11945	18092
Count time	10	10
Bkg C/M	30.050	30.040
Bkg cnt time	100	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Strontium-90	dpm/g	2.15E+07	8.0	8.32E+04
	uCi/g	9.69E+00 ✓		3.75E-02

Data Entry by T Trang-le Date 3/18/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/18/96

Pacific Northwest Laboratory 96

Strontium-90.....PNL-ALO-433 & 431 96123

Customer : TWRS Date Received : 03/ 11/ 96 Work order : M73195 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2618 Description : 119 COMP.F

Pipet Nos.: #80 #14

DF ---.0126 → 100 --- .99715 → 10 --- .99492 --- ---

Pipet checks are recorded on labsheets by pipet number

Std_____ LRB BNW_____ Page(s) No._____

Standard card ID 96123 Blank card ID 96123

Analyst [signature] Date 3/15/96

To (separation) 3/15/96 PST 1030

Instrument | P.B.C. - 1 | d/c Y-90 1.79 |

Date	3/15/96	3/18/96
Time(PST)	14:00	9:00
Total counts	11945	18092
Count time	10	10
Bkg C/M	30.05	30.04
Bkg cnt time	100	100

Analyst T Trang-le 3/15/96
T Trang-le 3/18/96

Pacific Northwest Laboratory 96123

Strontium-90.....PNL-ALO-433 & 431

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2618D Description : 119.COMP.F DUPLICATE

DF ---- .26070 ---> 100.00000 ---- .49715 ---> 10.00000 ---- .99492

Dilution Factor = 7.7550E+03 +/- 1.81%

Analysts Historical Yield .9800 +/- 7.0%

To (separation) 3 / 15 / 96 PST 10 : 30

Instrument	P.B.C. - 2	P.B.C - 2
d/c Y-90	1.8400	1.8400

Date	3 / 15 / 96	3 / 18 / 96
Time(PST)	14 : 2	9 : 1
Total counts	10943	16703
Count time	10	10
Bkg C/M	28.120	28.160
Bkg cnt time	100	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Strontium-90	dpm/g	1.69E+07	8.0	6.57E+04
	uCi/g	7.62E+00 ✓		2.96E-02

Data Entry by T Tran-le Date 3/18/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/18/96

Pacific Northwest Laboratory 96

Strontium-90.....PNL-ALO-433 & 431 90123

Customer : TWRS Date Received : 03/ 11/ 96 Work order M23/95 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2618D Description : 119.COMP.F DUPLICATE

Pipet Nos.: #82 #14

DF ---.2607 → 100 ---.49715 → 10 ---.99493--- ---

Pipet checks are recorded on labsheets by pipet number

Std_____ LRB BNW_____ Page(s) No._____

Standard card ID 90123 Blank card ID 90123

Analyst [illegible] Date 3/15/96

To (separation) 3/15/96 PST 10:30

Instrument	P.B.C. - 2	d/c Y-90 1.84

Date	3/15/96	3/18/96
Time(PST)	14:02	9:01
Total counts	10943	16703
Count time	10	10
Bkg C/M	28.12	28.16
Bkg cnt time	100	100

Analyst T Trang-Le 3/15/96
T Trang-Le 3/18/96

Pacific Northwest Laboratory 96096

Strontium-90.....PNL-ALO-433 & 431

Customer : TWRS Date Received 2/ 7/ 96 Work order : ARF(SOW) : ASR 2785

A.L.O. No. 96-02619 Description : FIELD BLANK.F

DF .... .49715 ---> 10.00000 .... .99492

Dilution Factor = 2.0217E+01 +/- 1.50%

Analysts Historical Yield .9800 +/- 7.0%

To (separation) 3 / 15 / 96 PST 10 : 30

Instrument	P.B.C. - 1	P.B.C - 1
d/c Y-90	1.7900	1.7900

Date	3 / 15 / 96	3 / 18 / 96
Time(PST)	14 : 10	9 : 11
Total counts	974	1501
Count time	10	10
Bkg C/M	30.050	30.040
Bkg cnt time	100	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Strontium-90	dpm/ml	3.93E+03	13.5	1.77E+02
	uCi/ml	1.77E-03 ✓		7.98E-05

Av $\frac{X\,100\,ml}{0.2253\,g} = 7.86E-1\ \frac{uCi}{g}$

JPP 3-18-96

Data Entry by T Trang-Le Date 3/18/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/18/96

Pacific Northwest Laboratory 96

Strontium-90.....PNL-ALO-433 & 431 96123

Customer : TWRS Date Received : 02/ 07/ 96 Work order : M23/95 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02619 Description : FIELD BLANK F

Pipet Nos.: #180 H,4

DF ---, 49715 → 10 --- 99492 --- --- ---

Pipet checks are recorded on labsheets by pipet number

Std_____ LRB BNW_____ Page(s) No._____

Standard card ID 96123 Blank card ID 96123

Analyst [illegible] Date 3/12/96

To (separation) 3/15/96 PST 10:30

Instrument | P.B.C. - 1 | d/c Y-90 1.79

Date	3/15/96	3/18/96
Time(PST)	14:10	9:11
Total counts	974	1501
Count time	10	10
Bkg C/M	30.05	30.04
Bkg cnt time	100	100

Analyst T Trang-le 3/15/96
T Trang-le 3/18/96

Pacific Northwest Laboratory 96129

Strontium-90.....PNL-ALO-433 & 431

Customer : TWRS Date Received 0/ 0/ 0 Work order : M23195 ARF(SOW) : ASR2785

A.L.O. No. 96-02619OUP Description :

DF .... .49715 ---> 10.00000 .... .99492

Dilution Factor = 2.0217E+01 +/- 1.73%

Analysts Historical Yield .9800 +/- 7.0%

To (separation) 3 / 15 / 96 PST 10 : 30

Instrument	P.B.C. - 2	P.B.C - 2
d/c Y-90	1.8400	1.8400

Date	3 / 15 / 96	3 / 18 / 96
Time(PST)	14 : 12	9 : 2
Total counts	947	1412
Count time	10	10
Bkg C/M	28.120	28.160
Bkg cnt time	100	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Strontium-90	dpm/ml	3.57E+03	13.6	1.72E+02
	uCi/ml	1.61E-03 ✓		7.75E-05

$\frac{X 100 ml}{Av\ 0.2253g} = 7.15E-1$

LRG 3-18-96

Data Entry by T Trang-6 Date 3/18/96

Calculation and Analytical Data Sheet Reviewed by LR Greenwood Date 3/18/96

Pacific Northwest Laboratory 96

Strontium-90.....PNL-ALO-433 & 431 96123

Customer : TWRS Date Received : 02/ 07/ 96 Work order #123195 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02619 Dup Description : FIELD BLANK,F Duplicate

Pipet Nos.: #82 #14

DF .49915 → 10 .99492 --- --- ---

Pipet checks are recorded on labsheets by pipet number

Std_____ LRB BNW_____ Page(s) No._____

Standard card ID 96123 Blank card ID 96123

Analyst TG Pospal Date 3/15/96

To (separation) 3/15/96 PST 10:30

Instrument | P.B.C. - 2 | d/c Y-90 1.84 |

Date	3/15/96	3/18/96
Time(PST)	14 : 12	9 : 02
Total counts	9407	412
Count time	10	10
Bkg C/M	28.12	28.16
Bkg cnt time	100	100

Analyst T Trang-le 3/15/96
T Trang-le 3/18/96

Pacific Northwest Laboratory 96095

Strontium-90.....PNL-ALO-433 & 431

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. BLK-2785 Description :

DF .... .99492 ---> 10.00000 .... .99492

Dilution Factor = 1.0102E+01 +/- 1.50%

Analysts Historical Yield .9800 +/- 7.0%

To (separation) 3 / 15 / 96 PST 10 : 30

Instrument	P.B.C. - 2	P.B.C - 2
d/c Y-90	1.8400	1.8400

Date	3 / 15 / 96	3 / 18 / 96
Time(PST)	13 : 29	8 : 27
Total counts	337	296
Count time	10	10
Bkg C/M	28.120	28.160
Bkg cnt time	100	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Strontium-90	dpm/ml	-1.57E+02	254.2	8.51E+01
	uCi/ml	-7.09E-05		3.84E-05 ✓

$\times \frac{100ml}{0.2253g} = 1.70E-2\ \frac{uCi}{g}$

JRJ 3-18-96

Data Entry by T Trang-Le Date 3/18/96

Calculation and Analytical Data Sheet Reviewed by L Rheinwald Date 3/18/96

Pacific Northwest Laboratory 96

Strontium-90.....PNL-ALO-433 & 431 96123

Customer : TWRS Date Received : 03/ 11/ 96 Work order M23195 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : BLK-2785 Description : D_2H_2O

Pipet Nos.: 714 714

DF ---.99492 → 10 — .99492 --- --- ---

Pipet checks are recorded on labsheets by pipet number

Std_____ LRB BNW_____ Page(s) No._____

Standard card ID 96123 Blank card ID 96123

Analyst [illegible] Date 3/15/96

To (separation) 3/15/96 PST 10:30

Instrument | P.B.C. - 2 | d/c Y-90 1.89 |

Date	3/15/96	3/18/96
Time(PST)	13:29	8:27
Total counts	337	296
Count time	10	10
Bkg C/M	28.12	28.16
Bkg cnt time	900	100

Analyst T Trang-le 3/15/96
T Trang-le 3/18/96

Pacific Northwest Laboratory 96095

Strontium-90.....PNL-ALO-433 & 431

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. STD-2785 Description : 1.8298 E6 dpm/ml

DF .... .09944 ---> 10.00000 .... .09944

Dilution Factor = 1.0113E+03 +/- 1.73%

Analysts Historical Yield 1.0000 +/- 6.0%

To (separation) 3 / 15 / 96 PST 10 : 30

Instrument	P.B.C. - 1	P.B.C - 1
d/c Y-90	1.7900	1.7900

Date	3 / 15 / 96	3 / 18 / 96
Time(PST)	13 : 29	8 : 26
Total counts	8337	12398
Count time	10	10
Bkg C/M	30.050	30.040
Bkg cnt time	100	100

historical yield 98%, ±7

Calculation and Results

		Activity	Uncertainty,%	MDA
Strontium-90	dpm/ml	1.47E+06	7.3	8.63E+03
	uCi/ml	6.64E-01		3.89E-03

81%

Data Entry by T Trang-le Date 3/18/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/18/96

Pacific Northwest Laboratory 96

Strontium-90.....PNL-ALO-433 & 431 96123

Customer : TWRS Date Received : 03/ 11/ 96 Work order M23195 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : STD-2785 Description : 2.2165 E6 dpm/ml Ref 4-26-88
1.8298 E6 dpm/ml

Pipet Nos.: #8 #8

DF ---.09944 ml → 10 ml --- .09944 ml --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Std RS-11-9 LRB BNW 52634 Page(s) No. 49, 50

Standard card ID 96123 Blank card ID 96123

Analyst [signature] Date 3/15/96

To (separation) 3/15/96 PST 10:30

Instrument | P.B.C. - 1 | d/c Y-90 1.79

Date	3/15/96	3/18/96
Time(PST)	13:29	8:26
Total counts	8337	12398
Count time	10	10
Bkg C/M	30.05	30.04
Bkg cnt time	100	100

Analyst [signature] 3-15-96
T Trang-le 3/18/96

Pacific Northwest Laboratory 96128

Strontium-90.....PNL-ALO-433 & 431

Customer : TWRS Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. STD+96-2617B Description : 1.8298 E6 dpm/ml

DF .... .09944 ---> 10.00000 .... .09944

Dilution Factor = 1.0113E+03 +/- 1.50%

Analysts Historical Yield .9800 +/- 7.0%

To (separation) 3 / 15 / 96 PST 10 : 30

Instrument	P.B.C. - 2	P.B.C - 2
d/c Y-90	1.8400	1.8400
Date	3 / 15 / 96	3 / 18 / 96
Time(PST)	13 : 41	8 : 40
Total counts	9476	14237
Count time	10	10
Bkg C/M	28.120	28.160
Bkg cnt time	100	100

1.82E6/1.0113E3 = 1.78E3
-3.98E4 /8.9735E3 = 4.44E
1.78E3
1.0113E3
1.80E6
1.8298E
99%

Calculation and Results

		Activity	Uncertainty,%	MDA
Strontium-90	dpm/ml	1.82E+06	8.0	8.54E+03
	uCi/ml	8.18E-01		3.85E-03

Data Entry by T Trang-le Date 3/18/96

Calculation and Analytical Data Sheet Reviewed by LR Freeman Date 3/18/96

Pacific Northwest Laboratory 96

Strontium-90.....PNL-ALO-433 & 431

96123

Customer : TWRS Date Received : 03/ 11/ 96 Work order : M 23195 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2617B Std + Description : PROCESS BLANK 2 2105 EC d/c/ml 4 26-88

Pipet Nos.: N82 A .09944 ml Std

DF --- .2253 → 100 --- .49715 → 10 — .09944 --- ---

Avg 52

Pipet checks are recorded on labsheets by pipet number

Std RS 11-9 LRB BNW 52626 Page(s) No. 49, 50

Standard card ID 96123 Blank card ID 96123

Analyst [signature] Date 3/15/96

To (separation) 3/15/96 PST 10:30

Instrument | P.B.C. - 2 | d/c Y-90 1.84 |

Date	3/15/96	3/18/96
Time(PST)	13:41	8:40
Total counts	9476	14237
Count time	10	10
Bkg C/M	28.12	28.16
Bkg cnt time	100	100

Analyst T Trang-le 3/15/96
T Trang-le 3/18/96

D6 - URANIUM ANALYSIS

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DATE TO QC: 03/20/96

DATA QUALITY REVIEW

I have reviewed the following data for completeness and for compliance with project requirements.

Analyte - Uranium

Data Package/Report - BX-112

Project No. - 22762

ACL Numbers - 96-2617, 96-2618, 96-2619

PNL ACL Quality Representative

3/28/96

Date

3/28/96

Table 3.3: Tank 241-BX-112 Cores 118,119 Total Beta, Sr-90, and Uranium Results

ALO #	CORE ID	Total Beta uCi/g	+/-% Error	Sr-90 uCi/g	+/-% Error	Uranium ug/g	+/-% Error
96-2617	PROCESS BLANK	4.26E-02	36%	<3.6E-2		<3.6E+0	
96-2617	118.COMP.F	6.97E+01	4%	5.68E+00	9%	9.79E+02	7%
96-2617-DUP	118.COMP.F DUP	6.86E+01	4%	4.92E+00	9%	1.05E+03	7%
	RPD	1.6%		14.3%		7.0%	
96-2618	119.COMP.F	6.33E+01	4%	9.69E+00	8%	1.09E+03	7%
96-2618-DUP	119.COMP.F DUP	6.41E+01	4%	7.62E+00	8%	1.01E+03	7%
	RPD	1.3%		23.9%		7.6%	
	MD			2.10			
96-2619	FIELD BLANK	7.63E+00	3%	7.86E-01	14%	<8.3E-1	
96-2619-DUP	FIELD BLANK DUP	7.50E+00	3%	7.15E-01	14%	<4.6E-1	
	RPD	1.7%		9.5%			
	LAB BLANK	<2.2E-3		<1.7E-2		<2.0E-2	
	LAB STANDARD	105%		81%		101%	
	SAMPLE SPIKE	88%		99%			

Pacific Northwest Laboratory 96123

Uranium Laser.....PNL-ALO-445

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2617B Description : PROCESS BLANK

DF .... .22530 ---> 100.00000 .... .05001

Dilution Factor = 8.8753E+03 +/- 1.43%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml		
		U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.12500	U-236 (Mass f)	.00000000
Reading 2	.11800	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	-3.12E-01	23.	3.56E-03 ✓

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by LRGreenwood Date 3/15/96

Pacific Northwest Laboratory 96

Uranium Laser.....PNL-ALO-445

96123

Customer : TWRS Date Received : 03/ 11/ 96 Work order M23197 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2617B Description : PROCESS BLANK

Pipet Nos.: #15

DF ---.2253 → 100 — .05001 --- --- ---

g ml

Pipet checks are recorded on labsheets by pipet number

Working Std Low ACL-0029 Page(s) No. 10

Standard card ID 96123 Blank card ID 96123

Equipment	U Laser			Mass Spec.
Working Std. Conc.	.0996 ug/mL		U-234 (Mass %)	
Vol. of Working Std.	.01976		U-235 (Mass %)	
Reading 1	.05	.20	U-236 (Mass %)	
Reading 2	.04	.195	U-238 (Mass %)	

Analyst K A Pappel Date 3/15/96

Pacific Northwest Laboratory 96123

Uranium Laser.....PNL-ALO-445

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2617 Description : 118.COMP.F

DF .... .21180 ---> 100.00000 .... .09944 -+-> .99492 .... .01976

Dilution Factor = 2.6296E+05 +/- 2.65%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml		
		U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.36500	U-236 (Mass f)	.00000000
Reading 2	.55800	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	9.79E-01 ✓	7.	1.92E-02

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Sherwood Date 3/15/96

Pacific Northwest Laboratory 96

Uranium Laser.....PNL-ALO-445

96123

Customer : TWRS Date Received : 03/ 11/ 96 Work order : M23197 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2617 Description : 118.COMP.F

Pipet Nos.: #18 #14 #3

DF --- .2118 g → 100 ml --- .09944 ml → .99492 .01976 ---

Pipet checks are recorded on labsheets by pipet number

Working Std Low ACL-0029 Page(s) No. 10

Standard card ID 96123 Blank card ID 96123

Equipment	U Laser		Mass Spec.
Working Std. Conc.	.0996 ug/mL		
Vol. of Working Std.	.01976		U-234 (Mass %)
Reading 1	.365	.365	U-235 (Mass %)
Reading 2	.56	.555	U-236 (Mass %)
			U-238 (Mass %)

Analyst [signature] Date 3/15/96

Pacific Northwest Laboratory 96123

Uranium Laser.....PNL-ALO-445

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2617D Description : 118.COMP.F DUPLICATE

DF ---- .23880 ---> 100.00000 ---- .09944 -+-> .99492 ---- .01976

Dilution Factor = 2.3323E+05 +/- 2.65%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml		
		U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.41000	U-236 (Mass f)	.00000000
Reading 2	.59000	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	1.05E+00 ✓	7.	1.61E-02

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by [signature] Date 3/15/96

Pacific Northwest Laboratory 96

Uranium Laser.....PNL-ALO-445 96123

Customer : TWRS Date Received : 03/ 11/ 96 Work order : 123192 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2617D Description : 118.COMP.F DUPLICATE

Pipet Nos.: #18 #14 #3

DF --- .2388 → 100 --- .09944 → .99492 .01976 ---
g mL mL mL mL

Pipet checks are recorded on labsheets by pipet number

Working Std Low ACL-0029 Page(s) No. 10

Standard card ID 96123 Blank card ID 96123

Equipment	U Laser		Mass Spec.
Working Std. Conc.	.0996 ug/mL		
		U-234 (Mass %)	
Vol. of Working Std.	01976	U-235 (Mass %)	
Reading 1	.41	U-236 (Mass %)	
Reading 2	.59	U-238 (Mass %)	

Analyst [signature] Date 3/15/96

Pacific Northwest Laboratory 96123

Uranium Laser.....PNL-ALO-445

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2618 Description : 119.COMP.F

DF .... .21260 ---> 100.00000 .... .09944 -+-> .99492 .... .01976

Dilution Factor = 2.6197E+05 +/- 2.65%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml	U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.39000	U-236 (Mass f)	.00000000
Reading 2	.57500	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	1.09E+00 ✓	7.	1.86E-02

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Uranium Laser.....PNL-ALO-445 96123

Customer : TWRS Date Received : 03/ 11/ 96 Work order M23197 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2618 Description : 119.COMP.F

Pipet Nos.:

			#8	#14	#3	
DF	--- .2126 →	100	--- .09944 →	.99492 —	.01976 ---	---
	g	ml	ml	ml	ml	

Pipet checks are recorded on labsheets by pipet number

Working Std Low ACL-0029 Page(s) No. 10

Standard card ID 96123 Blank card ID 96123

Equipment	U Laser		Mass Spec.
Working Std. Conc.	.0996 ug/mL	U-234 (Mass %)	
Vol. of Working Std.	01976	U-235 (Mass %)	
Reading 1	.39	U-236 (Mass %)	
Reading 2	.575	U-238 (Mass %)	

Analyst [signature] Date 3/15/96

Pacific Northwest Laboratory 96123

Uranium Laser.....PNL-ALO-445

Customer : TWRS Date Received 3/ 11/ 96 Work order : ARF(SOW) : ASR 2785 (2889)

A.L.O. No. 96-2618D Description : 119.COMP.F DUPLICATE

DF ---- .26070 ---> 100.00000 ---- .09944 -+-> .99492 ---- .01976

Dilution Factor = 2.1363E+05 +/- 2.65%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml		
		U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.44500	U-236 (Mass f)	.00000000
Reading 2	.63000	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	1.01E+00 ✓	7.	1.38E-02

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by LR Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Uranium Laser.....PNL-ALO-445 96123

Customer : TWRS Date Received : 03/ 11/ 96 Work order : M23197 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : 96-2618D Description : 119,COMP,F DUPLICATE

Pipet Nos.: #8 #14 #3

DF ---.2607 → 100 ---.09944 → .99492 — .01976 ---

g ~ ml ml ml

Pipet checks are recorded on labsheets by pipet number

Working Std Low ACL-0029 Page(s) No. 2

Standard card ID 96123 Blank card ID 96123

Equipment	U Laser		Mass Spec.
Working Std. Conc.	.0996 ug/mL	U-234 (Mass %)	
Vol. of Working Std.	.01976	U-235 (Mass %)	
Reading 1	.445	U-236 (Mass %)	
Reading 2	.63	U-238 (Mass %)	

Analyst K A Poyzel Date 3/15/96

Pacific Northwest Laboratory 96096

Uranium Laser.....PNL-ALO-445

Customer : TWRS Date Received 2/ 7/ 96 Work order : ARF(SOW) : ASR 2785

A.L.O. No. 96-02619 Description : FIELD BLANK.F

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml		
		U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.56000	U-236 (Mass f)	.00000000
Reading 2	.44000	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/ml	Uncertainties %		Less than mg/ml
Total uranium	-1.84E-04	6.	*	1.87E-06 ✓

$\times \frac{100\,ml}{.2253\,g}$ Av $= 8.3E-4$ mg/g

JRD 3-15-96

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Uranium Laser.....PNL-ALO-445 96123

Customer : TWRS Date Received : 02/ 07/ 96 Work order : M23/97 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02619 Description : FIELD BLANK.F

Pipet Nos.: #15

DF	.05001 ml	---	---	---	---	---

Pipet checks are recorded on labsheets by pipet number

Working Std Low ACL-0029 Page(s) No. 10

Standard card ID 96123 Blank card ID 96123

Equipment	U Laser		Mass Spec.
Working Std. Conc.	.0996 ug/mL	U-234 (Mass %)	
Vol. of Working Std.	01976	U-235 (Mass %)	
Reading 1	.56	U-236 (Mass %)	
Reading 2	.-14	U-238 (Mass %)	

Analyst [illegible] Date 3/15/96

Pacific Northwest Laboratory 96125

Uranium Laser.....PNL-ALO-445

Customer : TWRS Date Received 0/ 0/ 0 Work order : ..... ARF(SOW) : .....

A.L.O. No. 96-02619 DUP Description : .....

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml		
		U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.58000	U-236 (Mass f)	.00000000
Reading 2	.78000	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/ml	Uncertainties %	Less than mg/ml
Total uranium	1.14E-04 ✓	5.	1.04E-06

$\times \frac{100 ml}{.2253 g}$ = 4.6 E-4 mg/g

AV

JRG 3-15-96

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by LR Greenwood Date 3/15/96

Pacific Northwest Laboratory 96

Uranium Laser.....PNL-ALO-445

96133

Customer : TWRS Date Received : 02/ 07/ 96 Work order : M23192 ARF(SOW) : ASR 2785

A.L.O. No. : 96-02619 Dup Description : FIELD BLANK,F Duplicate

Pipet Nos.: #15

DF --- .05001 --- --- --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Working Std Low ACL-0029 Page(s) No. 10

Standard card ID 96133 Blank card ID 96133

Equipment	U Laser		Mass Spec.
Working Std. Conc.	.0996 ug/mL		
Vol. of Working Std.	01576	U-234 (Mass %)	
Reading 1	.58	U-235 (Mass %)	
Reading 2	.78	U-236 (Mass %)	
		U-238 (Mass %)	

Analyst [signature] Date 3/15/96

Pacific Northwest Laboratory 96095

Uranium Laser.....PNL-ALO-445

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. BLK-2785 Description :

DF ---- 5.00000

Dilution Factor = 2.0000E-01 +/- 1.00%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml		
		U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.00000	U-236 (Mass f)	.00000000
Reading 2	.19800	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/ml	Uncertainties %	Less than mg/ml
Total uranium	0.00E+00	101.	4.42E-08

✓ $X \frac{100 ml}{.2253 g} = 2.0E-5$ mg/g

JRG 3-15-96

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by [signature] Date 3/15/96

Pacific Northwest Laboratory 96

Uranium Laser.....PNL-ALO-445 96123

Customer : TWRS Date Received : 03/ 11/ 96 Work order M23197 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : BLK-2785 Description : D,H2O

Pipet Nos.:

DF --- 5ml --- --- --- --- --- ---

Pipet checks are recorded on labsheets by pipet number

Working Std Low ACL-0029 Page(s) No. 10

Lyp 3/15/96

Standard card ID 96123 Blank card ID 96123

Equipment	U Laser			Mass Spec.
Working Std. Conc.	.0996 ug/mL		U-234 (Mass %)	
Vol. of Working Std.	01976		U-235 (Mass %)	
Reading 1	.00	.00	U-236 (Mass %)	
Reading 2	.195	.20	U-238 (Mass %)	

Analyst [signature] Date 3/15/96

Pacific Northwest Laboratory 96095

Uranium Laser.....PNL-ALO-445

Customer : TWRS Date Received 2/ 7/ 96 Work order : K41903 ARF(SOW) : ASR 2785

A.L.O. No. STD-2785 Description : .1001 ug U/ml

DF .... .01976

Dilution Factor = 5.0607E+01 +/- 2.00%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml	U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.19500	U-236 (Mass f)	.00000000
Reading 2	.38800	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/ml	Uncertainties %	Less than mg/ml
Total uranium	1.01E-04	12.	5.41E-06

101%

Data Entry by T Trang-le Date 3/15/96

Calculation and Analytical Data Sheet Reviewed by LRGreenwood Date 3/15/96

Pacific Northwest Laboratory

96

96123
AT Yap 3/15/96

Uranium Laser.....PNL-ALO-445

Customer : TWRS Date Received : 03/ 11/ 96 Work order : M23197 ARF(SOW) : ASR 2785 (2889)

A.L.O. No. : STD-2785 Description : W-157 .1001 ug U/ml ACL-0029 p 4-7

Pipet Nos.: #3

DF ---.01976--- --- --- --- --- ---
ml

Pipet checks are recorded on labsheets by pipet number

Working Std Low ACL-0029 Page(s) No. 10

Standard card ID 96123 Blank card ID 96123

Equipment	U Laser		Mass Spec.
Working Std. Conc.	.0996 ug/mL		
Vol. of Working Std.	01976		U-234 (Mass %)
Reading 1	.195	.195	U-235 (Mass %)
Reading 2	.39	.385	U-236 (Mass %)
			U-238 (Mass %)

Analyst Ya Poyzpl Date 3/15/96

Samples: 96-2617 BLK; 2617; 2617 Dup; 2618; 2618 Dup; 2619; 2619 Dup; Std-2785; BLK-2785.

D7 - RADIOCHEMISTRY CALIBRATION AND CONTROL CHART DOCUMENTATION

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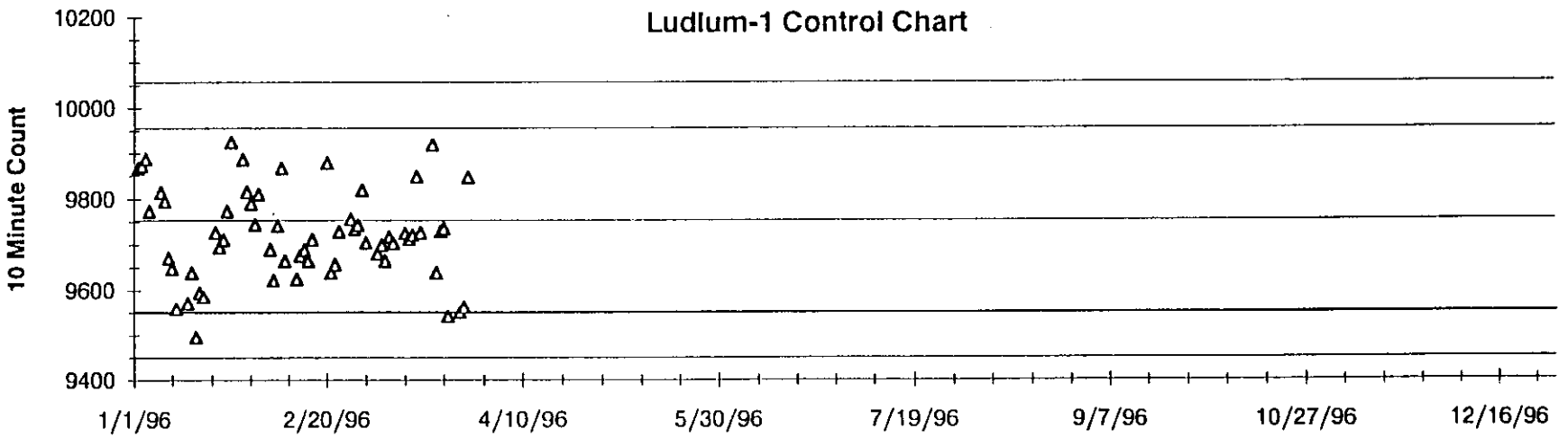
WHC-SD-WM-DP-170 Rev. 1



K. Thomas 3/27/96

L R Greenwood
3/27/96

BNW54273 page 12 1 of 5

Ludlum-1 WB76863

High Voltage 2.30

T1350 NBS Calibration Summary

24.90μL 3321 ± 35.4 d/m
24.92μL 3324 ± 35.5 d/m
} HEDL-N-3219 page 3

$\overline{X}_2$ = 3322.5 ± 25.067 d/m

Observed Counts:

$\overline{X}_{16}$ = 1404.407 ± 17.8045 c/m

Calculation:

3322.5 ± 25.067 d/m ÷ 1404.407 ± 17.8045 c/m = d/c

2.365767 ± 0.034902 = 0.4227 ~~d/c~~ d/d ± 1.48%

Reviewed LR Greenwood date 2/19/93

BATTELLE-NORTHWEST
RICHLAND, WASHINGTON

ALPHA COUNTER DATA SHEET

SAMPLE

SUBMITTED BY

COUNTED BY Anne E Kozelisky

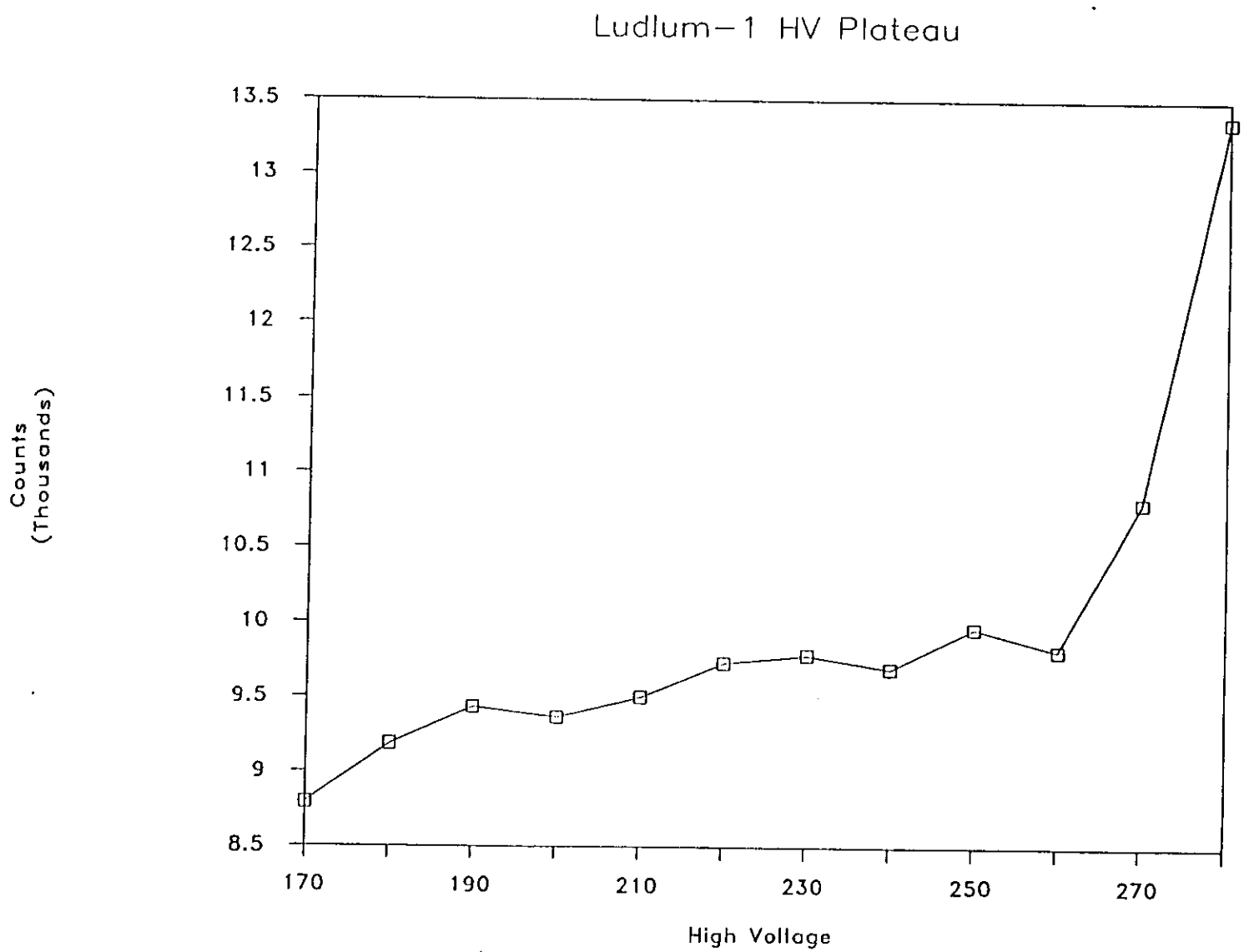
REMARKS Ludlum-1 Calibration Counts HV = 2.30 (WB76863)
T-1350

SAMPLE NUMBER		DATE 19 93	INST. NO.	INT. (MIN.) T	RECORDER READING SCALE OF:	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N. C	BGD B	NET RATE X = R − B + C	GEOMETRY %	DISINTEGRATION RATE d/m
24.90	1	2/12	L-1	10	+	14160	1416.0		0.173	1415.827		
	2				+	14047	1404.7			1404.527		
	3				+	13860	1386.0			1385.827		
	4				+	14282	1428.2			1428.027		
					+							
24.92	1				+	14205	1420.5			1420.327		
	2				+	13945	1394.5			1394.327		
	3				+	13922	1392.2			1392.027		
	4				+	13998	1399.8			1399.627		
					+							
					+							
					+							
					+							
					+							
					+							
24.90	1	2/17			+	14129	1412.9		0.138	1412.762		
	2				+	13809	1380.9			1380.762		
	3				+	13976	1397.6			1397.462		
	4				+	14320	1432.0			1431.862		
					+							
24.92	1				+	14371	1437.1			1436.962		
	2				+	13828	1382.8			1382.662		
	3				+	13937	1393.7			1393.562		
	4				+	13941	1394.1			1393.962		
					+							

BNW 54273
p. 12 245

2045

BNW
54273
p.12 3 of 5



BATTELLE-NORTHWEST
RICHLAND, WASHINGTON

ALPHA COUNTER DATA SHEET

SAMPLE

SUBMITTED BY

COUNTED BY

REMARKS High Voltage Plateau Sodium-1 using Control Standard

SAMPLE NUMBER	DATE 19 93	INST. NO.	INT. (MIN.) T	RECORDER READING SCALE OF:	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N. C	BGD B	NET RATE X = R − B + C	GEOMETRY %	DISINTEGRATION RATE d/m
2.40	2/11	L-1	10	+	9694						
2.50				+	9964						
2.60				+	9818						
2.70				+	10805						
2.8				+	13362						
				+							
2.30				+	9783						
2.20				+	9730						
2.10				+	9501						
2.00				+	9364						
1.90				+	9431						
1.80				+	9186						
1.70				+	87.92						
				+							
				+							
				+							
				+							
				+							
				+							
				+							
				+							
				+							
				+							
				+							
				+							

BNV
54273
1/12 4/5

BATTELLE-NORTHWEST
RICHLAND, WASHINGTON

ALPHA COUNTER DATA SHEET

SAMPLE

SUBMITTED BY

COUNTED BY

REMARKS Ludlum-1 Control Chart-Counts HV=2.30

SAMPLE NUMBER	DATE 19__	INST. NO.	INT. (MIN.) T	RECORDER READING SCALE OF:	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N. C	BGD B	NET RATE X = R − B + C	GEOMETRY %	DISINTEGRATION RATE d/m
	2/12/93	L-1	10	+	9764			0.173			
				+	9742						
				+	9779						
	2/16/93			+	9857			0.151			
				+	9760						
				+	9680						
				+	9709						
				+	9923						
				+	9800						
				+	9745						
				+	9756						
	2/17/93			+	9897			0.138			
				+	9855						
				+	9809						
				+	9865						
				+	9739						
				+	9726						
				+	~~9541~~ 2/17/93						
				+	9969						
				+	9818						
	2/18/93			+	9737			0.161			
				+							
				+							
				+							
				+							

BNW 54273

p. 12 of 5

LUDLUM 2

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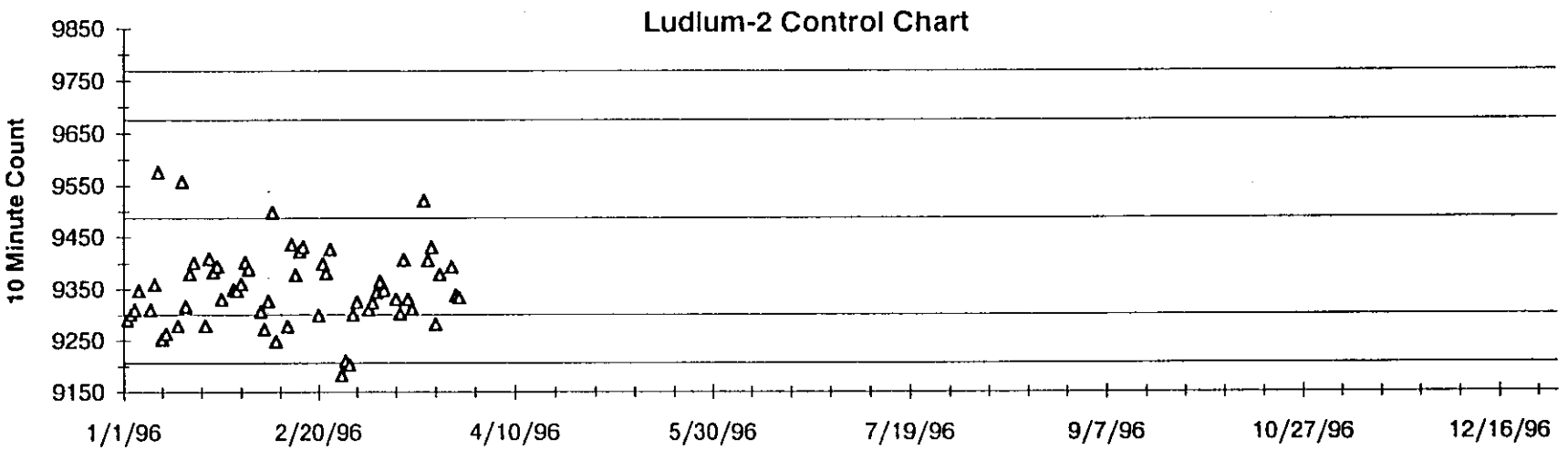

K. Thomas 3/07/96

L R Greenwood
3/27/96

BNW52343 p. 103

L. Greenwood 9-28-90

Ludlum-2 WA94744 [L-2]

T1350 NBS Calibration Summary

24.90ul 3321 ± 35 d/m
24.92ul 3324 ± 35 d/m

24.90ul $\bar{X}_4$ 1394.725 c/m

$\bar{X}_4$ 1396.425 c/m

$\bar{X}_8$ 1395.575 c/m

3321 d/m ÷ 1395.575 c/m = 2.379664
d/c = 0.420227

24.92ul $\bar{X}_4$ 1374.075 c/m

$\bar{X}_4$ 1367.650 c/m

$\bar{X}_8$ 1370.8625 c/m

3324 d/m ÷ 1370.8625 c/m = 2.424750
d/c = 0.412413

$\bar{X}_2$ = 0.416320

Project No. _____ Date of Work _____
Entered By _____ Date _____
Disclosed To and Understood By
Signed 1. _____ Date _____
2. _____ Date _____

Entered 9-26-90 Anne E Kozlowsky

102

BATTELLE-NORTHWEST
RICHLAND, WASHINGTON

ALPHA COUNTER DATA SHEET

SAMPLE Ludlum-2 WA94744

REMARKS Voltage @ 3.2

SUBMITTED BY

COUNTED BY

SAMPLE NUMBER	DATE 19 90	INST. NO.	INT. (MIN.) T	RECORDER READING SCALE OF 1	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N. C	BGD B	NET RATE X = R − B + C	GEOMETRY %	DISINTEGRATION RATE d/m
24.90 λ ①	4/19	2	10	+	13726						
②				+	14168						
③				+	13971						
④				+	13992						
				+							
24.92 λ ①	4/20			+	13696						
②				+	13561						
③				+	13790						
④				+	13659						
				+							
				+							
				+							
				+							
				+							
				+							
				+							
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				+							
				+							

BNW52343 p.102

2053

LUDLUM 3

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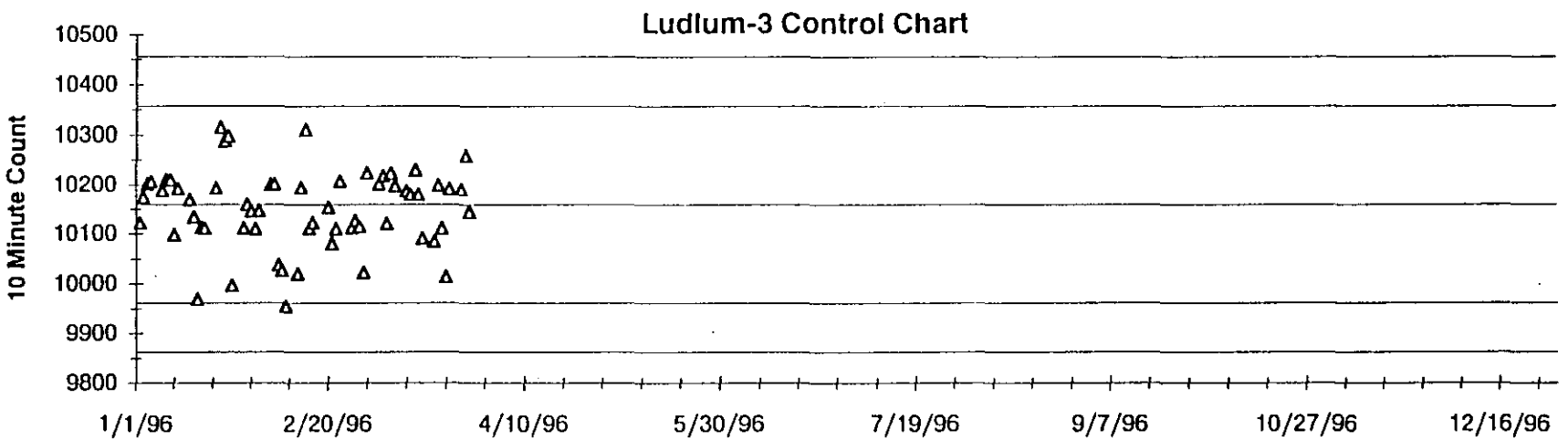

K. Thomas 3/27/96

J R Greenwood
3/27/96

2056

BNW52343 page 139 of 20

BATTELLE-NORTHWEST
RICHLAND, WASHINGTON

ALPHA COUNTER DATA SHEET

SAMPLE: Ludlum-3
SUBMITTED BY:
COUNTED BY:

REMARKS: Voltage @ 3.0

SAMPLE NUMBER		DATE 19 91	INST. NO.	INT. (MIN.) T	RECORDER READING SCALE OF 1	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N. C	BGD B	NET RATE X = R − B + C	GEOMETRY %	DISINTEGRATION RATE d/m
24.90λ	1	5-14	3	10	+	14567						
	2				+	14621						
	3				+	14520						
	4				+	14721						
					+							
24.92λ	1				+	14429						
	2				+	14258						
	3				+	14307						
	4				+	14374						
					+							
					+							
					+							
					+							
					+							
					+							
24.90λ	1	5-15			+	14583						
	2				+	14522						
	3				+	14470						
	4				+	14662						
					+							
24.92λ	1				+	14419						
	2				+	14243						
	3				+	14428						
	4				+	14361						
					+							

BNW 52313 page 138 -2 of 20

Ludlum-3 WA82316

High Voltage 3.00

T1350 NBS Calibration Summary

24.90µL 3321 ± 35.4 d/m
24.92µL 3324 ± 35.5 d/m
} HEDL-N-3219 page 3

24.90µL $\bar{X}$ 1460.7250 c/m

$\bar{X}$ 1455.9250 c/m

$\bar{X}$ 1458.3250 c/m ± 8.23 c/m

3321 d/m ÷ 1458.3250 c/m = 2.2773

~~d/c~~ c/d = 0.4391 ± 0.56%

24.92µL $\bar{X}$ 1434.2000 c/m

$\bar{X}$ 1440.6750 c/m

$\bar{X}$ 1435.2375 c/m ± 7.51 c/m

3324 d/m ÷ 1435.2375 c/m = 2.3160

~~d/c~~ = 0.4318 ± 0.52%

$\bar{X}$ = 0.4355 ± 0.76%

Reviewed LR Greenwood date 4/25/91

LUDLUM 4

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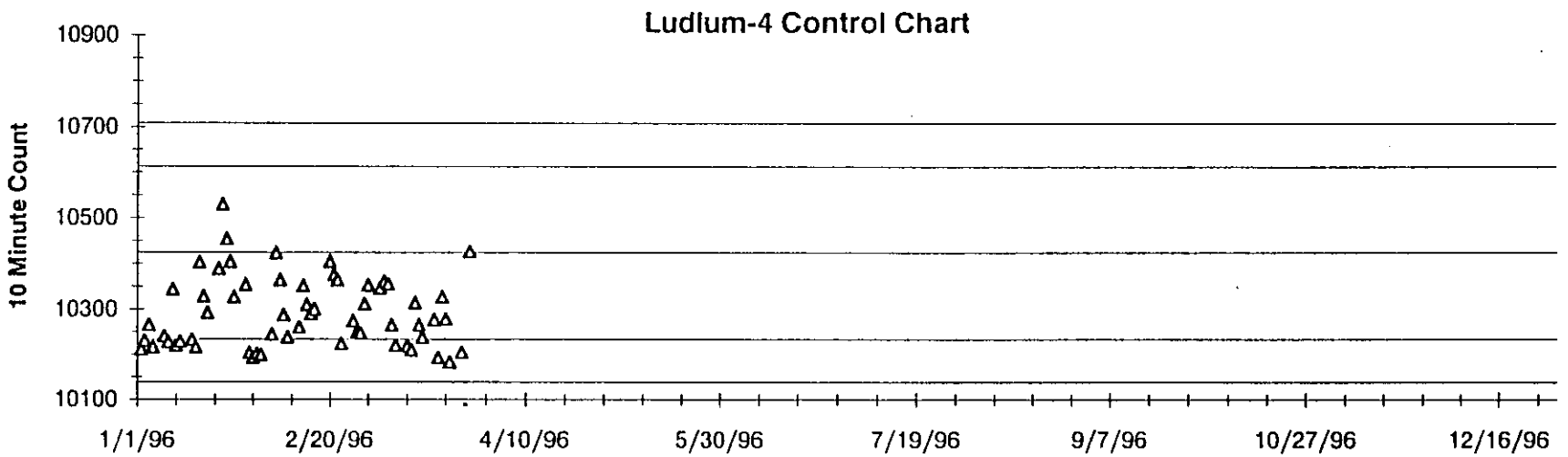


Kathie Thomas 3/27/96

J R Greenwood 3/27/96

BNW 52343 page 138-3 of 20

Ludlum-4 WA82317

High Voltage 3.00

T1350 NBS Calibration Summary

24.90μL	3321 ± 35.4 d/m	HEDL-N-3219 page 3
24.92μL	3324 ± 35.5 d/m	

24.90μL $\bar{X}$ 1456.3750 c/m

$\bar{X}$ 1462.1750 c/m

$\bar{X}$ 1459.2750 c/m ± 16.95 c/m

3321 d/m ÷ 1459.2750 c/m = 2.2758

d/c = 0.4394 ± 1.16%

24.92μL $\bar{X}$ 1437.5750 c/m

$\bar{X}$ 1443.9000 c/m

$\bar{X}$ 1440.7375 c/m ± 15.56 c/m

3324 d/m ÷ 1440.7375 c/m = 2.3072

d/c = 0.4334 ± 1.08%

$\bar{X}$ = 0.4364 ± 1.58%

Reviewed L R Greenwood date 9/25/91

BNW 52343 page 12 of 20

BATTELLE-NORTHWEST
RICHLAND, WASHINGTON

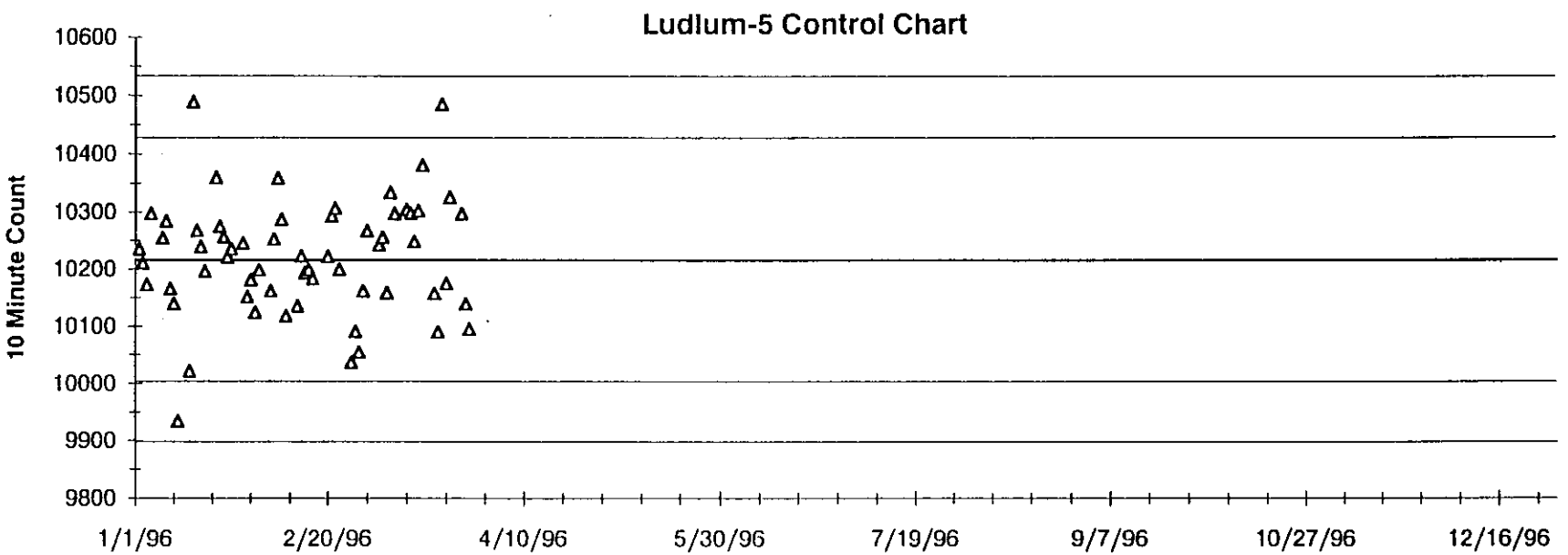
ALPHA COUNTER DATA SHEET

SAMPLE Ludlum-4
SUBMITTED BY
COUNTED BY

REMARKS Voltage @ 3.0

SAMPLE NUMBER		DATE 19 91	INST. NO.	INT. (MIN.) T	RECORDER READING SCALE OF:	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N. C	BGD B	NET RATE X = R − B + C	GEOMETRY %	DISINTEGRATION RATE d/m
24.90λ	1	5-9	4	10	+	14589						
	2				+	14440						
	3				+	14597						
	4				+	14629						
					+							
24.92λ	1				+	14491						
	2				+	14152						
	3				+	14431						
	4				+	14429						
					+							
					+							
					+							
					+							
					+							
					+							
24.90λ	1	5-10			+	14596						
	2				+	14509						
	3				+	14417						
	4				+	14965						
					+							
24.92λ	1				+	14663 ~~14965~~						
	2				+	14237						
	3				+	14450						
	4				+	14406						
					+							

2063



T. Thomas 3/27/96

L R Greenwood
3/27/96

BNW 52343 page 138-1 of 20

Ludlum-5 WA82318

High Voltage 2.80

T1350 NBS Calibration Summary

24.90μL	3321 ± 35.4 d/m	HEDL-N-3219 page 3
24.92μL	3324 ± 35.5 d/m	

24.90μL $\bar{X}$ 1403.6500 c/m

$\bar{X}$ 1406.1750 c/m

$\bar{X}$ 1404.9125 c/m ± 12.59 c/m

3321 d/m ÷ 1404.9125 c/m = 2.3638

d/c = 0.4230 ± 0.90%

24.92μL $\bar{X}$ 1379.5000 c/m

$\bar{X}$ 1384.2000 c/m

$\bar{X}$ 1381.8500 c/m ± 12.31 c/m

3324 d/m ÷ 1381.8500 c/m = 2.4055

d/c = 0.4157 ± 0.89%

$\bar{X}$ = 0.4194 ± 1.27%

Reviewed L R Greenwood date 9/25/91

BNW 52343 page 135-15 of 20

BATTELLE-NORTHWEST
RICHLAND, WASHINGTON

ALPHA COUNTER DATA SHEET

SAMPLE Cullum-5
SUBMITTED BY
COUNTED BY

REMARKS Voltage @ 2.8

SAMPLE NUMBER		DATE 19 91	INST. NO.	INT. (MIN.) T	RECORDER READING SCALE OF:	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N. C	BGD B	NET RATE X = R − B + C	GEOMETRY %	DISINTEGRATION RATE d/m
24.902	1	5-15			+	14019						
	2				+	14066						
	3				+	13857						
	4				+	14204						
					+							
24.922	1				+	13945						
	2				+	13639						
	3				+	13727						
	4				+	13869						
					+							
					+							
					+							
					+							
					+							
					+							
24.902	1	5-16			+	14004						
	2				+	13944						
	3				+	14061						
	4				+	14238						
					+							
24.922	1				+	13795						
	2				+	13722						
	3				+	14009						
	4				+	13847						
					+							

2055

LUDLUM 6

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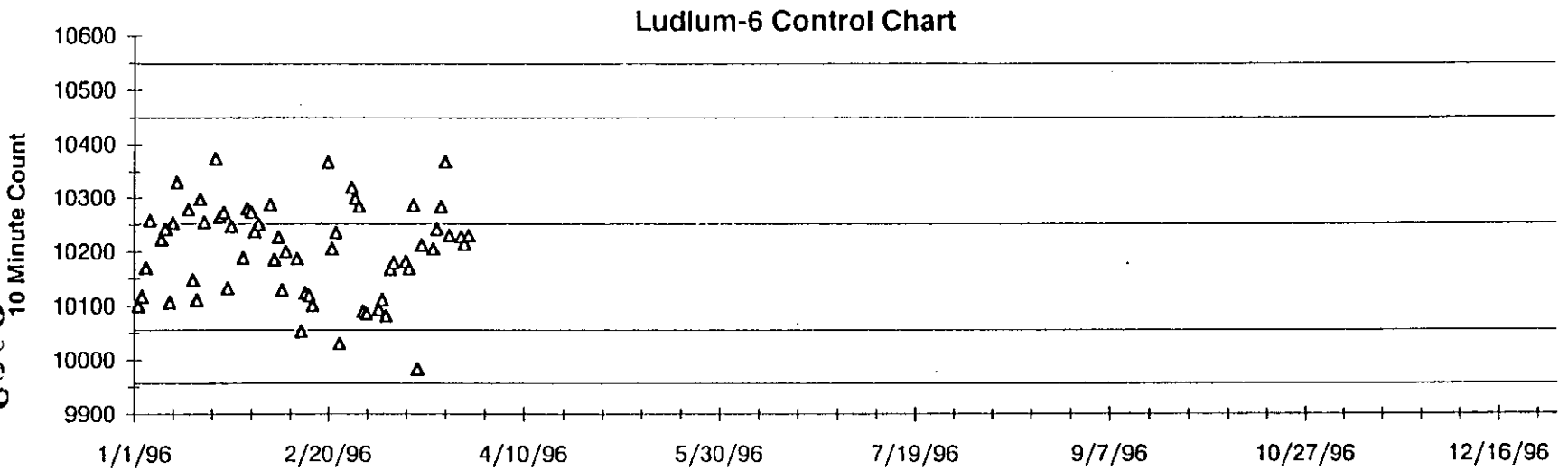

K. Thomas 3/27/96

L R Greenwood
3/27/96

BNW 52313 page 138-5 of 20

Ludlum-6 WA82319

High Voltage 2.70

T1350 NBS Calibration Summary

24.90μL	3321 ± 35.4 d/m	HEDL-N-3219 page 3
24.92μL	3324 ± 35.5 d/m	

24.90μL $\bar{X}$ 1419.8250 c/m

$\bar{X}$ 1412.7000 c/m

$\bar{X}$ 1416.2625 c/m ± 14.10 c/m

3321 d/m ÷ 1416.2625 c/m = 2.3449

d/c = 0.4265 ± 1.00%

24.92μL $\bar{X}$ 1389.7000 c/m

$\bar{X}$ 1389.0250 c/m

$\bar{X}$ 1389.3625 c/m ± 15.83 c/m

3324 d/m ÷ 1389.3625 c/m = 2.3925

d/c = 0.4180 ± 1.14%

$\bar{X}$ = 0.4222 ± 1.52%

Reviewed L R Greenwood date 9/25/91

BNW 57343 page 135-18 of 20

BATTELLE-NORTHWEST
RICHLAND, WASHINGTON

ALPHA COUNTER DATA SHEET

SAMPLE: Ludlum-6
SUBMITTED BY:
COUNTED BY:

REMARKS: HV Voltage @ 2.7

SAMPLE NUMBER	DATE 19 91	INST. NO.	INT. (MIN.) T	RECORDER READING SCALE OF:	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N. C	BGD B	NET RATE X = R − B + C	GEOMETRY %	DISINTEGRATION RATE d/m
21.90λ 1	5-15			+	14304						
2				+	14170						
3				+	13996						
4				+	14323						
				+							
21.92λ 1				+	14133						
2				+	13802						
3				+	13869						
4				+	13784						
				+	~~14323~~						
				+							
				+							
				+							
				+							
				+							
21.90λ 1	5-16			+	14210						
2				+	14142						
3				+	13922						
4				+	14234						
				+							
21.92λ 1				+	14141						
2				+	13845						
3				+	13713						
4				+	13862						
				+							

20.1

LUDLUM 7

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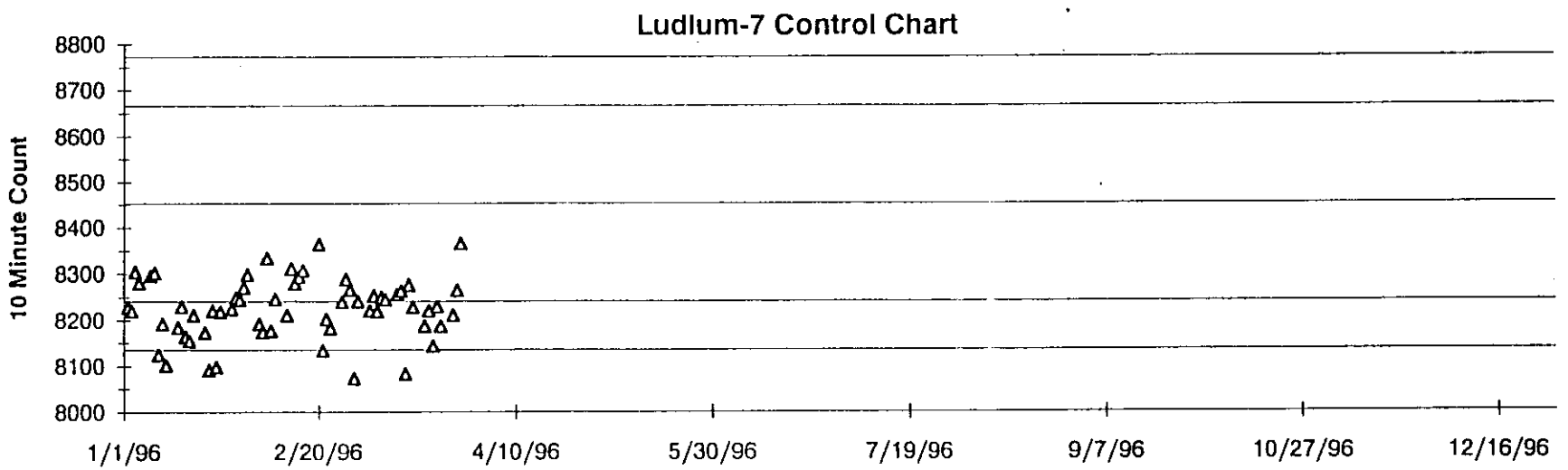


Detector out of service on some dates.

K. Thomas 3/27/96

L R Greenwood 3/27/96

2074

Ludlum-7 WB76764

High Voltage 3.40

T1350 NBS Calibration Summary

24.90μL 3321 ± 35.4 d/m
24.92μL 3324 ± 35.5 d/m } HEDL-N-3219 page 3

$\overline{X}_2$ = 3322.5 ± 25.067 d/m

Observed Counts:

$\overline{X}_{32}$ = 1319.381 ± 16.5868 c/m

Calculation:

3322.5 ± 25.067 d/m ÷ 1319.381 ± 16.5868 c/m = d/c

2.518226 ± 0.036922 = 0.3971 c/d ± 1.47%

Reviewed L R Greenwood date 3/9/94

LUD7CAL.XLS

Ludlum-7 T-1350 Calibration Counts
Source: Pu-239 T-1350 7-20-79

10 minute counts

Date	Source Id.	Counts	cpm
2/24/94	24.90µl - 1	13351	1335.1
	1	13349	1334.9
	2	13176	1317.6
	2	13442	1344.2
	3	13234	1323.4
	3	13322	1332.2
	4	13498	1349.8
	4	13279	1327.9
	24.92µl - 1	13019	1301.9
	1	13233	1323.3
	2	12860	1286.0
	2	13056	1305.6
	3	12982	1298.2
2/25/94	3	13151	1315.1
	4	12964	1296.4
	4	13149	1314.9
	24.90µl - 1	13249	1324.9
	1	13328	1332.8
	2	13106	1310.6
	2	13127	1312.7
	3	13150	1315.0
	3	13310	1331.0
	4	13382	1338.2
	4	13369	1336.9
	24.92µl - 1	13238	1323.8
	1	13211	1321.1
	2	12833	1283.3
	2	12977	1297.7
	3	13405	1340.5
2/28/94	3	13187	1318.7
	4	13216	1321.6
	4	13049	1304.9

avg 32 = 1319.381 ± 16.5868

Anne E Hoyshisky 3/8/94
Analyst/date

LUD7CON.XLS

Ludlum-7 Control Chart Counts

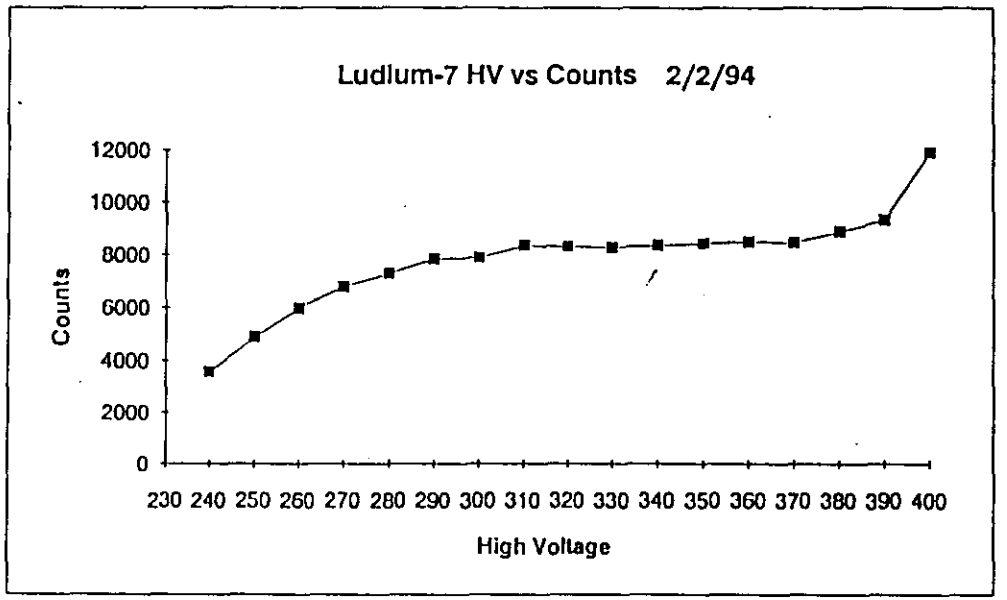
Date	10 minute Count
2/10/94	8591
2/10/94	8365
2/10/94	8492
2/11/94	8615
2/11/94	8558
2/11/94	8302
2/14/94	8492
2/14/94	8310
2/14/94	8610
2/15/94	8459
2/15/94	8559
2/15/94	8584
2/16/94	8324
2/16/94	8489
2/17/94	8315
2/17/94	8492
2/17/94	8470
2/18/94	8445
2/18/94	8655
2/18/94	8321
2/22/94	8571
2/23/94	8489
2/24/94	8463
2/25/94	8348
2/28/94	8317
3/1/94	8432
3/2/94	8350
3/3/94	8491
3/4/94	8472
3/7/94	8358
3/8/94	8320

Avg 31 =		8453.516
1 Sigma :	±	106.1058
2 Sigma :	±	214.4499
3 Sigma :	±	317.7754

Anne E Kozlitsky
Analyst/date

Ludlum-7 High Voltage
2/2/94

HV	Counts
240	3582
250	4882
260	5971
270	6793
280	7297
290	7857
300	7897
310	8372
320	8328
330	8301
340	8366
350	8445
360	8509
370	8480
380	8900
390	9363
400	11906



Anne E Hoechsky 2/2/94

LUDLUM 8

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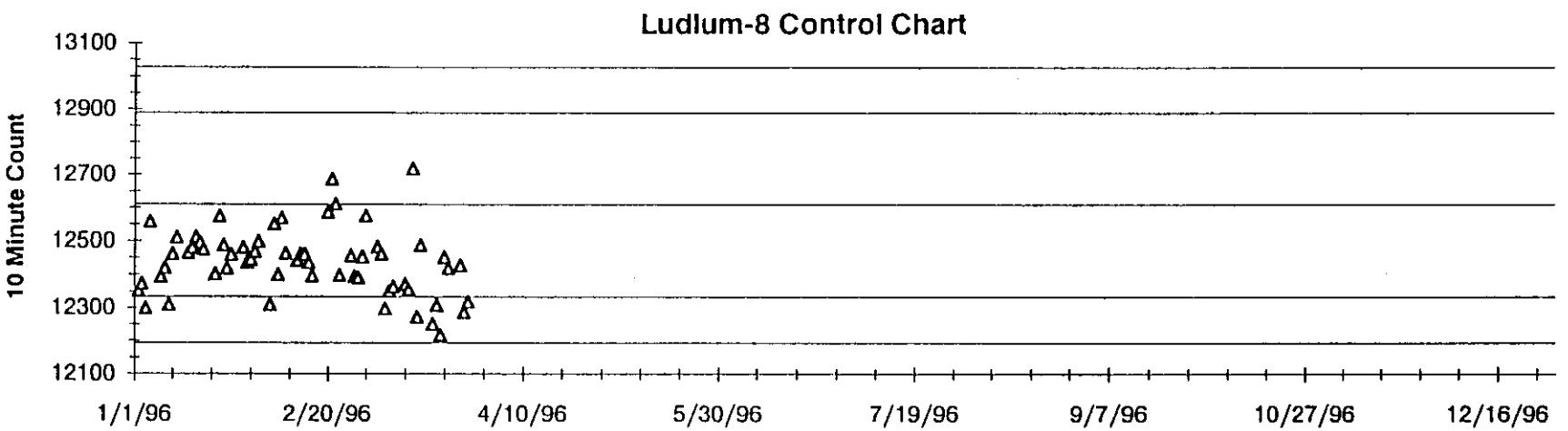

T. Thomas 3/27/96

BNW

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Ludlum-8 WA94743

High Voltage 3.30

T1350 NBS Calibration Summary

24.90μL 3321 ± 35.4 d/m
24.92μL 3324 ± 35.5 d/m } HEDL-N-3219 page 3

$\overline{X}_2$ = 3322.5 ± 25.067 d/m

Observed Counts:

$\overline{X}_{16}$ = 1434.831 c/m ± 21.933 c/m

Calculation:

3322.5 ± 25.067 d/m ÷ 1434.831 c/m ± 21.933 c/m = d/c

2.315603 ± 0.039474 = 0.4319 ~~d/c~~ c/d ± 1.70%

AK 3/29/93

Reviewed LR Greenwood date 2/12/93

BNW

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HV	Ludlum-8 WA94743	Ludlum-9 WA94745	Ludlum-10 WA94746	Ludlum-7 WB76864
180	367	845	304	867
190	1200	1550	1151	1480
200	1789	1950	1747	1912
210	2274	2400	2093	2204
220	2551	2443	2445	2584
230	2675	2600	2622	2637
240	2807	2640	2724	2804
250	2898	2777	2924	2908
260	2838	2778	2860	2991
270	2891	2904	2844	2958
280	2975	2830	2988	3019
290	3003	2794	2931	2979
300	3034	2868	3005	3099
310	3006	2943	2995	3073
320	3070	2955	2892	3071
330	3047	2821	3080	3126
340	2963	2919	3093	3039
350	2965	2865	2982	3277
360	3031	2867	3037	3837
370	3039	2895	3028	4514
380	3045	2875	2958	
390	2992	2854	3074	
400	2978	2904	3046	
410	3107	2989	3099	
420	3246	3358	3463	
430	3845	4538	4694	
440	5123			
450				
460				

Anne E Kozelsky 11/9/92

BATTELLE-NORTHWEST
RICHLAND, WASHINGTON

ALPHA COUNTER DATA SHEET

SAMPLE
SUBMITTED BY
COUNTED BY

REMARKS Ludlum - 8 Voltage @ 3.3 (WA94743)
Calibration Counts with T-1350 ^{239}Pu

SAMPLE NUMBER		DATE 19 93	INST. NO.	INT. (MIN.) T	RECORDER READING SCALE OF 1	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N. C	BGD B	NET RATE X = R − B + C	GEOMETRY %	DISINTEGRATION RATE d/m
24.90λ	1	2/5	L-8	10	+	14534	1453.4		0.070	1453.3		
	2				+	14444	1444.4			1444.3		
	3				+	14349	1434.9			1434.8		
	4				+	14565	1456.5			1456.4		
					+							
24.92λ	1				+	14367	1436.7			1436.6		
	2				+	14049	1404.9			1404.8		
	3				+	14238	1423.8			1423.7		
	4				+	14201	1420.9			1420.8		
					+							
					+							
					+							
					+							
					+							
					+							
24.90λ	1	2/8			+	14777	1477.7		0.066	1477.6		
	2				+	14202	1420.2			1420.1		
	3				+	14450	1445.0			1444.9		
	4				+	14640	1464.0			1463.9		
					+							
24.92λ	1				+	14471	1447.1			1447.0		
	2				+	14059	1405.9			1405.8		
	3				+	14075	1407.5			1407.4		
	4				+	14160	1416.0			1415.9		
					+							

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BNW
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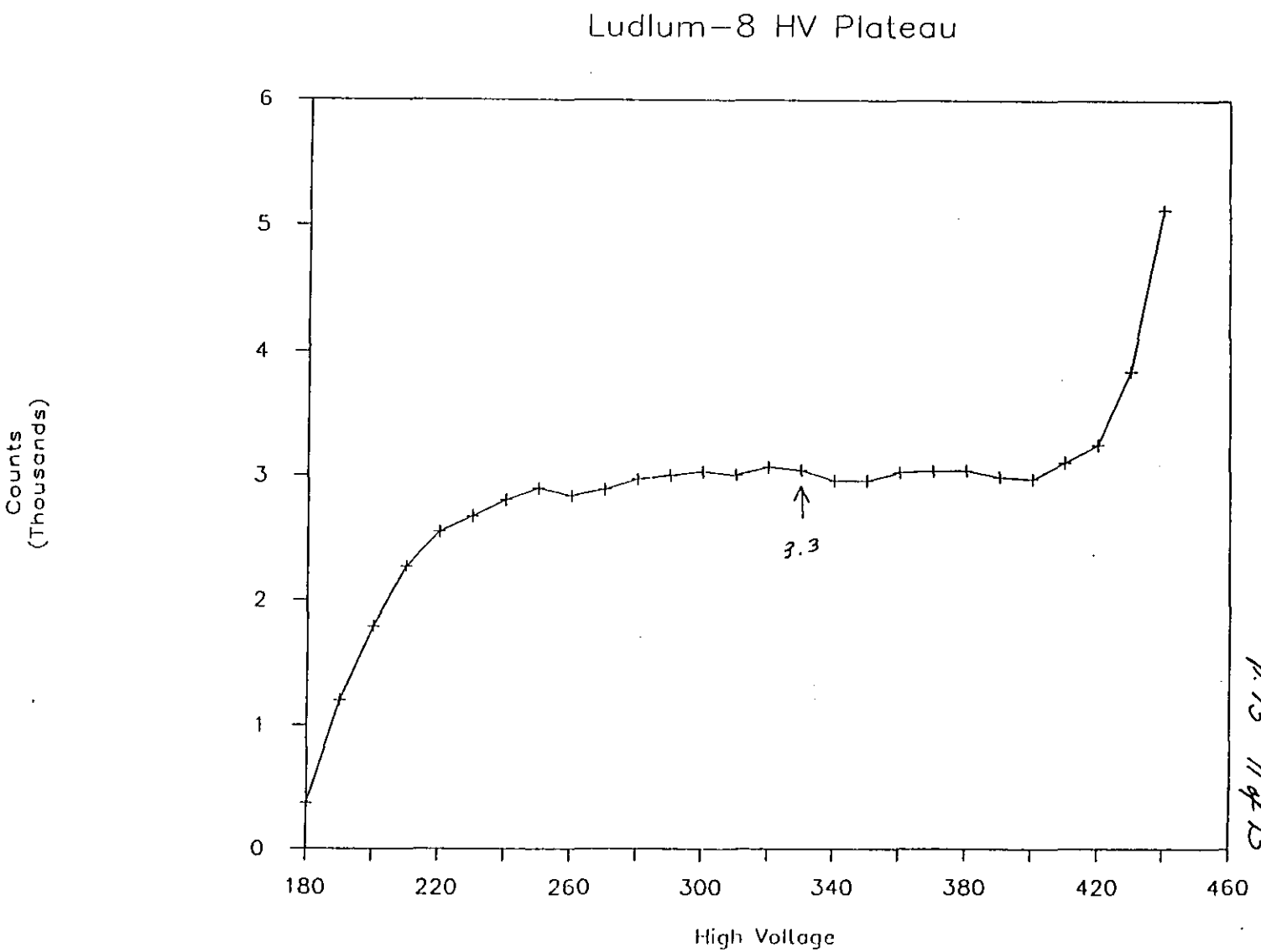
p. 13 11/94 13



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HV	Ludlum-8 WA94743	Ludlum-9 WA94745	Ludlum-10 WA94746	Ludlum-7 WB76864
180	367	845	304	867
190	1200	1550	1151	1480
200	1789	1950	1747	1912
210	2274	2400	2093	2204
220	2551	2443	2445	2584
230	2675	2600	2622	2637
240	2807	2640	2724	2804
250	2898	2777	2924	2908
260	2838	2778	2860	2991
270	2891	2904	2844	2958
280	2975	2830	2988	3019
290	3003	2794	2931	2979
300	3034	2868	3005	3099
310	3006	2943	2995	3073
320	3070	2955	2892	3071
330	3047	2821	3080	3126
340	2963	2919	3093	3039
350	2965	2865	2982	3277
360	3031	2867	3037	3837
370	3039	2895	3028	4514
380	3045	2875	2958	
390	2992	2854	3074	
400	2978	2904	3046	
410	3107	2989	3099	
420	3246	3358	3463	
430	3845	4538	4694	
440	5123			
450				
460				

Anne E Kozelisky 11/9/92

LUDLUM 9

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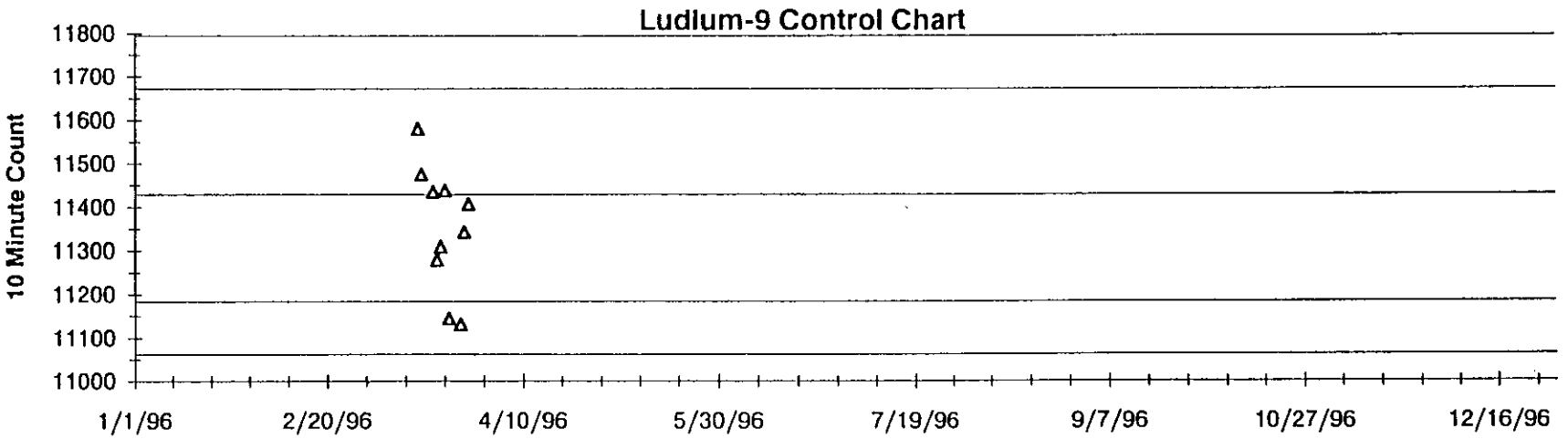

*Broken Switch on L9 on 3/13/96 fixed by Kevin P.
Detector out of service prior to 3/13/96.

K. Thomas 3/27/96

J R Greenwood 3/27/96

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Ludlum-9 WA94745

High Voltage 3.30

T1350 NBS Calibration Summary

24.90μL 3321 ± 35.4 d/m
24.92μL 3324 ± 35.5 d/m } HEDL-N-3219 page 3

$\overline{X}_2$ = 3322.5 ± 25.067 d/m

Observed Counts:

$\overline{X}_{16}$ = 1422.719 c/m ± 15.587 c/m

Calculation:

3322.5 ± 25.067 d/m ÷ 1422.719 c/m ± 15.587 c/m = d/c

2.335175 ± 0.031065 = 0.4282 ~~d/c~~ c/d ± 1.33%

RJK 3/29/93

Reviewed LR Greenwood date 2/12/93

BATTELLE-NORTHWEST
RICHLAND, WASHINGTON

ALPHA COUNTER DATA SHEET

SAMPLE

SUBMITTED BY

COUNTED BY

REMARKS Ludlum-9 Voltage @ 3.3 (WA 94745)
Calibration Counts with T-1350 ^{237}Pu

SAMPLE NUMBER		DATE 19 93	INST. NO.	INT. (MIN.) T	RECORDER READING SCALE OF:	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N. C	BGD B	NET RATE X = R − B + C	GEOMETRY %	DISINTEGRATION RATE d/m
24.902	1	2/5	L-9	10	+	14097	1409.7		0.092	1409.6		
	2				+	14258	1425.8			1425.7		
	3				+	14145	1414.5			1414.4		
	4				+	14453	1445.3			1445.2		
					+							
24.922	1				+	14337	1433.7			1433.6		
	2				+	14115	1411.5			1411.4		
	3				+	14017	1401.7			1401.6		
	4				+	14053	1405.3			1405.2		
					+							
					+							
					+							
					+							
					+							
					+							
24.902	1	2/8			+	14235	1423.8		0.081	1423.7		
	2				+	14337	1433.7			1433.6		
	3				+	14262	1426.2			1426.1		
	4				+	14435	1443.5			1443.4		
					+							
24.922	1				+	14441	1444.1			1444.0		
	2				+	13983	1398.3			1398.2		
	3				+	14123	1412.3			1412.2		
	4				+	14357	1435.7			1435.6		
					+							

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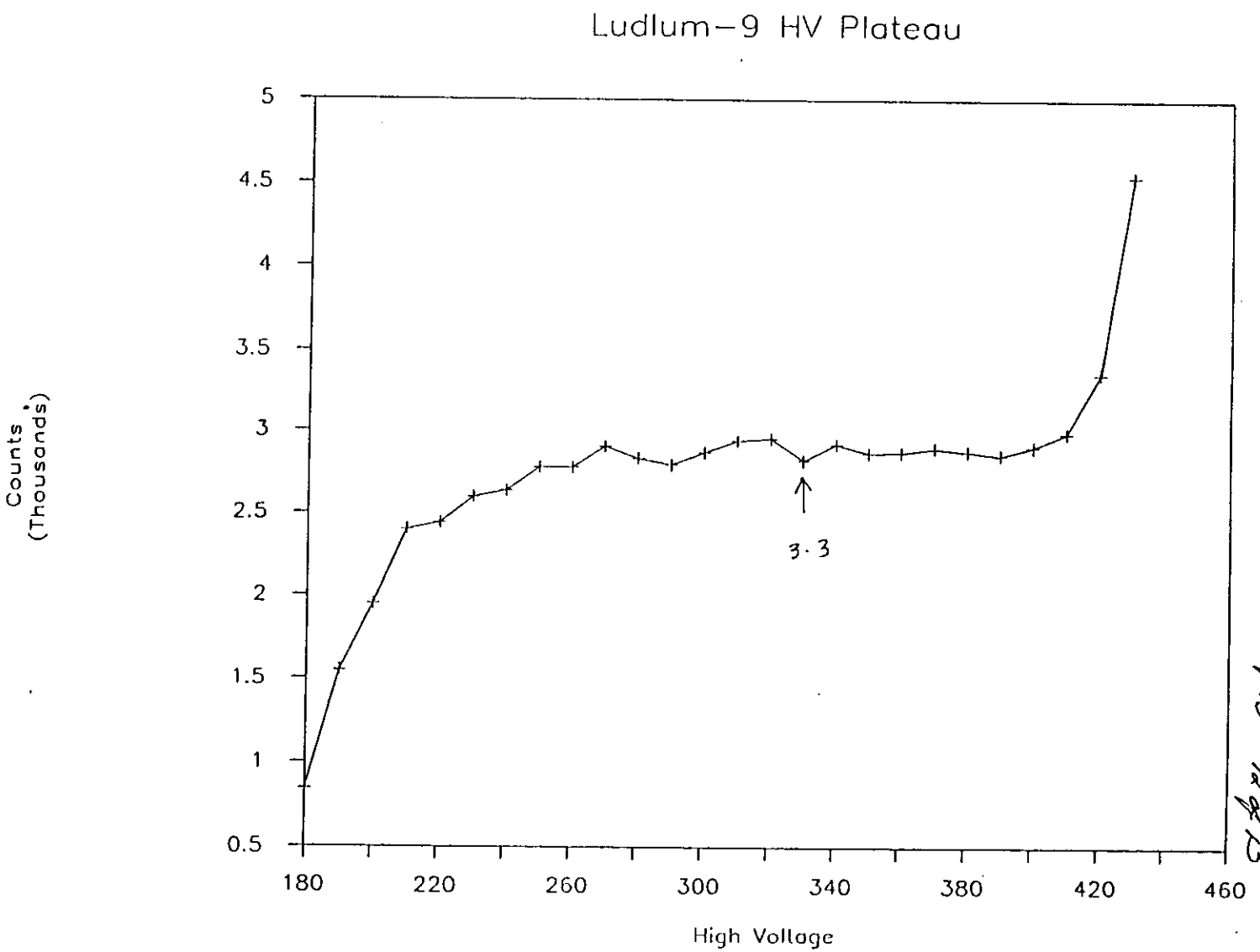

2092

BNW

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HV	Ludlum-8 WA94743	Ludlum-9 WA94745	Ludlum-10 WA94746	Ludlum-7 WB76864
180	367	845	304	867
190	1200	1550	1151	1480
200	1789	1950	1747	1912
210	2274	2400	2093	2204
220	2551	2443	2445	2584
230	2675	2600	2622	2637
240	2807	2640	2724	2804
250	2898	2777	2924	2908
260	2838	2778	2860	2991
270	2891	2904	2844	2958
280	2975	2830	2988	3019
290	3003	2794	2931	2979
300	3034	2868	3005	3099
310	3006	2943	2995	3073
320	3070	2955	2892	3071
330	3047	2821	3080	3126
340	2963	2919	3093	3039
350	2965	2865	2982	3277
360	3031	2867	3037	3837
370	3039	2895	3028	4514
380	3045	2875	2958	
390	2992	2854	3074	
400	2978	2904	3046	
410	3107	2989	3099	
420	3246	3358	3463	
430	3845	4538	4694	
440	5123			
450				
460				

Anne E Kozelsky 11/9/92

LUDLUM 10

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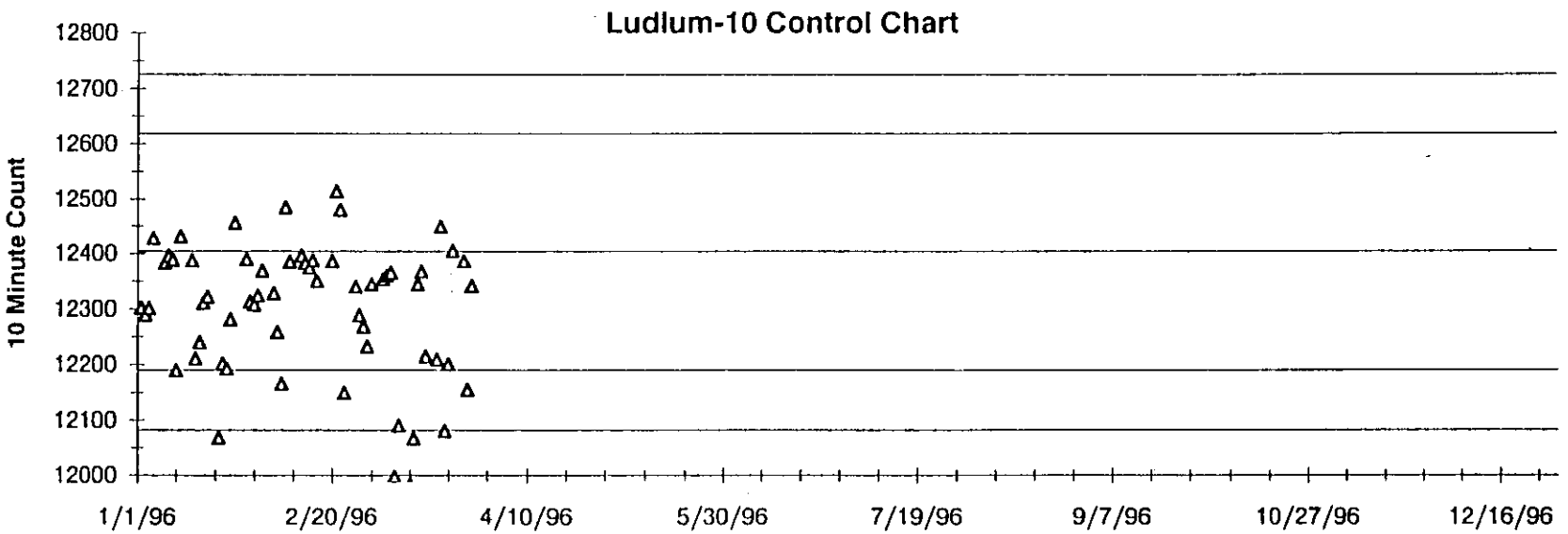

Detector out of service on some dates.

K. Thomas 3/27/96

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Ludlum-10 WA94746

High Voltage 3.30

T1350 NBS Calibration Summary

24.90μL 3321 ± 35.4 d/m
24.92μL 3324 ± 35.5 d/m } HEDL-N-3219 page 3

$\bar{X}_2$ = 3322.5 ± 25.067 d/m

Observed Counts:

$\bar{X}_{16}$ = 1402.781 c/m ± 16.529 c/m

Calculation:

3322.5 ± 25.067 d/m ÷ 1402.781 c/m ± 16.529 c/m = d/c

2.368509 ± 0.033139 = 0.4222 ~~d/c~~ c/d ± 1.40% 3/29/93 ASK

Reviewed LR Greenwood date 2/12/93

BATTELLE-NORTHWEST
RICHLAND, WASHINGTON

ALPHA COUNTER DATA SHEET

SAMPLE

SUBMITTED BY

COUNTED BY

REMARKS Ludlum-10 Voltage @ 3.3 (WA94746)
Calibration Counts with T-1350 ^{239}Pu

SAMPLE NUMBER		DATE 19 93	INST. NO.	INT. (MIN.) T	RECORDER READING SCALE OF:	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N. C	BGD B	NET RATE X = R − B + C	GEOMETRY %	DISINTEGRATION RATE d/m
24.90λ	1	2/5	L-10	10	+	13948	1394.8		0.078	1394.7		
	2				+	13958	1395.8			1395.7		
	3				+	13953	1395.3			1395.2		
	4				+	14375	1437.5			1437.4		
					+							
24.92λ	1				+	14020	1402.0			1401.9		
	2				+	13707	1370.7			1370.6		
	3				+	13820	1382.0			1381.9		
	4				+	13913	1391.3			1391.2		
					+							
					+							
					+							
					+							
					+							
					+							
24.90λ	1	2/8			+	14232	1423.2		0.059	1423.1		
	2				+	14029	1402.9			1402.8		
	3				+	13949	1394.8			1394.7		
	4				+	14185	1418.5			1418.4		
					+							
24.92λ	1				+	14055	1405.5			1405.4		
	2				+	14022	1402.2			1402.1		
	3				+	14221	1422.1			1422.0		
	4				+	14075	1407.5			1407.4		
					+							

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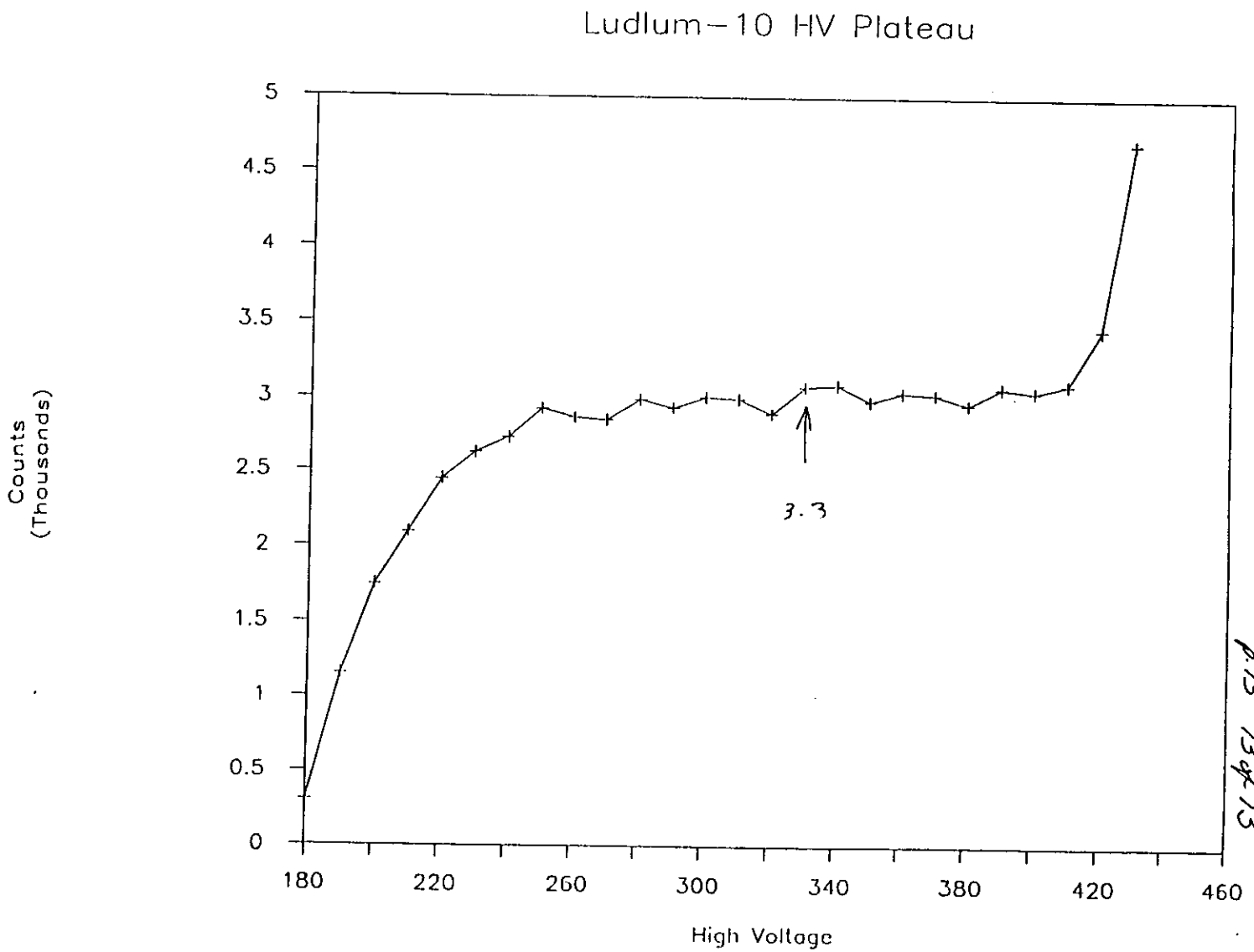

BNW

54273

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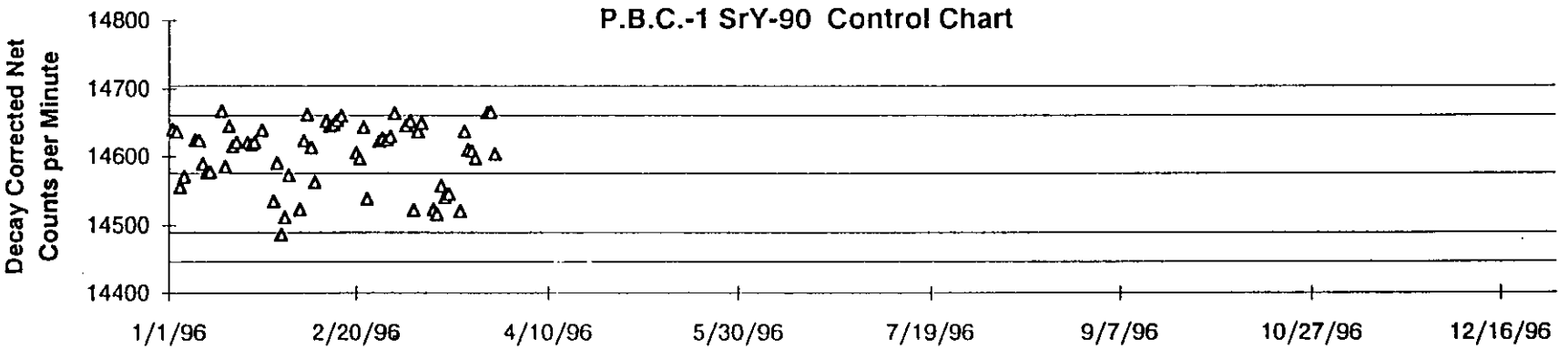
HV	Ludlum-8 WA94743	Ludlum-9 WA94745	Ludlum-10 WA94746	Ludlum-7 WB76864
180	367	845	304	867
190	1200	1550	1151	1480
200	1789	1950	1747	1912
210	2274	2400	2093	2204
220	2551	2443	2445	2584
230	2675	2600	2622	2637
240	2807	2640	2724	2804
250	2898	2777	2924	2908
260	2838	2778	2860	2991
270	2891	2904	2844	2958
280	2975	2830	2988	3019
290	3003	2794	2931	2979
300	3034	2868	3005	3099
310	3006	2943	2995	3073
320	3070	2955	2892	3071
330	3047	2821	3080	3126
340	2963	2919	3093	3039
350	2965	2865	2982	3277
360	3031	2867	3037	3837
370	3039	2895	3028	4514
380	3045	2875	2958	
390	2992	2854	3074	
400	2978	2904	3046	
410	3107	2989	3099	
420	3246	3358	3463	
430	3845	4538	4694	
440	5123			
450				
460				

Anne E Kozelsky 11/9/92

PROPORTIONAL BETA COUNTERS (PBC) USED FOR TOTAL BETA, SR-90 PBC 1 PBC 2

PBC 1



F. Thomas 3/27/96

L R Greenwood 3/27/96

^{90}SrY #W-80: ^{90}Y Calibration for P.B.C.-1

Volumetric dilution of ^{90}Sr Standard #RS-11-9 [BNW52815 pages 145-146.]
^{90}Sr Standard #RS-11-9 is a gravimetric/volumetric dilution of Isotope products ^{90}Sr Standard 7090-4 lot 186-98-A-3 [BNW52626 pp 49, 50]. Half-life reference: Browne and Firestone 1985.
W-80 adjusted for revised (Sr+Y)/Sr ratio at equilibrium:

$(2.03847 \times 10^5)(2.000255 \text{ new ratio}/2.0000 \text{ used ratio}) = 2.03872 \times 10^5$ D 90Sr+^{90}Y/m/ml on 8-1-91.

Assuming 100% ^{90}Y recovery at ion exchange separation time:

^{90}Sr + ^{90}Y decay to separation time = 8-1-91 → 7-10-92 = 344 D = 0.94184 Y

$$(2.03872 \times 10^5)E^{\frac{-(\ln 2)(0.94184)}{28.5Y}} = 1.99256 \times 10^5 \text{ D } ^{90}\text{Sr}+^{90}\text{Y/m/ml} \quad 7\text{-}10\text{-}92$$

BNW 52342 p.134 11 of 17

^{90}Y at separation time (all flasks)
(Sr+Y)/Sr = 2.000255
Sr+Y = 2.000255 Sr Y=2.000255Sr - Sr = 1.000255Sr
Y/(Sr+Y)=(1.000255Sr)/(Sr+1.0002555Sr)=1.000255Sr/2.000255Sr = 0.5000637
^{90}Y (all flasks) <u>at separation for each flask</u>

$$= (1.99256 \times 10^5 \text{ D } ^{90}\text{Sr}+^{90}\text{Y/m/ml})\left(\frac{0.5000637\ ^{90}\text{Y}}{^{90}\text{Sr}+^{90}\text{Y}}\right)(0.50033\text{mL std \#W-80})/(10.0\text{ml flask vol})$$

= 4985.32277 D ^{90}Y/m/ml flask solution at separation

for flask 1: ^{90}Y sep = 7/10/92 09:50:50
plate A counted 7/10/92 13:16:00, mid point = 13:16:00 + 10/2 = 13:21:00
7/10/92 09:50:50 → 13:21:00 = 3:30:10 = 3.50278 H

$$(4985.32277 \text{ D } ^{90}\text{Y/m/ml})\left(E^{\frac{-(\ln 2)(3.50278)}{64.1}}\right)(0.99420\text{mL})/2617.78\text{c/m} = 1.82298 \text{ d/c}$$

plate B counted 7/10/92 14:22:00, mid point = 14:22:00 + 10/2 = 14:27:00
7/10/92 09:50:50 → 14:27:00 = 4:36:10 = 4.60278 H

$$(4985.32277 \text{ D } ^{90}\text{Y/m/ml})\left(E^{\frac{-(\ln 2)(4.60278)}{64.1}}\right)(0.99420\text{mL})/2614.38\text{c/m} = 1.80377 \text{ d/c}$$

for flask 2: ^{90}Y sep = 7/10/92 09:49:55
plate A counted 7/10/92 13:27:00, mid point = 13:27:00 + 10/2 = 13:32:00
7/10/92 09:49:55 → 13:32:00 = 3:42:05 = 3.70139 H

$$(4985.32277 \text{ D } ^{90}\text{Y/m/ml})\left(E^{\frac{-(\ln 2)(3.70139)}{64.1}}\right)(0.99465\text{mL})/2679.88\text{c/m} = 1.77772 \text{ d/c}$$

plate B counted 7/10/92 14:11:00, mid point = 14:11:00 + 10/2 = 14:16:00
7/10/92 09:49:55 → 14:16:00 = 4:26:05 = 4.43472 H

$$(4985.32277 \text{ D } ^{90}\text{Y/m/ml})\left(E^{\frac{-(\ln 2)(4.43472)}{64.1}}\right)(0.99465\text{mL})/2656.58\text{c/m} = 1.77915 \text{ d/c}$$

for flask 3: ^{90}Y sep = 7/10/92 09:51:40
plate A counted 7/10/92 13:38:00, mid point = 13:38:00 + 10/2 = 13:43:00
7/10/92 09:51:40 → 13:43:00 = 3:51:20 = 3.85556 H

$$(4985.32277\ D\ ^{90}Y/m/ml)(E^{\frac{-(\ln 2)(3.85556)}{64.1}})(0.994796mL)/2667.98c/m = 1.78294\ d/c$$

plate B counted 7/10/92 14:33:00, mid point = 14:33:00 + 10/2 = 14:38:00
7/10/92 09:51:40 → 14:38:00 = 4:46:20 = 4.77222 H

$$(4985.32277\ D\ ^{90}Y/m/ml)(E^{\frac{-(\ln 2)(4.77222)}{64.1}})(0.994796mL)/2653.48c/m = 1.77500\ d/c$$

for flask 4: ^{90}Y sep = 7/10/92 09:52:15
plate A counted 7/10/92 13:49:00, mid point = 13:49:00 + 10/2 = 13:54:00
7/10/92 09:52:15 → 13:54:00 = 4:01:45 = 4.02917 H

$$(4985.32277\ D\ ^{90}Y/m/ml)(E^{\frac{-(\ln 2)(4.02917)}{64.1}})(0.99891mL)/2664.48c/m = 1.78930\ d/c$$

BNW 52342 p. 134 12 of 14

plate B counted 7/10/92 14:44:00, mid point = 14:44:00 + 10/2 = 14:49:00
7/10/92 09:52:15 → 14:49:00 = 4:56:45 = 4.94583 H

$$(4985.32277\ D\ ^{90}Y/m/ml)(E^{\frac{-(\ln 2)(4.94583)}{64.1}})(0.99891mL)/2631.08c/m = 1.79415\ d/c$$

for flask 5: ^{90}Y sep = 7/10/92 09:51:30
plate A counted 7/10/92 14:00:00, mid point = 14:00:00 + 10/2 = 14:05:00
7/10/92 09:51:30 → 14:05:00 = 4:13:30 = 4.22500 H

$$(4985.32277\ D\ ^{90}Y/m/ml)(E^{\frac{-(\ln 2)(4.22500)}{64.1}})(0.99932mL)/2725.58c/m = 1.74621\ d/c$$

plate B counted 7/10/92 14:55:00, mid point = 14:55:00 + 10/2 = 15:00:00
7/10/92 09:51:30 → 15:00:00 = 5:08:30 = 5.14167 H

$$(4985.32277\ D\ ^{90}Y/m/ml)(E^{\frac{-(\ln 2)(5.14167)}{64.1}})(0.99932mL)/2636.58c/m = 1.78735\ d/c$$

$\overline{X}_{10}$ = 1.78585 d/c

s = 0.01977

^{90}Y Calibration for P.B.C.-1

1.79 d/c (Rounded to nearest 0.01)

Anne E Kozlisky 9/23/92
Analyst/Date

[signature] 9/23/92
Cognizant Scientist/Date

ANALYTICAL LABORATORIES — BETA AND GAMMA COUNTER DATA SHEET

SAMPLE

SUBMITTED BY

COUNTED BY Anne E. Hagelich

REMARKS 90Y Calibration Counts P.B.C.-1 HV=2650

SAMPLE NUMBER	DATE 19 92	TIME PST	INST. NO.	SHELF NO.	ABSBR. MG/CM²	INT. (MIN) T	RECORDER READING SCALE OF	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N C	BGD B	NET RATE X=R−B+C	NORMALIZING RATE N.F.	NORMALIZED RATE COUNTS/MIN.
1a	7/10	1316	1	1	—	10	+	26469			29.42	2617.78		
1b		1422					+	26435				2614.38		
							+							
							+							
							+							
2a		1327					+	27090				2679.88		
2b		1411					+	26857				2656.58		
							+							
							+							
							+							
3a		1338					+	26971				2667.98		
3b		1433					+	26826				2653.48		
							+							
							+							
							+							
4a		1349					+	26936				2664.48		
4b		1444					+	26602				2631.08		
							+							
							+							
							+							
5a		1400					+	27547				2725.58		
5b		1455					+	26657				2636.58		
							+							
							+							
							+							

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Prepare five ^{90}Y solutions separated from ^{90}Sr using the SrY-90 standard #W-80 of BNW54342 p. 34. Load 500μL of standard onto glass column of 300μL Dowex 50, X-8, 200-400 mesh NH_4^+ form. Wash ~~pipet~~ column 2-1mL portions of deionized water. ATK 8/9/93

Note time when last drop of wash leaves column (begins decay time for ^{90}Y).

Elute ^{90}Y into 10mL volumetric flask with 4-1mL portions of 0.7M αHIBA, pH 4.6. Note time when last drop leaves column (begins T_0 for ^{90}Sr). Elute ^{90}Sr into 10mL volumetric flask with 3.5mL of 1M αHIBA, pH 5.0. Dilute to 10mL with deionized water. Mix and plate (duplicates for ^{90}Y) 1ml portions onto beta dishes, dry and count each source on Beta counter.

For more information, see BNW52626 p. 25-28.

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0.50033mL aliquot of #W-80 for all five columns.

Plate	Plated Aliquot	July 10, 1992 ^{90}Y T_0	^{90}Sr T_0
1 -	0.99420mL	0950.50	1047.0
2 -	0.99465mL	0949.55	1048.25
3 -	0.994796mL	0951.40	1048.10
4 -	0.99891mL	0952.15	1050.15
5 -	0.99932mL	0951.30	1045.20

Anne E Hogelisky 7/10/92
Analyst/date

PBC 2

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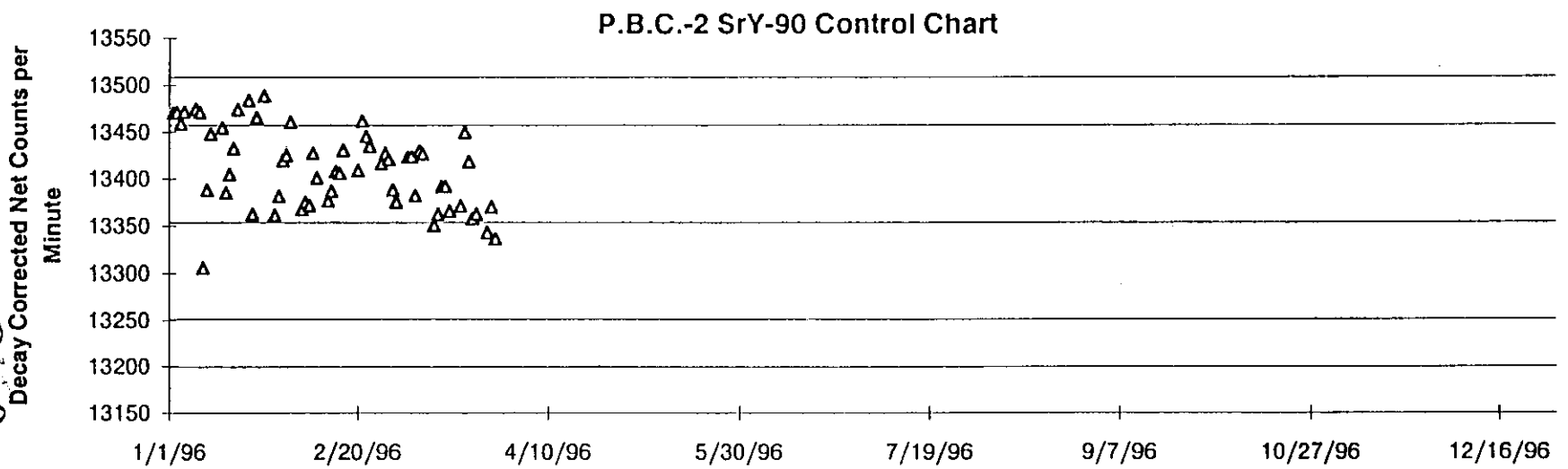

T. Thomas 3/27/96

J R Greenwood 3/27/96

^{90}SrY #W-80: ^{90}Y Calibration for P.B.C.

Volumetric dilution of ^{90}Sr Standard #RS-11-9 [BNW52815 pages 145-146.]
^{90}Sr Standard #RS-11-9 is a gravimetric/volumetric dilution of Isotope products ^{90}Sr Standard 7090-4 lot 186-98-A-3 [BNW52626 pp 49, 50]. Half-life reference: Browne and Firestone 1985.
W-80 adjusted for revised (Sr+Y)/Sr ratio at equilibrium:

$(2.03847 \times 10^5)(2.000255 \text{ new ratio}/2.0000 \text{ used ratio}) = 2.03872 \times 10^5$ D 90Sr+^{90}Y/m/ml on 8-1-91.

Assuming 100% ^{90}Y recovery at ion exchange separation time:

^{90}Sr + ^{90}Y decay to separation time = 8-1-91 → 7-10-92 = 344 D = 0.94184 Y

$$(2.03872 \times 10^5)E^{\frac{-(\ln 2)(0.94184)}{28.5Y}} = 1.99256 \times 10^5 \text{ D } ^{90}\text{Sr}+^{90}\text{Y/m/ml} \quad 7\text{-}10\text{-}92$$

BNW 52342 p.134 8 of 14

^{90}Y at separation time (all flasks)
(Sr+Y)/Sr = 2.000255
Sr+Y = 2.000255 Sr Y=2.000255Sr - Sr = 1.000255Sr
Y/(Sr+Y)=(1.000255Sr)/(Sr+1.0002555Sr)=1.000255Sr/2.000255Sr = 0.5000637
^{90}Y (all flasks) <u>at separation for each flask</u>

$$= (1.99256 \times 10^5 \text{ D } ^{90}\text{Sr}+^{90}\text{Y/m/ml})\left(\frac{0.5000637\ ^{90}\text{Y}}{^{90}\text{Sr}+^{90}\text{Y}}\right)(0.50033\text{mL std \#W-80})/(10.0\text{ml flask vol})$$

= 4985.32277 D ^{90}Y/m/ml flask solution at separation

for flask 1: ^{90}Y sep = 7/10/92 09:50:50
plate A counted 7/10/92 14:13:00, mid point = 14:13:00 + 10/2 = 14:18:00
7/10/92 09:50:50 → 14:18:00 = 4:27:10 = 4.45278 H

$$(4985.32277 \text{ D } ^{90}\text{Y/m/ml})\left(E^{\frac{-(\ln 2)(4.45278)}{64.1}}\right)(0.99420\text{mL})/2585.14\text{c/m} = 1.82714 \text{ d/c}$$

plate B counted 7/10/92 15:07:00, mid point = 15:07:00 + 10/2 = 15:12:00
7/10/92 09:50:50 → 15:12:00 = 5:21:10 = 5.35278 H

$$(4985.32277 \text{ D } ^{90}\text{Y/m/ml})\left(E^{\frac{-(\ln 2)(5.35278)}{64.1}}\right)(0.99420\text{mL})/2569.34\text{c/m} = 1.82057 \text{ d/c}$$

for flask 2: ^{90}Y sep = 7/10/92 09:49:55
plate A counted 7/10/92 14:24:00, mid point = 14:24:00 + 10/2 = 14:29:00
7/10/92 09:49:55 → 14:29:00 = 4:39:05 = 4.65139 H

$$(4985.32277 \text{ D } ^{90}\text{Y/m/ml})\left(E^{\frac{-(\ln 2)(4.65139)}{64.1}}\right)(0.99465\text{mL})/2596.74\text{c/m} = 1.81590 \text{ d/c}$$

plate B counted 7/10/92 15:17:30, mid point = 15:17:30 + 10/2 = 15:22:30
7/10/92 09:49:55 → 15:22:30 = 5:32:35 = 5.54306 H

$$(4985.32277 \text{ D } ^{90}\text{Y/m/ml})\left(E^{\frac{-(\ln 2)(5.54306)}{64.1}}\right)(0.99465\text{mL})/2592.74\text{c/m} = 1.80125 \text{ d/c}$$

for flask 3: ^{90}Y sep = 7/10/92 09:51:40
plate A counted 7/10/92 14:35:00, mid point = 14:35:00 + 10/2 = 14:40:00
7/10/92 09:51:40 → 14:40:00 = 4:48:20 = 4.80556 H

$$(4985.32277\ D\ ^{90}Y/m/ml)(E^{\frac{-(\ln 2)(4.80556)}{64.1}})(0.994796mL)/2605.14c/m = 1.80729\ d/c$$

plate B counted 7/10/92 15:28:00, mid point = 15:28:00 + 10/2 = 15:33:00
7/10/92 09:51:40 → 15:33:00 = 5:41:20 = 5.68889 H

$$(4985.32277\ D\ ^{90}Y/m/ml)(E^{\frac{-(\ln 2)(5.68889)}{64.1}})(0.994796mL)/2605.64c/m = 1.78977\ d/c$$

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for flask 4: ^{90}Y sep = 7/10/92 09:52:15
plate A counted 7/10/92 14:46:00, mid point = 14:46:00 + 10/2 = 14:51:00
7/10/92 09:52:15 → 14:51:00 = 4:58:45 = 4.97917 H

$$(4985.32277\ D\ ^{90}Y/m/ml)(E^{\frac{-(\ln 2)(4.97917)}{64.1}})(0.99891mL)/2607.34c/m = 1.80983\ d/c$$

plate B counted 7/10/92 15:39:00, mid point = 15:39:00 + 10/2 = 15:44:00
7/10/92 09:52:15 → 15:44:00 = 5:51:45 = 5.86250 H

$$(4985.32277\ D\ ^{90}Y/m/ml)(E^{\frac{-(\ln 2)(5.86250)}{64.1}})(0.99891mL)/2628.84c/m = 1.77797\ d/c$$

for flask 5: ^{90}Y sep = 7/10/92 09:51:30
plate A counted 7/10/92 14:56:30, mid point = 14:56:30 + 10/2 = 15:01:30
7/10/92 09:51:30 → 15:01:30 = 5:10:00 = 5.16667 H

$$(4985.32277\ D\ ^{90}Y/m/ml)(E^{\frac{-(\ln 2)(5.16667)}{64.1}})(0.99932mL)/2663.64c/m = 1.76872\ d/c$$

plate B counted 7/10/92 15:49:30, mid point = 15:49:30 + 10/2 = 15:54:30
7/10/92 09:51:30 → 15:54:30 = 6:03:00 = 6.05000 H

$$(4985.32277\ D\ ^{90}Y/m/ml)(E^{\frac{-(\ln 2)(6.05000)}{64.1}})(0.99932mL)/2622.34c/m = 1.77949\ d/c$$

$\overline{X}_{10}$ = 1.79979 d/c

s = 0.01987

^{90}Y Calibration for P.B.C.-2

1.80 d/c (Rounded to nearest 0.01)

Anne E Kozlisky 9/23/92
Analyst/Date

[signature] 9/23/92
Cognizant Scientist/Date

ANALYTICAL LABORATORIES — BETA AND GAMMA COUNTER DATA SHEET

SAMPLE

SUBMITTED BY

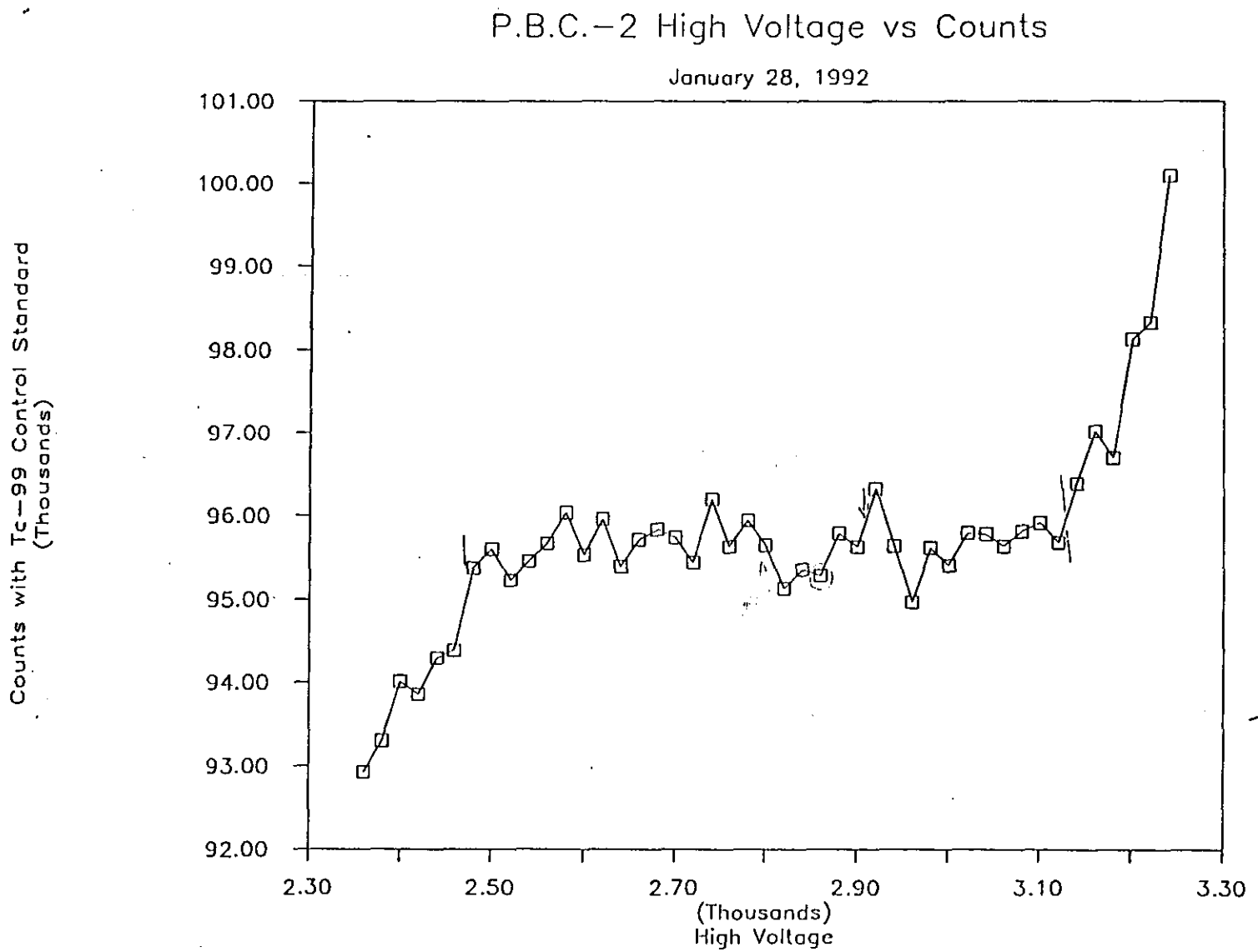
COUNTED BY Anne E Kozlisky

REMARKS ^{90}Y Calibration Counts P.B.C.-2 HV=2860

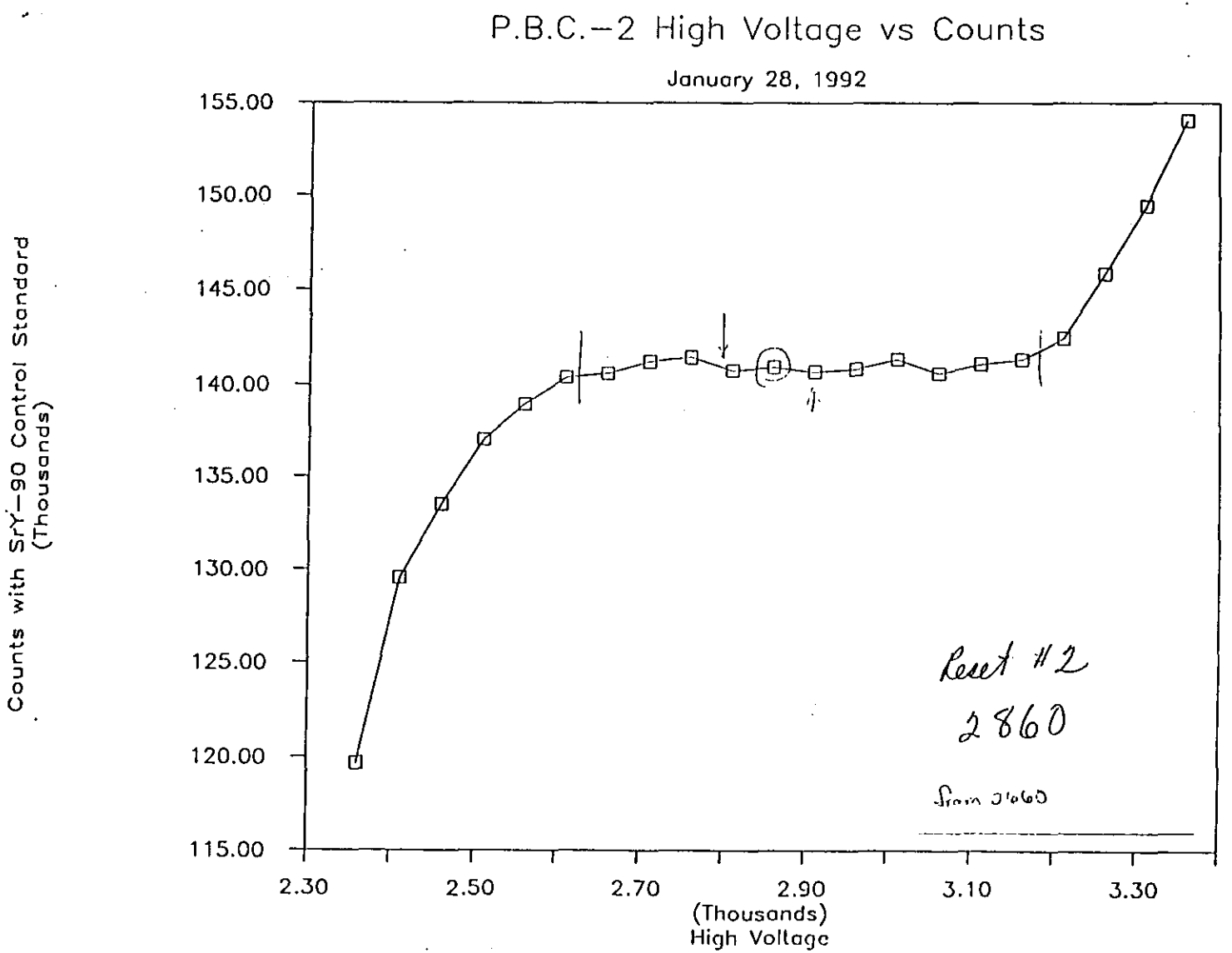
SAMPLE NUMBER	DATE 19 92	TIME	INST. NO.	SHELF NO.	ABSBR. MG/CM²	INT. (MIN) T	RECORDER READING SCALE OF	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N C	BGD B	NET RATE X=R−B+C	NORMALIZING RATE N.F.	NORMALIZED RATE COUNTS/MIN.
1a	7/10	1413	2	1	—	10	+	26146			29.46	2585.14		
1b		1507					+	25988				2569.34		
							+							
							+							
							+							
2a		1424					+	26262				2596.74		
2b		1517.30					+	26222				2592.74		
							+							
							+							
							+							
3a		1435					+	26346				2605.14		
3b		1528					+	26351				2605.64		
							+							
							+							
							+							
4a		1446					+	26368				2607.34		
4b		1539					+	26583				2628.84		
							+							
							+							
							+							
5a		1456.30					+	26931				2663.64		
5b		1549.30					+	26518				2622.34		
							+							
							+							
							+							

BNW 52342 p. 134 b of 4

2113



BNW 52342 p. 134 1 of 14



BNW 52342 p.134 2 of 4

ANALYTICAL LABORATORIES — BETA AND GAMMA COUNTER DATA SHEET

SAMPLE

SUBMITTED BY

COUNTED BY

REMARKS P.B.C.-2 High Voltage Plateau Counts with Tc^{99} Control Standard

page 1 of 3

SAMPLE NUMBER	DATE 19 92	TIME	INST. NO.	SHELF NO.	ABSBR. MG/CM²	INT. (MIN) T	RECORDER READING SCALE OF	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N C	BGD B	NET RATE X=R−B+C	NORMALIZING RATE N.F.	NORMALIZED RATE COUNTS/MIN.
HV 2660	1/14	0750	2	1	—	10	+	95720						
2680		0836					+	95837						
2700							+	95741						
2720							+	95447						
2740							+	96196						
2760							+	95636						
2780							+	95942						
2800							+	95653						
2820							+	95139						
2840							+	95363						
2860							+	95288						
2880							+	95791						
2800							+	95632						
2920							+	96317						
2940							+	95646						
2960							+	94975						
2980							+	95626						
3000							+	95414						
3020							+	95798						
3040							+	95788						
3060							+	95644						
3080							+	95815						
3100							+	95917						
							+							
							+							

BNW 52342 p. 134 3 of 14

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ANALYTICAL LABORATORIES — BETA AND GAMMA COUNTER DATA SHEET

SAMPLE

SUBMITTED BY

COUNTED BY

REMARKS P.B.C.-2 High Voltage Plateau Counts with Tc^{99} Control Standard

page 2 of 3

SAMPLE NUMBER	DATE 1992	TIME	INST. NO.	SHELF NO.	ABSBR. MG/CM²	INT. (MIN) T	RECORDER READING SCALE OF ____	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N C	BGD B	NET RATE X=R−B+C	NORMALIZING RATE N.F.	NORMALIZED RATE COUNTS/MIN.
HV 3120	1/15	1056		1	—	10	+	96585						
3140							+	96375						
3160							+	97006						
3180							+	96687						
3200							+	98123						
3220							+	98318						
3240							+	100085						
2640							+	95397						
2620							+	95961						
2600							+	95538						
2580							+	96037						
2560							+	95673						
2540							+	95462						
2520							+	95234						
2500							+	95607						
2480							+	95378						
2460	1/16						+	99384						
2440							+	94291						
~~2420~~							+	94823						
~~2400~~							+	~~78888~~						
~~2380~~	2420						+	93857						
~~2360~~	2400						+	94013						
2380							+	93302						
2360							+	92933						
							+							

NAC 11/10/92

ON/N 52342 p. 134 4 of 14

2117

ANALYTICAL LABORATORIES — BETA AND GAMMA COUNTER DATA SHEET

SAMPLE

SUBMITTED BY

COUNTED BY

REMARKS P.B.C.-2 High Voltage Plateau Counts with Sr-Y90 Control Standard

page 3 of 3

SAMPLE NUMBER	DATE 19 92	TIME	INST. NO.	SHELF NO.	ABSOR. MG/CM²	INT. (MIN) T	RECORDER READING SCALE OF ___	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N C	BGD B	NET RATE X=R−B+C	NORMALIZING RATE N.F.	NORMALIZED RATE COUNTS/MIN.
2360	1/16		2	1	—	10	+	119672						
2410							+	129549						
2460							+	133511						
2510							+	137002						
2560							+	138963						
2610							+	140404						
2660							+	140623						
2710							+	141238						
2760							+	141452						
2810	1/22						+	140768						
2860							+	140950						
2910	1/27						+	140707						
2960							+	140869						
3010							+	141303						
3060							+	140611						
3110							+	141131						
3160							+	141358						
3210							+	142452						
3260							+	145859						
3310							+	149467						
3360							+	154038						
							+							
							+							
							+							
							+							

BNW 52342 Pg 151 S.C. #

2119

ANALYTICAL LABORATORIES — BETA AND GAMMA COUNTER DATA SHEET

SAMPLE: ^{90}Sr Y Calibration Counts

SUBMITTED BY:

COUNTED BY: Anne E Hoffsiddy

REMARKS: ^{90}Sr Y $1.00216 \times 10^4 \pm 2.685 \times 10^2$ d/m 3/25/92 #W-80 BNW54342 p34
P.B.C.-2 HV = 2860 Methane Flow Rate ~ 17

SAMPLE NUMBER	DATE 1992	TIME	INST. NO.	SHELF NO.	ABSBR. MG/CM²	INT. (MIN) T	RECORDER READING SCALE OF 1	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N. C	BGD B	NET RATE X = R−B+C	NORMALIZING RATE N. F.	NORMALIZED RATE COUNTS/MIN.
^{90}Sr Y-1	7/17	1035	2	1	–	10	+	53112			49.11	5282.03		
-2		1046					+	53733				5344.13		
-3		1057					+	52411				5211.93		
-4		1148					+	53168				5287.63		
-5		1159					+	53661				5336.93		
-6		1210					+	53521				5322.93		
-7		1221					+	53702				5341.03		
-8		1231					+	53800				5350.83		
-9		1242					+	53952				5366.03		
-10		1254					+	53888				5359.63		
-11		1305					+	54277				5398.53		
-12		1416					+	53535				5324.33		
							+							
							+							

Decay Period: 3/25/92 → 7/17/92 = ~~115~~ 114 days = ~~0.314859~~ 0.312121 Y

$\bar{X}_{12}$ = 5327.16$\overline{33}$ ± 48.334

Decay: $(1.00216 \times 10^4)\,E\left(\frac{-(\ln 2)(\cancel{0.314859}\ 0.312121)}{28.5}\right) = \cancel{9945.91}\ 9945.15$ d/μm

± $(268.5)\,E$ (same as above) = $\cancel{266.46}$ 266.15 d/μm

$\cancel{9945.91}$ 9945.15 ± $\cancel{266.46}$ 266.15 dpm ÷ 5327.16$\overline{33}$ ± 48.334 = 1.866999 1.866876 ± 0.0528 d/c

P.B.C.-2 d/c = 1.87 ± 0.05

Anne E Hoffsiddy 10/21/92

Reviewed: All ↓ 10-21-92

BNW 54342 p34

ANALYTICAL LABORATORIES — BETA AND GAMMA COUNTER DATA SHEET

SAMPLE: Tc^{99} Calibration

SUBMITTED BY:

COUNTED BY: Bruce E Hazlehurst

REMARKS: Tc^{99} Secondary Standard 1.4013E+5 ± 5.74E+2 d/m/ml BNW52626 p. 8-10 (1-3-5-7-9) 100.012 glass calib. pipet (2-4-6-8-10) 100.062 glass calib. pipet P.B.C.-2 HV=2860 Methane Flow Rate ~47

SAMPLE NUMBER	DATE 19 92	TIME	INST. NO.	SHELF NO.	ABSOR. MG/CM²	INT. (MIN) T	RECORDER READING SCALE OF +	TOTAL COUNTS N	RECORDED RATE R = N/T	COINC. CORR'N C	BGD B	NET RATE X=R−B+C	NORMALIZING RATE N.F.	NORMALIZED RATE COUNTS/MIN.
TC1	1/29		2			20	+	99095			28.65	4926.10		
TC2							+	102027				5072.70		
TC3							+	99768				4959.75		
TC4							+	98045				4873.60		
TC5							+	102352				5088.95		
TC6							+	95611				4751.90		
TC7							+	101068				5024.75		
TC8							+	99309				4936.80		
TC9							+	96841				4813.40		
TC10							+	99841				4963.40		
TC1	7/15						+	98750			29.32	4908.18		
TC2							+	101727				5057.03		
TC3							+	99764				4958.88		
TC4							+	98034				4872.38		
TC5							+	102569				5099.13		
TC6	7/16						+	96012			29.30	4771.30		
TC7							+	100464				4993.90		
TC8							+	98939				4917.65		
TC9							+	97036				4822.50		
TC10							+	99322				4936.80		
							+				$\bar{X}_{20}$ =	4937.455 ± 101.16388 c/m		
Average pipet volume = 0.100035 ml							+							
0.100035 ml * 1.4013E+5 ± 5.74E+2 d/m/ml = 14017.90455 ± 57.42 d/m												Bruce E Hazlehurst 7/29/92		
14017.90455 ± 57.42 d/m ÷ 4937.455 ± 101.16388 c/m = 2.84 ± 0.0593												NOV		
							+			Reviewed:				

BNW 52626 p. 134 7-8-92

2100

LUDLUM ZnS ALPHA SCINTILLATION COUNTERS USED FOR TOTAL ALPHA LUDLUM 1 THROUGH 10

WHC-SD-WM-DP-170 Rev. 1

GEA
CALIBRATION AND CONTROL CHARTS
DETECTOR G
DETECTOR H

CERTIFIED COPY: Standards Laboratory Radiochemical Preparation Data Base

Printed By: R.G. SWOBODA

Signature: R.G. Swoboda 10/2/95

Printing Date: Oct 2, 1995

Rec_118
Initiated 08-11-95
Entered by R.G. Swoboda

Gamma Source Preparations
for
Initial Efficiency Calibration

Dilutions of Vendor Supplied (Amersham QCY.48) Mixed-Gamma Calibration sources were prepared in a number of various geometries for initial calibration and/or calibration verification of several 325 Bldg. gamma detectors.

Preparation work for the gamma efficiency calibrations was initiated with the receipt of the standard material on 5-3-95. The last source was prepared on 8-11-95.

Work Plan Description:

-Two QCY.48 Mixed-Gamma Sources received from Amersham on 5-2-95 were assigned sequential Certificate #'s RS-126 and RS-127. which are specific to Amersham Solution Source Numbers R5/130/51 and R5/130/50 respectively. The certificates for the two QCY.48 standards used for source preparation of several gamma geometries are photoscanned into this document (see below).

- Projections for proper aliquot sizes were planned based on estimated counting efficiencies. The GEASOURC.XLS spreadsheet was used to transcribe and document the requirements for proper aliquots to use of the QCY.48 source. The efficiency sources were required to be prepared at an activity level which would provide a minimum of 10,000 counts at each energy line when counted for a nominal 30 min to 1 hr count.

- Aliquots of these sources were directly added to each preparation with accurate weights taken and recorded (if at all possible) to insure the integrity of each preparation. This information was transferred to the preparation spreadsheet as each geometry was initiated. -- see the following GEAPREP.XLS

- Using the certificate information from the QCY.48 sources and the specific aliquot vol/wt. information from the prepared gamma standards, Efficiency File data was uploaded into the Canberra GENIE Gamma Efficiency Library for each source that was prepared at a different aliquot size. Thus, each geometry source was cross-referenced to a unique Certificate File. Examples of two Cert. Files are included in this document following the prepsheet information. The only information that would appear different for subsequent certificate files would be the extension on the Standard ID which changes to depict a different aliquot size (Quantity).

-The Canberra GENIE system automatically calibrates the detector for the particular geometry and generates a "best fit" efficiency curve for each geometry based on one or more counts. The Calibration File for each source clearly identifies the source description and the Certificate File used to generate the efficiency curve. These data files are stored on the Gamma counting systen with backup files located in the initial and continuing calibration records for each detector. The actual calibrations are continuing as time permits with those geometries used most often taking precident over seldom used geometries.

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RS-126

Amersham International plc
Amersham UK

NAMAS
CALIBRATION
No 3146

[redacted]

Description

Product code: OCT.48 Solution number: RS/130/51

This mixed radionuclide gamma-ray reference standard consists of a solution in 4M HCl of the ten radionuclides listed below.

Measurement and Accuracy

Reference time: 1200 GMT on 1 May 1995

Mass of solution: 5.3877 grams Density: 1.073 g/ml at 20°C

@ 35 99.7%CL

Parent radionuclide	Gamma-ray energy (keV)	Gamma-rays per second per gram of solution	Random uncertainty	Systematic uncertainty	Overall uncertainty
Americium-241	59.54	1092	± 0.2 %	± 1.9 %	± 2.1 %
Cadmium-109	88.03	620	± 0.3 %	± 3.3 %	± 3.6 %
Cobalt-57	122.1	561	± 0.1 %	± 1.6 %	± 1.7 %
Cerium-139	165.9	679	± 0.2 %	± 1.3 %	± 1.5 %
Mercury-203	279.2	1916	± 0.3 %	± 2.0 %	± 2.3 %
Tin-113	391.7	2015	± 0.1 %	± 4.3 %	± 4.4 %
Strontium-85	514.0	3769	± 0.3 %	± 1.6 %	± 1.9 %
Caesium-137	661.7	2339	± 0.2 %	± 1.9 %	± 2.1 %
Yttrium-88	898.0	5988	± 0.2 %	± 3.5 %	± 3.7 %
Cobalt-60	1173	3311	± 0.2 %	± 0.4 %	± 0.6 %
Cobalt-60	1333	3313	± 0.2 %	± 0.4 %	± 0.6 %
Yttrium-88	1836	6346	± 0.2 %	± 3.5 %	± 3.7 %

Purity

At the reference time the solution also contained the following impurities:

Iron-55 equal to 5.3 becquerels (0.14 nanocuries) per gram.

Remarks

Further details, including composition of the solution, methods of measurement, decay scheme assumptions, decay tables and definitions of uncertainties, are given in the data sheet accompanying this certificate.

This product meets the quality assurance requirements of NRC Regulatory Guide 4.15 for achieving explicit NIST traceability as defined in NCRP58 (1985).

Approved Signatory

W. F. Case

Accepted 5-3-95

W F Case

Page 1 of 1

P.O. # 705917

RS-126
Barcode # 108455

Amersham

This certificate is issued in accordance with the conditions of accreditation granted by the National Measurement Accreditation Service which has assessed the measurement capability of the laboratory and its traceability to recognised national standards and to the units of measurement realised at the corresponding national standards laboratory. Copyright of this certificate is owned jointly by the British Crown and the issuing laboratory and may not be reproduced other than in full except with the prior written approval of the Head of NAMAS and the issuing laboratory.

2125

RS-127

Amersham International plc
Amersham UK

[redacted]

NAMAS
CALIBRATION
No. 0146

Description Product code: OCY.49 Solution number: RE/130/50

This mixed radionuclide gamma-ray reference standard consists of a solution in 4M HCl of the ten radionuclides listed below.

Measurement and Accuracy Reference time: 1200 GMT on 1 May 1995

Mass of solution: 5.4941 grams Density: 1.073 g/ml at 20°C

@3σ ~99.7% CL

Parent radionuclide	Gamma-ray energy (keV)	Gamma-rays per second per gram of solution	Random uncertainty	Systematic uncertainty	Overall uncertainty
Americium-241	59.54	1092	± 0.2 %	± 1.9 %	± 2.1 %
Cadmium-109	88.03	620	± 0.3 %	± 3.3 %	± 3.6 %
Cobalt-57	122.1	561	± 0.1 %	± 1.6 %	± 1.7 %
Cerium-139	165.9	679	± 0.2 %	± 1.3 %	± 1.5 %
Mercury-203	279.2	3916	± 0.3 %	± 2.0 %	± 2.3 %
Tin-113	391.7	2015	± 0.1 %	± 4.3 %	± 4.4 %
Strontium-85	514.0	3769	± 0.3 %	± 1.6 %	± 1.9 %
Cesium-137	661.7	2339	± 0.2 %	± 1.9 %	± 2.1 %
Yttrium-88	898.0	5988	± 0.2 %	± 3.5 %	± 3.7 %
Cobalt-60	1173	3311	± 0.2 %	± 0.4 %	± 0.6 %
Cobalt-60	1333	3313	± 0.2 %	± 0.4 %	± 0.6 %
Yttrium-88	1836	6346	± 0.2 %	± 3.5 %	± 3.7 %

Purity At the reference time the solution also contained the following impurities:

Iron-55 equal to 5.3 becquerels (0.14 nanocuries) per gram.

Remarks Further details, including composition of the solution, methods of measurement, decay scheme assumptions, decay tables and definitions of uncertainties, are given in the data sheet accompanying this certificate.

This product meets the quality assurance requirements of NRC Regulatory Guide 4.15 for achieving explicit NIST traceability as defined in NCRPSE (1985).

Approved Signatory

P.O. # 705917

W. F. Case

Accepted 5-3-95

RS-127
Barcode # 108456

W F Case

Page 1 of 1

Amersham

The certificate is issued in accordance with the conditions of accreditation granted by the National Measurement Accreditation Service, which has assessed the measurement capability of the laboratory and its traceability to recognised national standards and to the units of measurement realised at the participating national standards laboratory. Copyright of the certificate is owned jointly by the British Crown and the issuing laboratory and may not be reproduced other than in full except with the prior written approval of the Head of NAMAS and the issuing laboratory.

Traceability is the ability to relate the accuracy of measurement of radionuclides to the National Institute of Standards and Technology (NIST). Traceability is achieved by participation in a Measurements Assurance Program linked to NIST and production of certified materials in accordance with a quality assurance program.

Amersham participates in measurement assurance programs conducted by NIST in cooperation with the Nuclear Energy Institute (NEI, formerly USCEA). Additionally, our production facilities and measurement laboratories operate under routinely audited quality assurance programs.

Therefore, Amersham certified standardized products meet or exceed, the NRC requirements for measurements traceable to NIST.

GEASOURC.XLS

Amersham (QCY.48) GEA calibration standard, ref. date =						5/1/95			Density = 1.073 g/ml.					
nominal total volume = 10 mL			elapsed days =		21					gammas/sec	gammas at	*estimated	estimated	estimated
							gamma/s/g at T=		gammas/s/g	vol taken mL	ount time (min)	efficiency	total gammas	counting
	intensity %	t1/2		g/sec/gr	error %	g/s/gr	5/22/95		5/22/95	0.25	60			error %
Am-241	35.7	432.7	yrs	1092	2.1	1,092	1,092		1,092	273	982,709	0.1	98,271	0.32
Cd-109	3.6	1.2665	yrs	620	3.6	620	601		601	150	540,715	0.06	32,443	0.56
Co-57	85.5	271.77	days	561	1.7	561	532		532	133	478,569	0.055	26,321	0.62
Ce-139	84	138	days	679	1.5	679	611		611	153	549,925	0.05	27,496	0.60
Hg-203	10	47	days	1916	2.3	1,916	1,406		1,406	351	1,265,130	0.045	56,931	0.42
Sn-113	64	115.09	days	2015	4.4	2,015	1,776		1,776	444	1,598,048	0.04	63,922	0.40
Sr-85	99	64.84	days	3769	1.9	3,769	3,011		3,011	753	2,710,022	0.035	94,851	0.32
Cs-137	85	30	years	2339	2.1	2,339	2,336		2,336	584	2,102,305	0.03	63,069	0.40
Y-88	99	106.61	days	6346	3.7	6,346	5,536		5,536	1,384	4,982,483	0.02	99,650	0.32
Co-60	99	5.271	yrs	3311	0.6	3,311	3,286		3,286	822	2,957,455	0.01	29,575	0.58
* Efficiency estimate based on previous Cs-137 Gel.1 calibrations in 10 ml LSC geometry.														
NAS GEA calibration standard, reference date					3/1/95		need density, assuming 1 until further information is provided							
nominal total volume = 10 mL			elapsed days =		40					gammas/sec	gammas at count	estimated	estimated	estimated
							dpm/g at date=		gammas/s/g	vol (mL)	time (min)	efficiency	total gammas	counting
	intensity %	t1/2		kDq/g	error %	dpm/g	4/10/95		4/10/95	0.25	40			error %
Am-241	35.7	432.7	yrs	6.592	2.16	395,520	395,431		2,353	588	1,411,759	0.09	127,058	0.28
Cd109	3.6	1.2665	yrs	37.39	2.18	2,243,400	2,112,889		1,268	317	760,640	0.09	68,458	0.38
Co57	85.5	271.77	days	1.33	2.2	79,800	72,060		1,027	257	616,116	0.055	33,886	0.54
Te123m	84	119.7	days	2.308	2.16	138,480	109,848		1,538	384	922,723	0.05	46,136	0.47
Cr51	10	27.704	days	15.88	2.25	952,800	350,239		584	146	350,239	0.07	24,517	0.64
Sn113	64	115.09	days	2.091	2.28	125,460	98,601		1,052	263	631,046	0.04	25,242	0.63
Sr85	99	64.84	days	2.259	2.24	135,540	88,381		1,458	365	874,976	0.035	30,624	0.57
Cs137	85	30	years	1.761	2.33	105,660	105,393		1,493	373	895,840	0.0359	32,161	0.56
Y-88	99	106.61	days	3.974	2.24	238,440	183,837		3,033	758	1,819,986	0.02	36,400	0.52
Co-60	99	5.271	yrs	1.873	2.38	112,380	110,773		1,878	457	1,096,634	0.0163	17,873	0.75

Prepsheet for QCY.48 (RS-126 and RS-127 Standards)
at specific geometries.

QCYPREP.XLS

GEA standards---Prepared from Amersham QCY.48 Sources -- Ref Date 5-1-95

Density of QCY.48 Standard in g/mL = 1.073

Actual measured density of 4 M HCl = 1.0393

Date Prepared for Counting Rm.	Source description	Standard used	Vol (ml) of Std	Measured Mass wt. of standard (g)	Calculated Expected Weight (g)	Bias meas./calc.
5-15-95	point sources (pill vial)	RS-126	0.25	0.26769	0.26404	0.0138
5-15-95	2-mL in glass LSC vial	RS-126	0.25	0.26701	0.26404	0.0113
5-15-95	5-mL in glass LSC vial	RS-126	0.25	0.2677	0.26404	0.0139
5-15-95	10-mL in glass LSC vial	RS-126	0.25	0.26767	0.26404	0.0137
5-15-95	50-mL in 4 oz PC jar (PSJ)	RS-126	0.25	0.26314	0.26404	-0.0034
5-15-95	100-mL poly bottle	RS-126	0.25	0.26745	0.26404	0.0129
5-15-95	1000-mL marinelli beaker	RS-126a	0.5	not possible	0.51965	
5-15-95	100-mL water in 4oz PC jar	RS-126a	0.5	0.5228	0.51965	0.0061
5-15-95	100 mL in 8oz PC jar	RS-126a	0.5	0.5131	0.51965	-0.0126
5-15-95	500 mL in 8oz PC Jar	RS-126a	0.5	0.5119	0.51965	-0.0149
Additional Sources Prepared as Requested by Richard Ratner						
8-10-95	10-mL in glass LSC vial	RS-126b	1.5	1.56633	1.55895	0.0047
8-11-95	2-mL in glass LSC vial	RS-127a	1.5	1.53612	1.55895	-0.0146

Opted to use the density of 4 M HCl for Bias Calc.
A bias greater than 2% (+/- 0.02) between the actual measured weight and the expected weight based on the measured density of 4 M HCl was considered unacceptable and a repreparation of the geometry source was made.

Certificate Files for RS-126b and RS-127a as they appear in the Canberra GENIE Gamma Library

DKA200:[GAMMA.EFF]RS-126-B.CER;1
2-OCT-1995 11:22

Title : QCY.48 Amersham standard RS/130/51 RS-126
Quantity : 1.6 Assay date : 1-MAY-1995 12:00:00.

Nuclide Name	Half Life	Energy (keV)	Rate	% Err	% Abn	CAL/INIT?
Am-241	432.70Y	59.5	1092.	0.70	35.7	Yes
Cd-109	1.27Y	88.0	620.	1.20	3.6	Yes
Co-57	271.77D	122.1	561.	0.57	85.5	Yes
Ce-139	138.00D	165.9	679.	0.50	84.0	Yes
Hg-203	47.00D	279.2	1916.	0.77	10.0	Yes
Sn-113	115.09D	391.7	2015.	1.47	64.0	Yes
Sr-85	64.84D	514.0	3769.	0.63	99.3	Yes
Cs-137	30.00Y	661.7	2339.	0.70	85.2	Yes
Y-88	106.61D	898.1	5988.	1.23	92.7	Yes
Co-60	5.27Y	1173.2	3311.	0.20	99.9	Yes
Co-60	5.27Y	1332.5	3313.	0.20	100.0	Yes
Y-88	106.61D	1836.1	6346.	1.23	99.3	Yes

DKA200:[GAMMA.EFF]RS-127-A.CER;1
2-OCT-1995 11:22

Title : QCY.48 Amersham standard RS/130/50 RS-127 FOR TRACK DETECTOR
Quantity : 1.5 Assay date : 1-MAY-1995 12:00:00.

Nuclide Name	Half Life	Energy (keV)	Rate	% Err	% Abn	CAL/INIT?
Am-241	432.70Y	59.5	1092.	0.70	35.7	Yes
Cd-109	1.27Y	88.0	620.	1.20	3.6	Yes
Co-57	271.77D	122.1	561.	0.57	85.5	Yes
Ce-139	138.00D	165.9	679.	0.50	84.0	Yes
Hg-203	47.00D	279.2	1916.	0.77	10.0	Yes
Sn-113	115.09D	391.7	2015.	1.47	64.0	Yes
Sr-85	64.84D	514.0	3769.	0.63	99.3	Yes
Cs-137	30.00Y	661.7	2339.	0.70	85.2	Yes
Y-88	106.61D	898.1	5988.	1.23	92.7	Yes
Co-60	5.27Y	1173.2	3311.	0.20	99.9	Yes
Co-60	5.27Y	1332.5	3313.	0.20	100.0	Yes
Y-88	106.61D	1836.1	6346.	1.23	99.3	Yes

DETECTOR G

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VMS Calibration Report V1.5 Generated 2-OCT-1995 11:06:24

Configuration : MCA0:[USER]G$1
Analyses by : SCRCAL V1.1
Detector Name : G
Efficiency type : Empirical
Detector Geometry: PO-4PC-100ML-W

Energy Calib Time: 10-JUL-1995 08:56:39
Effncy Calib Time: 9-AUG-1995 16:41:15
Shelf : 0

Energy Calibration Report

Energy = 0.3639 + 0.3753*Channel + 0.0000E+00*(Channel**2)

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	158.07	59.50	59.68	-0.184
2	233.97	88.00	88.17	-0.166
3	324.57	122.10	122.17	-0.065
4	441.27	165.90	165.96	-0.059
5	743.09	279.20	279.22	-0.020
6	1042.56	391.70	391.60	0.097
7	1368.37	514.00	513.87	0.129
8	1761.68	661.70	661.46	0.236
9	2391.66	898.10	897.88	0.223
10	3125.06	1173.20	1173.10	0.101
11	3549.87	1332.50	1332.51	-0.013
12	4892.55	1836.10	1836.38	-0.280

FWHM Calibration Report

FWHM = 0.5296 + 5.1664E-02*(Energy**1/2)

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	59.50	1.06	0.93	0.136
2	88.00	1.10	1.01	0.083
3	122.10	1.13	1.10	0.031
4	165.90	1.19	1.20	-0.002
5	279.20	1.29	1.39	-0.105
6	391.70	1.50	1.55	-0.055
7	514.00	1.59	1.70	-0.110
8	661.70	1.74	1.86	-0.123
9	898.10	2.02	2.08	-0.060
10	1173.20	2.38	2.30	0.086
11	1332.50	2.40	2.42	-0.015
12	1836.10	2.88	2.74	0.135

Approved by: Richard T. R Approval Date: 10/ 2/ 95

Additional print-out of July 10 energy & FWHM calibration.

RTR

VMS Calibration Report V1.5 Generated 2-OCT-1995 11:11:51

Configuration : DKA200:[USER.SCUSR.EFF]EFF_GOGSV10MLW_M.CNF;1
Analyses by : CALIBRATE V1.7,PEAK V16.5
Detector Name : G Energy Calib Time: 10-JUL-1995 08:56:39
Efficiency type : Empirical Effncy Calib Time: 7-AUG-1995 15:13:59
Detector Geometry: PO-GSV-10ML-W Shelf : 0

Efficiency Calibration Report

Eff = exp(a2 + a3*x + a4*x**2 + a5*x**3 + a6*x**4 + a7*x**5), x=ln(a1/energy)

a1	a2	a3	a	a5	a6	a7
947.8	-3.812	0.9890	-3.0955E-02	-0.1698	0.1510	-4.3621E-02

Average Deviation = 1.57 % Reduced Chi-Square = 4.20

Nbr	Energy (keV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
1	59.54	4.42E-02	2.24E-04	4.36E-02	2.84	1.44
2	88.03	8.70E-02	5.06E-04	9.03E-02	-6.51	-3.79
3	122.06	1.03E-01	4.80E-04	1.01E-01	3.18	1.48
4	165.85	9.45E-02	4.70E-04	9.17E-02	6.01	2.99
5	279.19	6.45E-02	3.90E-04	6.45E-02	0.15	0.09
6	391.69	4.89E-02	2.77E-04	4.92E-02	-1.29	-0.73
7	514.00	3.88E-02	1.58E-04	3.92E-02	-2.03	-0.83
8	661.66	3.23E-02	1.11E-04	3.12E-02	9.76	3.35
9	898.07	2.26E-02	1.06E-04	2.33E-02	-6.95	-3.28
10	1173.24	1.80E-02	5.06E-05	1.79E-02	1.14	0.32
11	1332.50	1.60E-02	4.60E-05	1.59E-02	2.55	0.73
12	1836.08	1.25E-02	6.06E-05	1.23E-02	2.70	1.31

Approved by: Richard T. Ries Approval Date: 10/ 31/ 95

This is an additional print-out of Aug-7-1995 efficiency calibration of GØGSV10MLW. RTR

VMS Calibration Report V1.5 Generated 2-OCT-1995 11:12:52

Configuration : DKA200:[USER.SCUSR.EFF]EFF_G3GSV2MLW_M.CNF;1
Analyses by : CALIBRATE V1.7,PEAK V16.5
Detector Name : G Energy Calib Time: 10-JUL-1995 08:56:39
Efficiency type : Empirical Effncy Calib Time: 2-AUG-1995 17:02:20
Detector Geometry: P3-GSV-2ML-W Shelf : 3

Efficiency Calibration Report

Eff = exp(a2 + a3*x + a4*x**2 + a5*x**3 + a6*x**4 + a7*x**5), x=ln(a1/energy)

a1	a2	a3	a4	a5	a6	a7
947.8	-5.469	0.7929	-2.0840E-02	4.4022E-02	-2.7428E-03	-1.2491E-02

Average Deviation = 1.55 % Reduced Chi-Square = 3.08

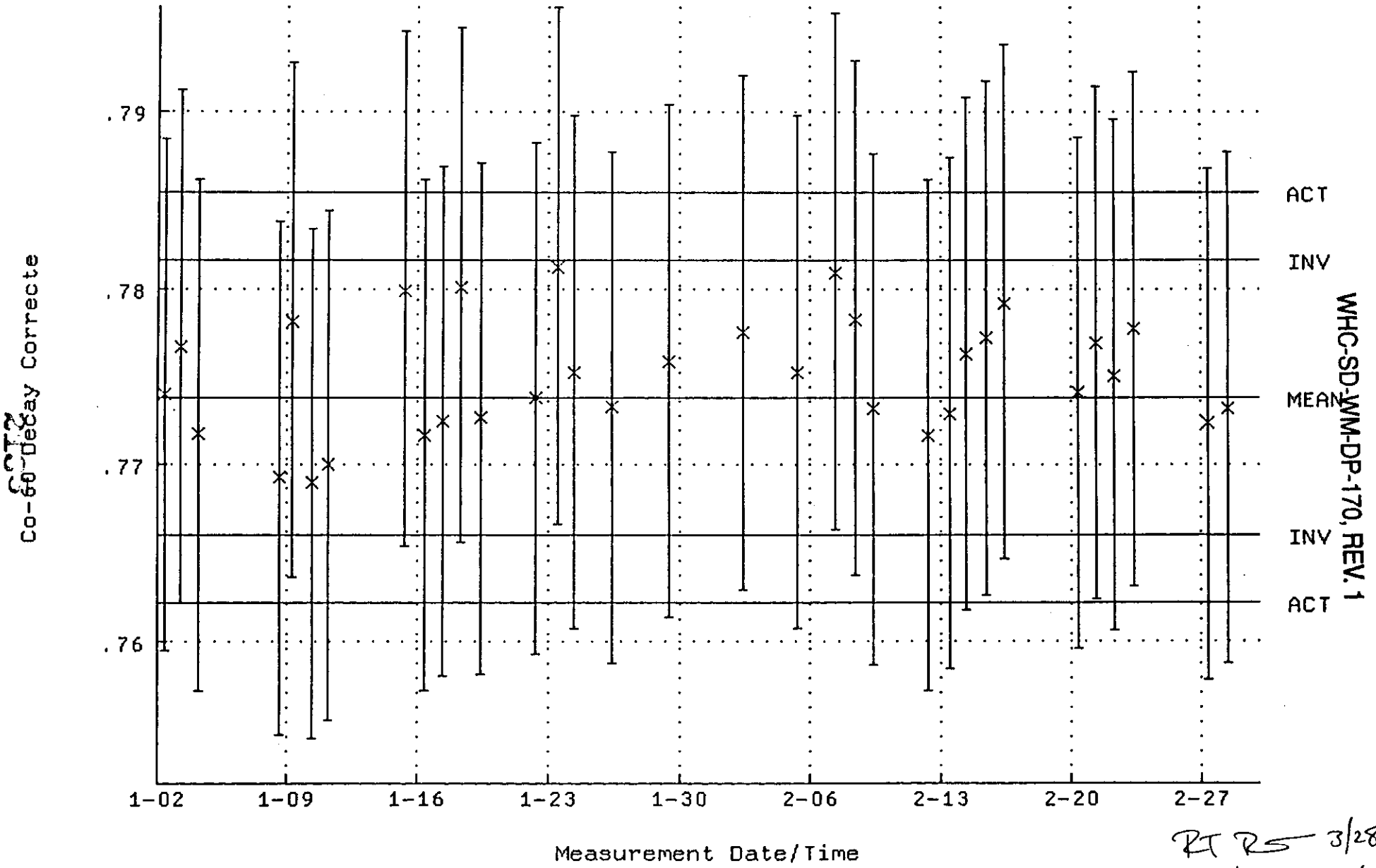
Nbr	Energy (keV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
1	59.54	9.18E-03	4.63E-05	9.19E-03	-0.20	-0.10
2	88.03	1.55E-02	9.86E-05	1.58E-02	-3.25	-2.06
3	122.06	1.74E-02	9.65E-05	1.74E-02	0.22	0.12
4	165.85	1.61E-02	9.33E-05	1.59E-02	2.89	1.67
5	279.19	1.12E-02	7.29E-05	1.12E-02	-0.06	-0.04
6	391.69	8.48E-03	5.38E-05	8.54E-03	-1.12	-0.71
7	514.00	6.69E-03	2.99E-05	6.85E-03	-5.47	-2.45
8	661.66	5.67E-03	2.16E-05	5.60E-03	3.19	1.21
9	898.07	4.39E-03	2.23E-05	4.40E-03	-0.44	-0.22
10	1173.24	3.56E-03	1.01E-05	3.55E-03	0.10	0.03
11	1332.50	3.20E-03	9.27E-06	3.20E-03	-0.71	-0.21
12	1836.08	2.49E-03	1.29E-05	2.44E-03	3.30	1.72

Approved by: Richard T. R[illegible] Approval Date: 10/ 2/ 95

This is an additional print-out of the Aug-2-1995 efficiency calibration of G3GSV2MLW.

RTR

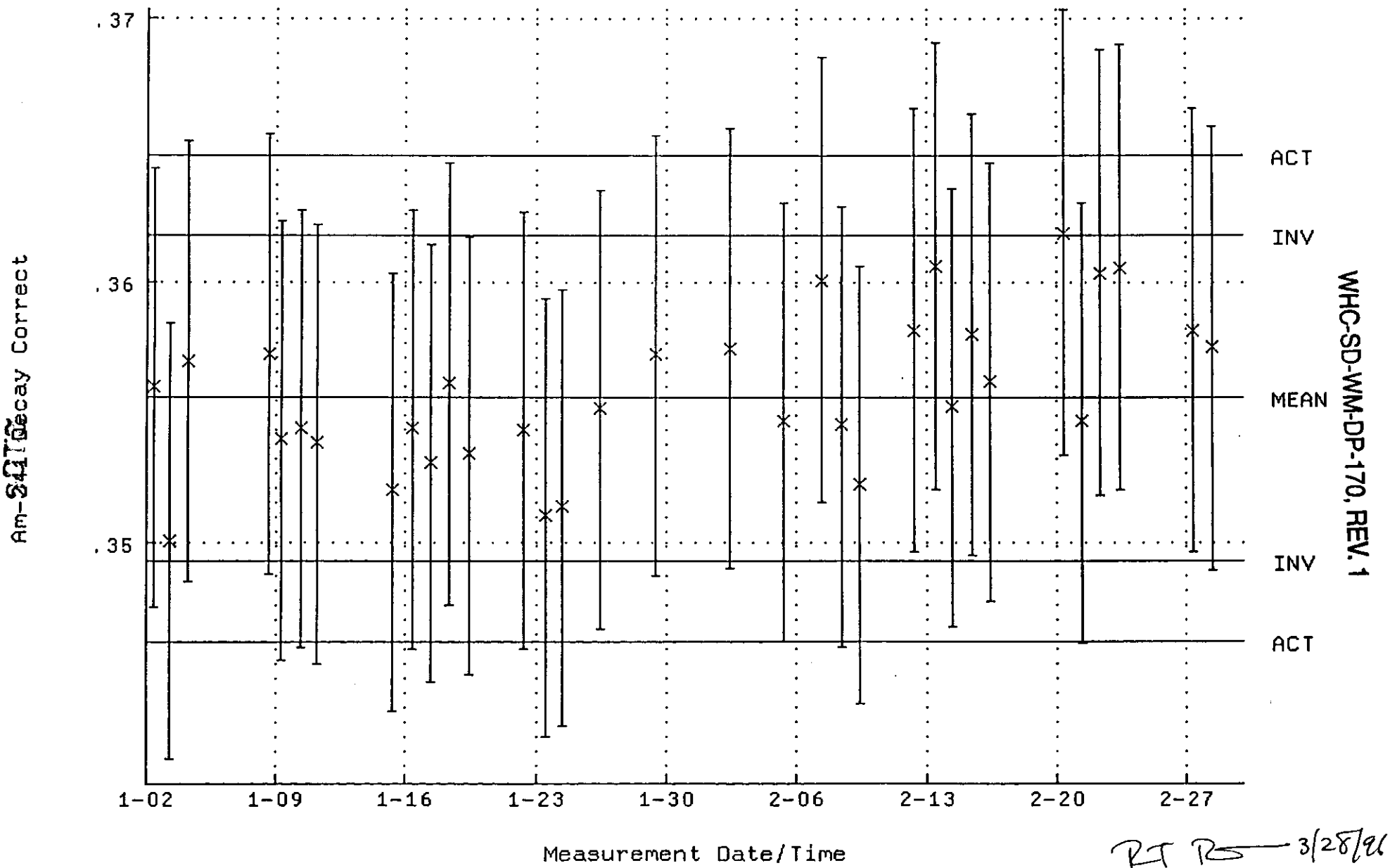
QA filename : DKA200:[GAMMA.QA]DET_G.QAF;1
Parameter Name : NLACTVTY-CO (Co-60 Decay Corrected Activity)
Start/End Dates : 2-JAN-1996 10:14:57 through 1-MAR-1996 00:00:00
Mean +- Std Dev : 0.773854 +- 3.898136E-03 (0.50 %)



WHC-SD-WM-DP-170, REV. 1

RT RS 3/28/96
L R Leonard 3/28/96

QA filename : DKA200:[GAMMA.QA]DET_G.QAF;1
Parameter Name : NLACTVTY-AM (Am-241 Decay Corrected Activity)
Start/End Dates : 2-JAN-1996 10:14:57 through 1-MAR-1996 00:00:00
Mean +- Std Dev : 0.355571 +- 3.105503E-03 (0.87 %)



WHC-SD-WM-DP-170, REV. 1

RT R 3/28/96
JR Greenwood 3/28/96

DECTECTOR H

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VMS Calibration Report V1.5 Generated 2-OCT-1995 11:06:09

Configuration : MCA0:[USER]H$1
Analyses by : SCRCAL V1.1
Detector Name : H
Efficiency type : Empirical
Detector Geometry: PO-4PC-100ML-W

Energy Calib Time: 10-JUL-1995 14:06:54
Effncy Calib Time: 7-AUG-1995 11:58:19
Shelf : 0

Energy Calibration Report

Energy = 0.1326 + 0.3749*Channel + 0.0000E+00*(Channel**2)

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	158.77	59.54	59.66	-0.117
2	234.85	88.03	88.18	-0.147
3	325.58	122.06	122.19	-0.131
4	442.39	165.85	165.98	-0.132
5	744.42	279.19	279.21	-0.022
6	1044.23	391.69	391.61	0.078
7	1370.18	514.00	513.81	0.191
8	1763.92	661.66	661.42	0.238
9	2394.48	898.07	897.82	0.253
10	3128.72	1173.24	1173.08	0.161
11	3554.20	1332.50	1332.59	-0.090
12	4897.96	1836.08	1836.36	-0.282

FWHM Calibration Report

FWHM = 0.2752 + 6.4642E-02*(Energy**1/2)

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	59.54	0.98	0.77	0.201
2	88.03	0.99	0.88	0.107
3	122.06	1.03	0.99	0.041
4	165.85	1.11	1.11	0.002
5	279.19	1.27	1.36	-0.088
6	391.69	1.42	1.55	-0.132
7	514.00	1.58	1.74	-0.156
8	661.66	1.81	1.94	-0.127
9	898.07	2.06	2.21	-0.148
10	1173.24	2.50	2.49	0.007
11	1332.50	2.71	2.63	0.078
12	1836.08	3.26	3.05	0.215

Approved by: Richard T Ross Approval Date: 10/2/95

This is an additional print-out of the energy & FWHM calibration of Detector H

July 10, 1995

RTR 10/2/95 ~~Aug-7-1995 efficiency~~

RTR 10/2/95 ~~position PO4PC100ML-W detector~~

RTR

VMS Calibration Report V1.5 Generated 2-OCT-1995 11:14:00

Configuration : DKA200:[USER.SCUSR.EFF]EFF_HOGSV10MLW_M.CNF;1
Analyses by : CALIBRATE V1.7,PEAK V16.5
Detector Name : H Energy Calib Time: 10-JUL-1995 14:06:54
Efficiency type : Empirical Effncy Calib Time: 15-AUG-1995 17:07:06
Detector Geometry: PO-GSV-10ML-W Shelf : 0

Efficiency Calibration Report

Eff = exp(a2 + a3*x + a4*x**2 + a5*x**3 + a6*x**4 + a7*x**5), x=ln(a1/energy)

a1	a2	a3	a	a5	a6	a7
947.8	-4.007	0.9588	-2.9952E-02	-0.1462	0.1413	-4.4620E-02

Average Deviation = 1.14 % Reduced Chi-Square = 2.89

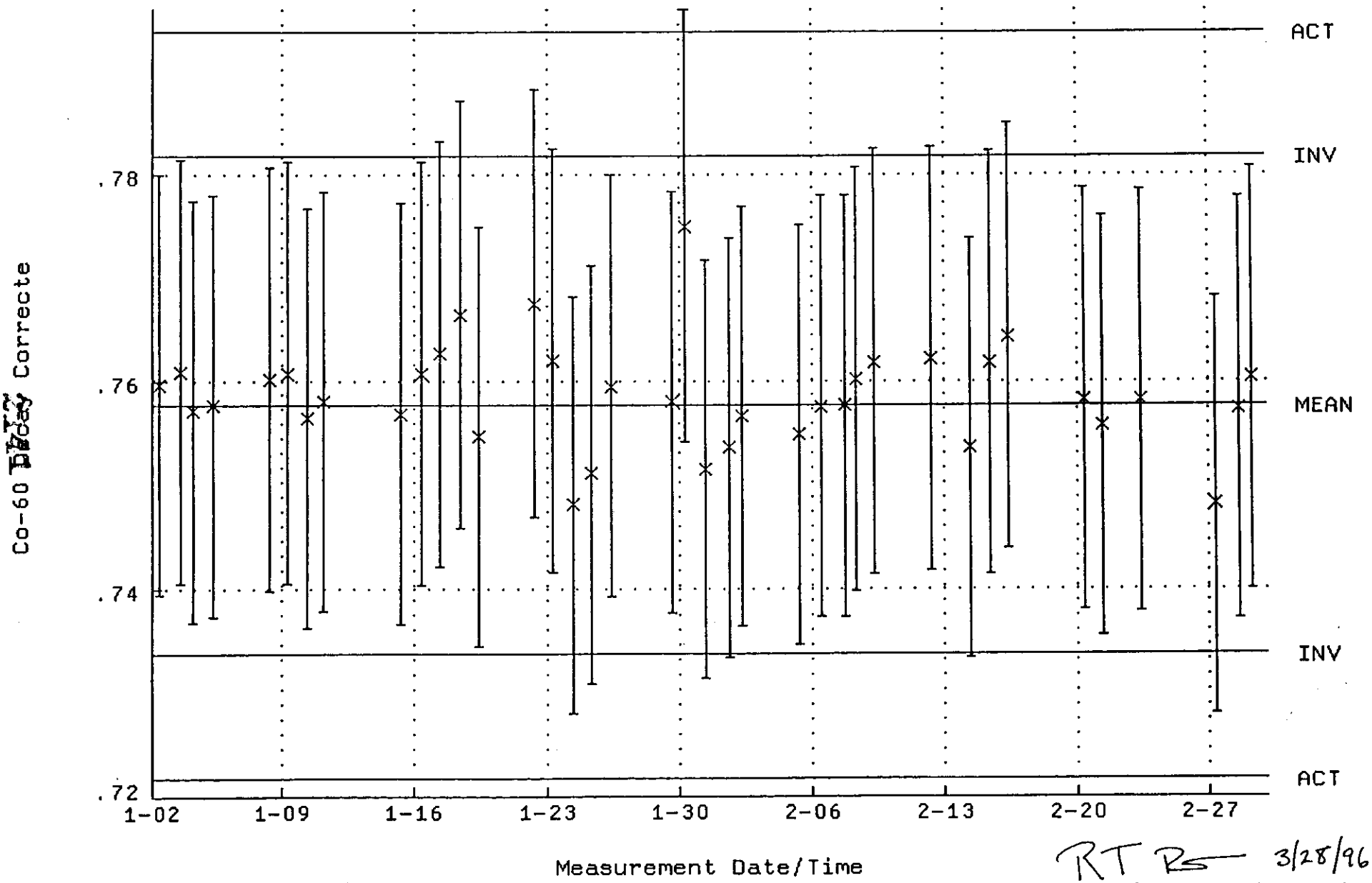
Nbr	Energy (keV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
1	59.54	2.64E-02	1.91E-04	2.63E-02	0.67	0.48
2	88.03	6.43E-02	4.78E-04	6.49E-02	-1.21	-0.90
3	122.06	7.82E-02	4.84E-04	7.83E-02	-0.25	-0.15
4	165.85	7.44E-02	4.75E-04	7.32E-02	2.49	1.59
5	279.19	5.10E-02	4.20E-04	5.22E-02	-2.78	-2.29
6	391.69	3.90E-02	2.93E-04	3.99E-02	-3.07	-2.30
7	514.00	3.16E-02	1.72E-04	3.18E-02	-1.33	-0.72
8	661.66	2.61E-02	1.20E-04	2.55E-02	5.46	2.50
9	898.07	1.86E-02	1.16E-04	1.92E-02	-4.38	-2.74
10	1173.24	1.51E-02	5.49E-05	1.48E-02	4.31	1.57
11	1332.50	1.32E-02	5.10E-05	1.32E-02	0.77	0.30
12	1836.08	1.04E-02	6.57E-05	1.03E-02	1.55	0.98

Approved by: Richard T. Ro Approval Date: 10 / 2 / 95

This is an additional print-out of the 15-Aug-1995 efficiency calibration of position PØGSVØMLW.

RTR
2

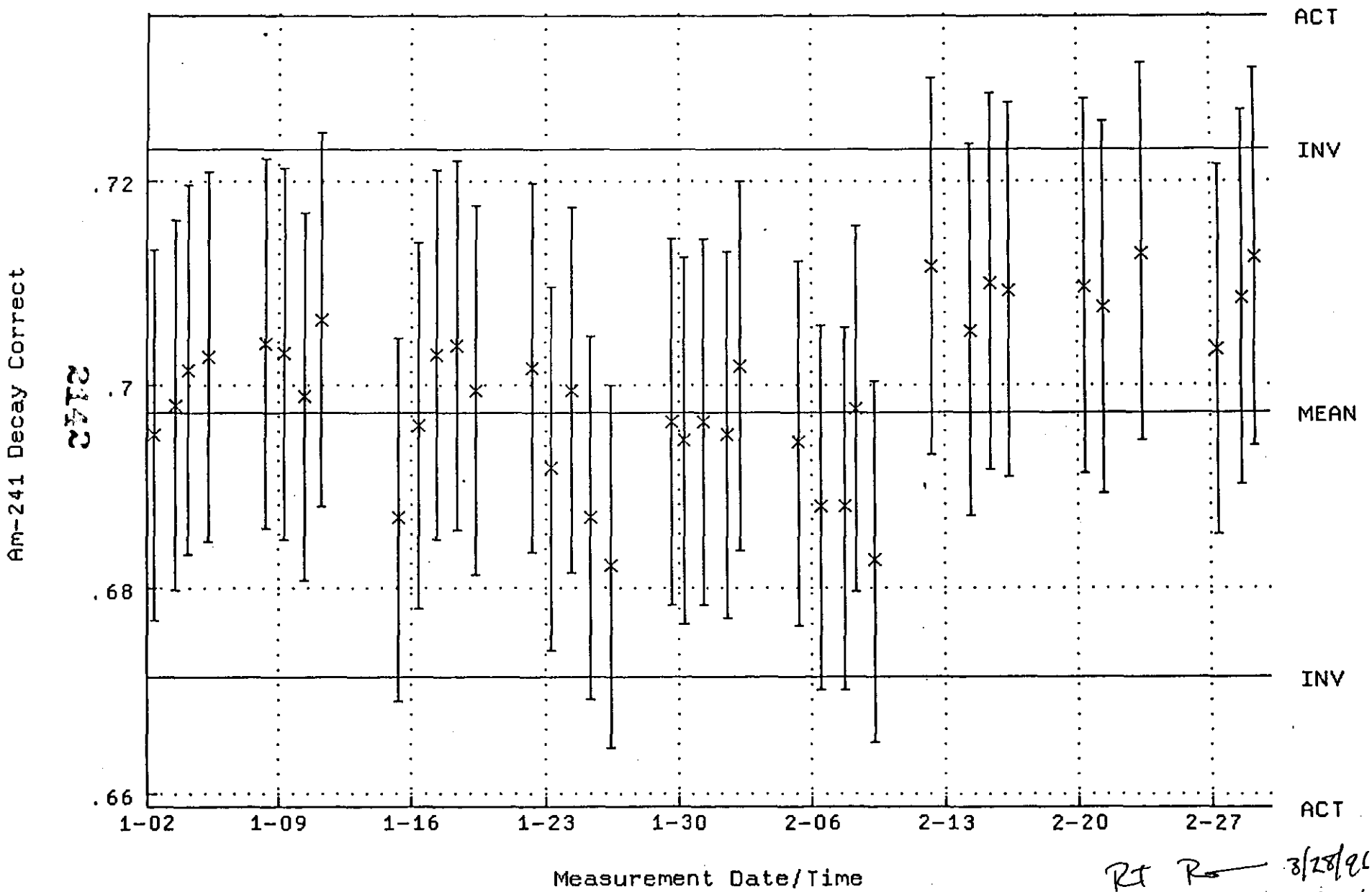
QA filename : DKA200:[GAMMA.QA]DET_H.QAF;1
Parameter Name : NLACTVTY-CO (Co-60 Decay Corrected Activity)
Start/End Dates : 2-JAN-1996 10:15:00 through 1-MAR-1996 00:00:00
Mean +- Std Dev : 0.757858 +- 1.199753E-02 (1.58 %)



WHC-SD-WM-DP-170, REV. 1

RT R 3/28/96
LR Greenwood 3/28/96

QA filename : DKA200:[GAMMA.QA]DET_H.QAF;1
Parameter Name : NLACTVTY-AM (Am-241 Decay Corrected Activity)
Start/End Dates : 2-JAN-1996 10:15:00 through 1-MAR-1996 00:00:00
Mean +- Std Dev : 0.697342 +- 1.286680E-02 (1.85 %)



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WHC-SD-WM-DP-170, REV. 1

RT R 3/28/96
LDGreenwood 3/28/96

SINGLE SHELL TANK

WASTE CHARACTERIZATION PROJECT

APPENDIX E

HISTORICAL DQO ANALYSES

INORGANIC & RADIOCHEMISTRY

TANK BX-112 CORES 118 & 119

June 1996

Pacific Northwest National Laboratory

E1 - INTRODUCTION ANALYSIS

Introduction to Historical DQO Primary Data Package

This section of the BX-112 Cores 118 and 119 Historical DQO Primary Data Package contains primary or "raw" data collected during preparation and analysis of inorganic and radiochemistry samples. All analytical information is tracked by the laboratory sample number. Assessment of the primary analytical data will require in-depth knowledge of the methodology.

E2 - SAMPLE PREP DATA SHEETS

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WATER LEACH

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DATA PACKAGE ROUTING

The attached records have **completed technical review** and are being routed for further processing.

Identification of Records - Tank BX112

ACL Numbers: 96-02607; 96-02608; 96-02613; 96-02614

Tests: Water Leach

ASR Number: 2785.01

Project Number: 22762 or ED Work Order: _____

Sent By -

Karla Smith — 5/7/96 — P7-22

Name — Date 5/7/96 — MSIN

__ Return after DQ Review (if required)
__ Return after PM Review

Data Quality Review Complete (if required) -

[signature] — 5/24/96

DQ Signature — Date

PM - Check the Following if Data Package is to be Returned -

__ PM Review complete; return to sender

For LSO Use Only

X DQ Review required
__ ACL Waste

Completed QC Screen BN — 5-28-96

Initial — Date

Client Due Date 5/31/96

Battelle Pacific Northwest Laboratories
Analytical Chemistry Laboratory
Shielded Analytical Laboratory

Shielded Analytical Laboratory
WATER LEACH

Tank BX112 Core(s) 118/119

Project Id: 22762 WP Number: K41990

TI/ASR Number: TI96-PM-10 ASR 2785.01

Sample Ident.	Sample Gross Wt (g)	Sample Tare Wt (g)	Sample Net Wt (g)	DIW Gross Wt (g)	DIW Tare Wt (g)	DIW Net Wt (g)	Spike Volume
96-02607-BLK PROCESS BLANK	—	86.4185	—	—	—	50.0840	
96-02607 118.2A.W2	87.4439	86.8971	0.5468	137.5226	87.4439	50.0787	
96-02607-DUP 118.2A.W2 DUPLICATE	95.6049	95.0377	0.5672	145.6428	95.6049	50.0379	
96-02608 118.2B.W2	95.6572	95.1281	0.5291	145.6967	95.6572	50.0395	
96-02608-DUP 118.2B.W2 DUPLICATE	84.3285	83.7940	0.5345	134.3766	84.3285	50.0481	
96-02613 119.2A.W2	87.4458	86.8966	0.5492	137.5516	87.4458	50.1058	
96-02613-DUP 119.2A.W2 DUPLICATE	95.2139	94.6692	0.5447	145.7025	95.2139	50.4886	
96-02614 119.2B.W2	84.5024	83.9883	0.5141	134.5544	84.5024	50.0520	
96-02614-DUP 119.2B.W2 DUPLICATE	82.8557	82.3150	0.5407	133.1847	82.8557	50.3290	

M&TE: METTLER AT400 ANALYTICAL BALANCE (360-06-01-037)

Analyst: Lori P. Daniell Date: 5-2-96 Reviewer: [signature] Date: 5-2-96

Battelle Pacific Northwest Laboratories
Analytical Chemistry Laboratory
325 Shielded Analytical Laboratory

SAMPLE PREP SHEET
(325 SHIELDED ANALYTICAL LABORATORY)

TI NO.: TI96-PM-10/ASR 2785.01 PROJECT NO.: 22762 WBS NO.: _____ SAMPLE TYPE: SLUDGE

ISSUED BY: Rick T. Steele DATE: 5/1/96 PREP TYPE: WATER LEACH

ANALYST: Lori P. Daugell DATE: 5-2-96 CONTROLLING PROCEDURE: PNL-ALO-010

REVIEW: [illegible] DATE: 5-2-96 QA PLAN: MCS 033 IMPACT LEVEL: II

CORE ID: CORE 118/119 TANK ID: BX112

WORK PACKAGE NUMBER	ALO NUMBER	SAMPLE IDENTIFICATION	ANALYTE OR ANALYSIS	SAMPLE WT	WATER WT (g)	TOTAL VOL (mL)	SPIKE ID	SPIKE VOL (mL)	DILUTION FACTOR	DILUTION MATRIX	PIPET CALIB (mL)	ORDER NUMBER
K41992	96-02607-BLK	PROCESS BLANK	ICP	—	50.0840							
	96-02607	118.2A.W2		0.5468	50.0787							40418
	96-02607-DUP	118.2A.W2 DUPLICATE		0.5672	50.0379							
	96-02608	118.2B.W2		0.5291	50.0395							40419
	96-02608-DUP	118.2B.W2 DUPLICATE		0.5345	50.0481							
	96-02613	119.2A.W2		0.5492	50.1058							40420
	96-02613-DUP	119.2A.W2 DUPLICATE		0.5447	50.4886							
	96-02614	119.2B.W2		0.5141	50.0570							40421
	96-02614-DUP	119.2B.W2 DUPLICATE		0.5407	50.3290							

REQUIRED PROCEDURE(S) BY ANALYTE: ICP PNL-ALO-211

PAGE 1 OF 1

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SAMPLE DISTRIBUTION

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DATA PACKAGE ROUTING

The attached records have **completed technical review** and are being routed for further processing.

Identification of Records - Tank BY112

ACL Numbers: 96-02605-BLK; 96-02607; 96-02606-BLK; 96-02608; 96-02611-BLK; 96-02613; 96-02612-BLK; 96-02614

Tests: Subsample of fusion solutions for Radchem

ASR Number: 2785.01

Project Number: 22762 or ED Work Order: _____

Sent By -

Karla Smith — Name; 5/7/96 — Date; P7-22 — MSIN

__ Return after DQ Review (if required)
__ Return after PM Review

Data Quality Review Complete (if required) -

[signature] — DQ Signature; 5/24/96 — Date

PM - Check the Following if Data Package is to be Returned -

__ PM Review complete; return to sender

For LSO Use Only

X DQ Review required
__ ACL Waste

Completed QC Screen BN — Initial; 5-28-96 — Date

Client Due Date 5/31/96

Battelle Pacific Northwest Laboratories
Analytical Chemistry Laboratory
Shielded Analytical Laboratory

Sample Receiving and Preparatory Laboratory
Bench Sheet

Client: Mike Wise WP Number: K41991

TI#/ASR: ASR 2785.01 Procedure: Subsample

SAMPLE IDENTIFICATION

2 mls of the following achive fusion preps were transfered to LSC vials for GEA analysis.

1 - 96-02605 Blank
2 - 96-02607 } BX 112 CORE 118 SEG. 2
3 - 96-02607 Dup
4 - 96-02606 Blank } Pipette # H30754 at 17°C
5 - 96-02608 } BX 112 CORE 118 SEG. 2
6 - 96-02608 Dup } 2.0051g
7 - 96-02611 Blank } 2.0026g. X = 2.0038 g
8 - 96-02613 } BX 112 CORE 119 SEG. 2 2.0065g. S = 0.0019
9 - 96-02613 Dup } 2.0021g. %RSD = 0.0948
10 - 96-02612 Blank } 2.0029g. Delv. = 2.0063 ml
11 - 96-02614 } BX 112 CORE 119 SEG. 2
12 - 96-02614 Dup }

M&TE: ____ Room 420 (360-06-01-036) Room 524 (360-06-01-038) ____
✓ Room 525 (360-06-01-037) Room 525 (360-06-01-042) ____

Analyst: Lori P. Darnell Date: 5-1-96 Reviewer: [signature] Date: 5-1-96

Battelle Pacific Northwest Laboratories
Analytical Chemistry Laboratory
Shielded Analytical Laboratory

Sample Receiving and Preparatory Laboratory
Bench Sheet

Client: Mike Urie WP Number: K41991

TI#/ASR: ASR 2785.01 Procedure: Subsample

SAMPLE IDENTIFICATION

5 mls of the following achive fusion preps were transfered to LSC vials for Rad-Chem Analysis

1 - 96-02605 Blank
2 - 96-02607 } BX112 Core 118 Seg. 2
3 - 96-02607 Dup
4 - 96-02606 Blank } Pipette #H30754 at 17°C
5 - 96-02608 } BX112 Core 118 Seg. 2
6 - 96-02608 Dup } 5.0055g.
7 - 96-02611 Blank } 5.0093g. X = 5.0079g
8 - 96-02613 } BX112 Core 119 Seg. 2 5.0078g. S = 0.0015
9 - 96-02613 Dup } 5.0083g. %RSD = 0.030
10 - 96-02612 Blank } 5.0087g. Delv = 5.0140m
11 - 96-02614 } BX112 Core 119 Seg. 2
12 - 96-02614 Dup }

M&TE: ____ Room 420 (360-06-01-036) Room 524 (360-06-01-038) ____
✓ Room 525 (360-06-01-037) Room 525 (360-06-01-042) ____

Analyst: Lori P. Darnell Date: 5-1-96 Reviewer: [signature] Date: 5-1-96

Battelle Pacific Northwest Laboratories
Analytical Chemistry Laboratory
325 Shielded Analytical Laboratory

SAMPLE PREP SHEET
(325 SHIELDED ANALYTICAL LABORATORY)

TI NO.: TI96-PM-10/ASR 2785.01 PROJECT NO.: 22762 WBS NO.: _____ SAMPLE TYPE: SLUDGE

ISSUED BY: Rick T. Steele DATE: 5/1/96 PREP TYPE: NI/KOH FUSION

ANALYST: Lori P. Darnell DATE: 5-1-96 CONTROLLING PROCEDURE: PNL-ALO-010

REVIEW: [illegible] DATE: 5-2-96 QA PLAN: MCS 033 IMPACT LEVEL: II

CORE ID: CORE 118 TANK ID: BX112

WORK PACKAGE NUMBER	ALO NUMBER	SAMPLE IDENTIFICATION	ANALYTE OR ANALYSIS	SAMPLE WT	WATER WT (g)	TOTAL VOL (mL)	SPIKE ID	SPIKE VOL (mL)	DILUTION FACTOR	DILUTION MATRIX	PIPET CALIB (mL)	ORDER NUMBER
K41991	96-02605-BLK	PROCESS BLANK	SEE BELOW			100						
	96-02607	118.2A.F		0.1688								40414
	96-02607-DUP	118.2A.F DUPLICATE		0.1570								
	96-02606-BLK											
	96-02608	118.2B.F		0.1651								40415
	96-02608-DUP	118.2B.F DUPLICATE		0.1837								
			TOTAL BETA									
			GEA									
			Sr-90									
			U-laser									

REQUIRED PROCEDURE(S) BY ANALYTE: T. BETA PNL-ALO-430/431; Sr-90 PNL-ALO-430/431; GEA-Cs-137 PNL-ALO-450; U-laser PNL-ALO-445

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Battelle Pacific Northwest Laboratories
Analytical Chemistry Laboratory
325 Shielded Analytical Laboratory

SAMPLE PREP SHEET
(325 SHIELDED ANALYTICAL LABORATORY)

TI NO.: TI96-PM-10/ASR 2785.01 PROJECT NO.: 22762 WBS NO.: _____ SAMPLE TYPE: SLUDGE

ISSUED BY: Rick T. Steele DATE: 5/1/96 PREP TYPE: NI/KOH FUSION

ANALYST: Lori P. Darnell DATE: 5-1-96 CONTROLLING PROCEDURE: PNL-ALO-010

REVIEW: [illegible] DATE: 5-2-96 QA PLAN: MCS 033 IMPACT LEVEL: II

CORE ID: CORE 118 TANK ID: BX112

WORK PACKAGE NUMBER	ALO NUMBER	SAMPLE IDENTIFICATION	ANALYTE OR ANALYSIS	SAMPLE WT	WATER WT (g)	TOTAL VOL (mL)	SPIKE ID	SPIKE VOL (mL)	DILUTION FACTOR	DILUTION MATRIX	PIPET CALIB (mL)	ORDER NUMBER
K41991	96-02611-BLK	PROCESS BLANK	SEE BELOW			100						
	96-02613	119.2A.F		0.1544								40416
	96-02613-DUP	119.2A.F DUPLICATE		0.1408								
	96-02612-BLK											
	96-02614	119.2B.F		0.1495								40417
	96-02614-DUP	119.2B.F DUPLICATE		0.1773								
			TOTAL BETA									
			GEA									
			Sr-90									
			U-laser									

REQUIRED PROCEDURE(S) BY ANALYTE: T. BETA PNL-ALO-430/431; Sr-90 PNL-ALO-430/431; GEA-Cs-137 PNL-ALO-450; U-laser PNL-ALO-445

PAGE 1 OF 1

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E3 - ICP ANALYSIS

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Project: TWRS
Procedure: PNL-ALO-211

File: m050996a
Analyzed: 05/09/96

BX-112 Core 118 Water Leaches

	118 Segment 2A		118 Segment 2B		
Sam Log#:	96-02607	96-02607	96-02608	96-02608	96-02607
Split#:	118.2A.W2	118.2A.W2	118.2B.W2	118.2B.W2	Blank
ICP Dil:	1.00	1.00	1.00	1.00	1.00
Dil Fctr:	91.6	88.2	94.6	93.6	91.9

Est. IDL ug/mL	Analyte	Sample ug/g	Duplicate ug/g	RPD	Sample ug/g	Duplicate ug/g	RPD	Batch Blk ug/g	Post Spike Recoveries Spk "A"	Spk "B"
0.015	Ag	ND	ND		ND	ND		ND	77.3%	
0.060	Al	730	706	3	604	675	11	ND	93.8%	
0.080	As	ND	ND		ND	ND		ND	105.8%	
0.050	B	(6)	(7)		(6)	(7)		ND	105.0%	
0.010	Ba	ND	ND		ND	ND		ND	98.5%	
0.005	Be	ND	ND		ND	ND		ND	100.2%	
0.100	Bi	(60)	(24)		(29)	(49)		ND	96.2%	
0.250	Ca	(49)	(38)		(95)	(103)		(69)	101.2%	
0.015	Cd	ND	ND		ND	ND		ND	101.4%	
0.100	Ce	ND	ND		ND	ND		ND		99.4%
0.050	Co	ND	ND		ND	ND		ND	98.8%	
0.020	Cr	279	279	0	274	281	3	ND	87.8%	
0.050	Cu	ND	ND		ND	ND		ND	95.2%	
0.050	Dy	ND	ND		ND	ND		ND		96.6%
0.100	Eu	ND	ND		ND	ND		ND		97.7%
0.050	Fe	(18)	(7)		(9)	(15)		ND	99.5%	
2.000	K	(437)	(484)		(482)	(459)		ND	94.8%	
0.050	La	ND	ND		ND	ND		ND		95.8%
0.030	Li	(14)	(14)		37	36	2	ND	98.5%	
0.100	Mg	(25)	(22)		(40)	(41)		(21)	100.5%	
0.050	Mn	ND	ND		ND	ND		ND	104.0%	
0.030	Mo	(27)	27		(26)	(26)		ND	98.3%	
0.250	Na	65,262	65,052	0	65,826	67,068	2	(35)	n/a	
0.100	Nd	ND	ND		ND	ND		ND		93.7%
0.030	Ni	n/a	n/a		n/a	n/a		n/a	100.6%	
0.250	P	5,573	5,435	3	5,391	5,449	1	(24)	n/a	
0.100	Pb	ND	ND		ND	ND		ND	96.7%	
0.300	Pd	ND	ND		ND	ND		ND		103.0%
0.300	Rh	ND	ND		ND	ND		ND		97.8%
0.100	Ru	ND	ND		ND	ND		ND		99.2%
0.100	Sb	ND	ND		ND	ND		ND	101.1%	
0.100	Se	ND	ND		ND	ND		ND	107.6%	
0.500	Si	ND	(48)		ND	ND		ND	102.5%	
1.000	Sn	ND	ND		ND	ND		ND		
0.015	Sr	ND	ND		ND	ND		ND	100.5%	
0.500	Te	ND	ND		ND	ND		ND		100.9%
0.800	Th	ND	ND		ND	ND		ND		96.3%
0.025	Ti	ND	ND		ND	ND		ND	98.2%	
0.500	Tl	ND	ND		ND	ND		ND	100.5%	
2.000	U	ND	(202)		(195)	(216)		ND		104.3%
0.015	V	ND	ND		ND	ND		ND	98.9%	
0.500	W	ND	ND		ND	ND		ND		100.1%
0.010	Y	ND	ND		ND	ND		ND		98.5%
0.020	Zn	ND	ND		ND	ND		ND	100.1%	
0.025	Zr	ND	ND		ND	ND		ND	98.6%	

Note:
1) Estimated Quantitation Limit (EQL) = 10x IDL; "( )" results <EQL but =>IDL.
2) Above 5 times EQL, results reportable to 2 1/2 significant digits.
3) The process "blank" has not been subtracted from the "Sample & Duplicate" results.
4) Above 5 times EQL, precision is estimated at better than +/-20% and accuracy +/-15%.
5) "ND" = Not Detected; Estimated Sample Detection Limit (ug/mL) = (IDL in ug/mL) * (Dil Fctr)
6) If RPD flagged with "*", then RPD >20% and sample & duplicate results >EQL.
7) Spike recovery "n/a" = Spike concentration <25% of sample concentration.

Data, including calibration/QC, archived File ICP-325-405-1/96A0114

Analyzed Date: 05/09/96
Project: TWRS
Procedure: PNL-ALO-211
ICP Data Name: 96A0114
Tank ID: BX-112 Core 118 Water Leaches

File: m050996a
Reported: 05/24/96
Data Page 1 of 2

Segment ID:	118 Segment 2A		118 Segment 2B					
Sample Log#	Sample 96-02607 118.2A.W2	Duplicate 96-02607 118.2A.W2	Sample 96-02608 118.2B.W2	Duplicate 96-02608 118.2B.W2	96-02607 Blank	96-02607 P.S. "A"	96-02607 P.S. "B"	96-02607 PS Base
Prep Type	Water	Water	Water	Water	Water	Water	Water	Water
Sample Wt-g	0.5468	0.5672	0.5291	0.5345	0.5444	0.5461	0.5461	0.5461
Makeup Vol-mL	50.08	50.04	50.04	50.05	50.05	50.08	50.08	50.08
Dil: Smpl-mL								
Dil: Vol-mL								
Prep Factor	91.6	88.2	94.6	93.6	91.9	91.7	91.7	91.7
Spike ID						9604151901	9604181902	
Spike PreDil'n						2.0	2.0	2.0
ICP Dilution	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Dil Fctr	91.6	88.2	94.6	93.6	91.9	91.7	91.7	91.7
Run Time	11:01	11:23	11:42	11:46	10:54	11:05	11:15	11:01
(ug/g) Ag	-0.0	0.1	-0.1	-0.3	-0.1	17.7	-0.6	-0.0
Al	729.8	705.8	603.9	675.0	0.1	795.3	540.2	730.8
As	5.9	6.3	5.7	5.9	-0.8	121.2	15.5	5.9
B	5.6	6.7	6.0	6.7	1.2	99.1	293.0	5.6
Ba	0.0	0.0	0.0	0.0	0.1	22.6	0.3	0.0
Be	0.0	0.0	0.0	0.0	-0.0	4.6	0.0	0.0
Bi	59.7	24.2	29.0	48.7	-0.1	1132.7	197.8	59.8
Ca	48.9	37.7	95.3	103.1	69.3	1184.9	84.9	49.0
Cd	0.1	-0.0	-0.0	-0.0	0.1	23.3	0.3	0.1
Ce	-0.7	-0.2	-0.5	-1.1	0.1	-3.6	91.1	-0.7
Co	-0.1	0.0	0.1	-0.1	-0.1	45.3	-0.4	-0.1
Cr	279.1	278.9	273.7	280.8	-0.1	180.0	138.5	279.4
Cu	-0.4	-0.3	-0.2	-0.5	-0.1	43.7	0.5	-0.4
Dy	-0.2	-0.0	-0.1	-0.2	-0.0	-0.5	88.6	-0.2
Eu	0.1	0.2	0.1	0.1	0.0	-0.0	89.6	0.1
Fe	18.4	6.8	8.6	15.0	-0.4	922.1	63.6	18.4
K	437.3	483.9	481.5	458.6	22.7	1305.7	73.0	437.8
La	-0.4	0.0	-0.0	-0.2	0.0	-0.7	43.9	-0.4
Li	13.6	13.6	36.7	36.1	0.0	97.1	6.4	13.6
Mg	25.4	22.3	40.0	40.6	20.7	1487.7	14.2	25.5
Mn	0.1	0.1	0.1	0.1	0.1	23.8	0.4	0.1
Mo	26.5	26.5	25.7	26.4	-0.1	58.3	13.1	26.5
Na	65262.4	65051.7	65826.0	67068.3	34.6	33536.8	32424.5	65346.1
Nd	-1.1	-0.1	-0.2	-1.0	0.2	-3.2	85.9	-1.1
Ni	0.4	-0.0	-0.1	-0.1	0.7	46.1	1.5	0.4
P	5572.9	5434.7	5390.7	5449.1	24.2	2841.5	2733.7	5580.0
Pb	-0.4	0.2	0.3	-0.1	-1.7	110.9	9.7	-0.4
Pd	0.8	4.5	3.8	1.2	2.1	-7.6	94.5	0.8
Rh	1.3	2.6	2.5	1.2	0.2	-3.0	89.7	1.3
Ru	3.4	3.8	3.5	3.4	-0.0	0.6	91.0	3.4
Sb	1.3	1.1	1.1	0.4	-1.5	115.9	3.9	1.3
Se	3.8	5.2	5.4	4.7	-0.1	123.3	5.1	3.8
Si	44.5	48.0	41.7	39.5	2.2	940.2	2696.8	44.6
Sn	-5.0	-1.4	-3.3	-6.1	-5.3	-3.9	87.4	-5.0
Sr	0.3	0.2	0.3	0.4	0.3	23.0	0.9	0.3
Te	1.1	2.0	1.7	0.8	-1.2	0.8	92.6	1.1
Th	0.2	-0.2	0.3	0.2	-0.4	2.3	441.6	0.2
Ti	-0.1	-0.1	-0.0	-0.1	-0.0	45.0	0.3	-0.1
Tl	0.4	1.5	0.3	0.4	-1.2	115.2	0.4	0.4
U	176.9	202.3	195.5	215.6	0.3	47.2	1195.7	177.1
V	-0.1	0.0	0.0	-0.1	-0.1	45.4	-0.2	-0.1
W	1.5	1.6	2.3	2.7	0.8	3.3	91.8	1.5
Y	-0.1	-0.0	-0.0	-0.1	0.0	-0.1	45.2	-0.1
Zn	-0.0	-0.0	-0.0	0.0	0.3	45.9	0.4	-0.0
(ug/g) Zr	0.6	0.2	0.4	0.7	-0.2	90.4	3.5	0.6

Template: TC-swl-2 ICP RAW DATA -- IEC Corrected m050996a

Analyzed: 05/09/96
Project: TWRS
Procedure: PNL-ALO-211
MT&E: JA ICP WB73520

BX-112 Core 118 Water Leaches

Raw Data
Data Page 2 of 2

Analyst: Barry Sanden 5/20/96 Reviewer: MW Thu 5/20/96

Sample ID:		96-02607	96-02607	96-02608	96-02608	96-02607	96-02607	96-02607	96-02607	Post Spikes "A"	Post Spikes "B"
Split ID:		118.2A.W2	118.2A.W2	118.2B.W2	118.2B.W2	Blank	P.S. "A"	P.S. "B"	PS Base		
Run Time:		11:01	11:23	11:42	11:46	10:54	11:05	11:15	11:01	ug/mL	ug/mL
(ug/mL)	Ag	-0.000	0.001	-0.001	-0.003	-0.001	0.193	-0.007	-0.000	0.500	
	Al	7.969	8.001	6.386	7.208	0.001	8.673	5.890	7.969	10.000	
	As	0.064	0.071	0.060	0.064	-0.008	1.322	0.169	0.064	2.500	
	B	0.061	0.076	0.064	0.072	0.013	1.081	3.195	0.061	2.000	
	Ba	0.000	0.000	0.000	0.000	0.001	0.246	0.003	0.000	0.500	
	Be	0.000	0.000	0.000	0.000	-0.000	0.050	0.000	0.000	0.100	
	Bi	0.652	0.274	0.307	0.520	-0.001	12.352	2.157	0.652	25.000	
	Ca	0.534	0.428	1.008	1.101	0.753	12.922	0.926	0.534	25.000	
	Cd	0.001	-0.001	-0.000	-0.000	0.001	0.254	0.003	0.001	0.500	
	Ce	-0.008	-0.002	-0.006	-0.012	0.001	-0.040	0.994	-0.008		2.000
	Co	-0.001	0.000	0.001	-0.001	-0.001	0.494	-0.004	-0.001	1.000	
	Cr	3.047	3.162	2.894	2.999	-0.001	1.962	1.510	3.047	1.000	
	Cu	-0.005	-0.003	-0.003	-0.005	-0.001	0.476	0.005	-0.005	1.000	
	Dy	-0.002	-0.000	-0.001	-0.002	-0.000	-0.006	0.966	-0.002		2.000
	Eu	0.001	0.002	0.001	0.001	0.000	-0.000	0.977	0.001		2.000
	Fe	0.201	0.077	0.091	0.160	-0.005	10.055	0.693	0.201	20.000	
	K	4.775	5.485	5.091	4.898	0.247	14.239	0.796	4.775	25.000	
	La	-0.004	0.001	-0.000	-0.003	0.000	-0.008	0.479	-0.004		1.000
	Li	0.148	0.155	0.388	0.386	0.000	1.059	0.070	0.148	2.000	
	Mg	0.278	0.253	0.423	0.433	0.225	16.223	0.155	0.278	32.000	
	Mn	0.001	0.001	0.001	0.001	0.001	0.260	0.004	0.001	0.500	
	Mo	0.289	0.301	0.272	0.281	-0.001	0.636	0.143	0.289	1.000	
	Na	712.588	737.388	696.021	716.271	0.376	365.713	353.584	712.588	36.700	
	Nd	-0.012	-0.002	-0.002	-0.011	0.002	-0.035	0.937	-0.012		2.000
	Ni	0.004	-0.000	-0.001	-0.002	0.008	0.503	0.017	0.004	1.000	
	P	60.849	61.605	56.999	58.194	0.263	30.986	29.810	60.849	5.000	
	Pb	-0.004	0.003	0.003	-0.001	-0.019	1.209	0.105	-0.004	2.500	
	Pd	0.008	0.051	0.040	0.013	0.023	-0.083	1.030	0.008		2.000
	Rh	0.014	0.029	0.026	0.013	0.002	-0.033	0.978	0.014		2.000
	Ru	0.038	0.043	0.037	0.036	-0.000	0.007	0.992	0.038		2.000
	Sb	0.014	0.013	0.011	0.004	-0.016	1.263	0.043	0.014	2.500	
	Se	0.041	0.058	0.057	0.050	-0.001	1.344	0.056	0.041	2.500	
	Si	0.486	0.544	0.441	0.422	0.024	10.253	29.408	0.486	20.000	
	Sn	-0.054	-0.016	-0.035	-0.066	-0.057	-0.043	0.953	-0.054		2.000
	Sr	0.003	0.002	0.004	0.004	0.003	0.251	0.009	0.003	0.500	
	Te	0.012	0.022	0.018	0.009	-0.013	0.009	1.009	0.012		2.000
	Th	0.002	-0.002	0.003	0.002	-0.005	0.025	4.816	0.002		10.000
	Ti	-0.001	-0.001	-0.000	-0.001	-0.000	0.491	0.003	-0.001	1.000	
	Tl	0.004	0.017	0.003	0.004	-0.013	1.256	0.004	0.004	2.500	
	U	1.932	2.293	2.067	2.302	0.003	0.515	13.039	1.932		25.000
	V	-0.001	0.000	0.000	-0.001	-0.001	0.495	-0.002	-0.001	1.000	
	W	0.016	0.018	0.024	0.029	0.009	0.035	1.001	0.016		2.000
	Y	-0.001	-0.000	-0.000	-0.001	0.000	-0.001	0.493	-0.001		1.000
	Zn	-0.000	-0.000	-0.000	0.000	0.003	0.501	0.005	-0.000	1.000	
(ug/mL)	Zr	0.006	0.002	0.004	0.007	-0.002	0.986	0.038	0.006	2.000	

Project: TWRS
Procedure: PNL-ALO-211

File: m050996b
Analyzed: 05/09/96

BX-112 Core 119 Water Leaches

	119 Segment 2A		119 Segment 2B	
Sam Log#:	96-02613	96-02613	96-02614	96-02614
Split#:	119.2A.W2	119.2A.W2	119.2B.W2	119.2B.W2
ICP Dil:	1.00	1.00	1.00	1.00
Dil Fctr:	91.2	92.7	97.4	93.1

Est. IDL ug/mL	Analyte	Sample ug/g	Duplicate ug/g	RPD	Sample ug/g	Duplicate ug/g	RPD	Batch Blk ug/g	Post Spike Recoveries Spk "A"	Spk "B"
0.015	Ag	ND	ND		ND	ND				
0.060	Al	58	81	33 *	292	239	20	Batch Blank and Post Spikes		
0.080	As	ND	ND		ND	ND		presented with Core 118		
0.050	B	(5)	(6)		(6)	(6)		Segment 2A/2B results		
0.010	Ba	ND	ND		ND	ND				
0.005	Be	ND	ND		ND	ND				
0.100	Bi	ND	ND		ND	ND				
0.250	Ca	(115)	(92)		(76)	(80)				
0.015	Cd	ND	ND		ND	ND				
0.100	Ce	ND	ND		ND	ND				
0.050	Co	ND	ND		ND	ND				
0.020	Cr	234	236	1	225	225	0			
0.050	Cu	ND	ND		ND	ND				
0.050	Dy	ND	ND		ND	ND				
0.100	Eu	ND	ND		ND	ND				
0.050	Fe	ND	ND		ND	ND				
2.000	K	n/a	n/a		n/a	n/a				
0.050	La	ND	ND		ND	ND				
0.030	Li	29	29	1	(11)	(11)				
0.100	Mg	(45)	(45)		(41)	(44)				
0.050	Mn	ND	ND		ND	ND				
0.030	Mo	(25)	(25)		(24)	(24)				
0.250	Na	65,708	66,180	1	64,384	64,845	1			
0.100	Nd	ND	ND		ND	ND				
0.030	Ni	n/a	n/a		n/a	n/a				
0.250	P	5,119	5,175	1	5,380	5,334	1			
0.100	Pb	ND	ND		ND	ND				
0.300	Pd	ND	ND		ND	ND				
0.300	Rh	ND	ND		ND	ND				
0.100	Ru	ND	ND		ND	ND				
0.100	Sb	ND	ND		ND	ND				
0.100	Se	ND	ND		ND	ND				
0.500	Si	(70)	(69)		(52)	(52)				
1.000	Sn	ND	ND		ND	ND				
0.015	Sr	ND	ND		ND	ND				
0.500	Te	ND	ND		ND	ND				
0.800	Th	ND	ND		ND	ND				
0.025	Ti	ND	ND		ND	ND				
0.500	Tl	ND	ND		ND	ND				
2.000	U	ND	ND		ND	ND				
0.015	V	ND	ND		ND	ND				
0.500	W	ND	ND		ND	ND				
0.010	Y	ND	ND		ND	ND				
0.020	Zn	ND	ND		ND	ND				
0.025	Zr	ND	ND		ND	ND				

Note:
1) Estimated Quantitation Limit (EQL) = 10x IDL; "( )" results <EQL but =>IDL.
2) Above 5 times EQL, results reportable to 2 1/2 significant digits.
3) The process "blank" has not been subtracted from the "Sample & Duplicate" results.
4) Above 5 times EQL, precision is estimated at better than +/-20% and accuracy +/-15%.
5) "ND" = Not Detected; Estimated Sample Detection Limit (ug/mL) = (IDL in ug/mL) * (Dil Fctr)
6) If RPD flagged with "*", then RPD >20% and sample & duplicate results >EQL.

Data, including calibration/QC, archived File ICP-325-405-1/96A0114

Analyzed Date: 05/09/96
Project: TWRS
Procedure: PNL-ALO-211
ICP Data Name: 96A0114
Tank ID: BX-112 Core 119 Water Leaches

File: m050996b
Reported: 05/24/96
Data Page 1 of 2

Segment ID:	119 Segment 2A		119 Segment 2B	
	Sample	Duplicate	Sample	Duplicate
Sample Log#	96-02613	96-02613	96-02614	96-02614
	119.2A.W2	119.2A.W2	119.2B.W2	119.2B.W2
Prep Type	Water	Water	Water	Water
Sample Wt-g	0.5492	0.5447	0.5141	0.5407
Makeup Vol-mL	50.11	50.49	50.05	50.33
Dil: Smpl-mL				
Dil: Vol-mL				
Prep Factor	91.2	92.7	97.4	93.1
Spike ID				
Spike PreDil'n				
ICP Dilution	1.00	1.00	1.00	1.00
Dil Fctr	91.2	92.7	97.4	93.1
Run Time	11:50	11:53	11:57	12:01
(ug/g) Ag	-0.1	-0.2	-0.2	-0.1
Al	58.0	80.9	292.3	239.0
As	5.6	5.5	5.7	4.7
B	5.1	6.2	6.3	5.9
Ba	0.0	-0.0	-0.0	-0.0
Be	0.0	-0.0	0.0	0.0
Bi	5.5	3.3	5.6	5.1
Ca	115.2	91.6	75.6	79.9
Cd	-0.2	-0.2	-0.2	-0.3
Ce	-1.4	-2.1	-1.4	-1.3
Co	-0.0	-0.1	-0.1	0.0
Cr	233.9	236.1	224.6	225.4
Cu	-0.3	-0.4	-0.4	-0.3
Dy	-0.2	-0.2	-0.2	-0.1
Eu	0.0	0.0	0.0	0.0
Fe	2.4	1.1	1.6	2.0
K	341.9	354.5	337.7	348.8
La	-0.2	-0.2	-0.3	-0.1
Li	29.1	29.3	11.3	11.3
Mg	45.2	44.6	40.7	43.9
Mn	0.0	0.0	0.0	0.0
Mo	24.9	25.3	23.5	23.7
Na	65707.7	66179.9	64383.8	64845.3
Nd	-0.5	-1.0	-1.2	-0.6
Ni	-0.2	-0.3	-0.3	-0.6
P	5119.5	5175.4	5380.4	5333.7
Pb	-1.4	-1.2	-1.5	-1.3
Pd	2.0	1.2	1.7	2.8
Rh	1.7	1.1	1.0	1.9
Ru	3.5	3.6	2.9	3.3
Sb	0.0	0.1	0.3	0.6
Se	2.4	3.0	3.5	2.8
Si	70.0	69.4	51.8	52.5
Sn	-6.7	-6.2	-8.1	-5.2
Sr	0.3	0.2	0.2	0.2
Te	0.6	0.5	0.7	0.8
Th	0.4	-0.0	0.8	0.3
Ti	-0.1	-0.1	-0.1	-0.1
Tl	0.6	0.6	0.6	0.5
U	51.1	22.0	47.6	54.5
V	-0.1	-0.1	-0.1	-0.0
W	1.4	2.1	0.8	1.2
Y	-0.1	-0.1	-0.1	-0.1
Zn	-0.1	-0.1	-0.0	-0.1
(ug/g) Zr	-0.1	-0.2	-0.2	-0.1

Template: TC-swl-2 ICP RAW DATA -- IEC Corrected m050996b

Analyzed: 05/09/96
Project: TWRS
Procedure: PNL-ALO-211
MT&E: JA ICP WB73520

BX-112 Core 119 Water Leaches

Raw Data
Data Page 2 of 2

Analyst: Danny Sanders 5/20/96

Reviewer: MW [illegible] 5/20/96

Sample ID:		96-02613	96-02613	96-02614	96-02614	Post Spikes "A"	Post Spikes "B"
Split ID:		119.2A.W2	119.2A.W2	119.2B.W2	119.2B.W2		
Run Time:		11:50	11:53	11:57	12:01	ug/mL	ug/mL
(ug/mL)	Ag	-0.001	-0.002	-0.002	-0.001	0.500	
	Al	0.636	0.873	3.002	2.567	10.000	
	As	0.062	0.059	0.058	0.051	2.500	
	B	0.056	0.067	0.065	0.064	2.000	
	Ba	0.000	-0.001	-0.000	-0.000	0.500	
	Be	0.000	-0.000	0.000	0.000	0.100	
	Bi	0.061	0.035	0.057	0.055	25.000	
	Ca	1.263	0.989	0.776	0.858	25.000	
	Cd	-0.003	-0.002	-0.002	-0.003	0.500	
	Ce	-0.015	-0.023	-0.014	-0.014		2.000
	Co	-0.000	-0.001	-0.001	0.000	1.000	
	Cr	2.564	2.547	2.307	2.421	1.000	
	Cu	-0.003	-0.004	-0.005	-0.003	1.000	
	Dy	-0.002	-0.002	-0.002	-0.001		2.000
	Eu	0.000	0.000	0.000	0.000		2.000
	Fe	0.026	0.012	0.016	0.021	20.000	
	K	3.747	3.824	3.469	3.747	25.000	
	La	-0.002	-0.003	-0.003	-0.001		1.000
	Li	0.319	0.316	0.117	0.121	2.000	
	Mg	0.495	0.481	0.418	0.472	32.000	
	Mn	0.000	0.000	0.000	0.000	0.500	
	Mo	0.273	0.273	0.241	0.255	1.000	
	Na	720.210	713.986	661.306	696.653	36.700	
	Nd	-0.006	-0.011	-0.013	-0.006		2.000
	Ni	-0.002	-0.003	-0.003	-0.006	1.000	
	P	56.114	55.836	55.264	57.302	5.000	
	Pb	-0.015	-0.013	-0.016	-0.014	2.500	
	Pd	0.022	0.012	0.017	0.030		2.000
	Rh	0.019	0.012	0.010	0.021		2.000
	Ru	0.038	0.039	0.030	0.036		2.000
	Sb	0.000	0.001	0.003	0.006	2.500	
	Se	0.026	0.032	0.036	0.030	2.500	
	Si	0.768	0.749	0.532	0.564	20.000	
	Sn	-0.074	-0.066	-0.083	-0.056		2.000
	Sr	0.004	0.002	0.002	0.002	0.500	
	Te	0.006	0.006	0.007	0.009		2.000
	Th	0.005	-0.000	0.009	0.003		10.000
	Ti	-0.001	-0.001	-0.001	-0.001	1.000	
	Tl	0.006	0.006	0.007	0.005	2.500	
	U	0.560	0.237	0.489	0.586		25.000
	V	-0.001	-0.001	-0.001	-0.000	1.000	
	W	0.016	0.023	0.008	0.013		2.000
	Y	-0.001	-0.001	-0.001	-0.001		1.000
	Zn	-0.001	-0.001	-0.000	-0.001	1.000	
(ug/mL)	Zr	-0.001	-0.002	-0.002	-0.001	2.000	

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

								QC CCV1 96040	CCV1 960403I901			
								A0114	A0114			
								5/9/96	5/9/96			
			Statistical Summary for 'QC CCV1 960403I901'					10:13	13:28			
(IV:CCV1)								CONC	CONC			
	TRUE	*N*	*Average*	*S.Dev*	*%RSD*	*Bias*	*Bias*	1059	1105			
	(ug/mL)		(ug/mL)	(ug/mL)	(%)	(ug/mL)	(%)	*(ug/mL)*	*(ug/mL)*			
Ag	0.600	2	0.587	0.001	0	-0.013	-2.2	0.59	0.59			
Al	6.000	2	5.943	0.025	0	-0.057	-1.0	5.93	5.96			
As	2.000	2	2.046	0.031	2	0.046	2.3	2.02	2.07			
B	1.000	2	1.051	0.006	1	0.051	5.1	1.05	1.05			
Ba	0.600	2	0.581	0.002	0	-0.019	-3.1	0.58	0.58			
Be	0.200	2	0.198	0.000	0	-0.002	-1.1	0.20	0.20			
Bi		2	0.027	0.002	7			0.028	0.025			
Ca	30.000	2	30.025	0.093	0	0.025	0.1	30.0	30.1			
Cd	0.600	2	0.597	0.005	1	-0.003	-0.4	0.60	0.59			
Ce		2	-0.023	0.014	-63			0.013	0.033			
Co	0.600	2	0.597	0.005	1	-0.003	-0.6	0.59	0.60			
Cr	0.600	2	0.585	0.000	0	-0.015	-2.6	0.59	0.58			
Cu	0.600	2	0.557	0.004	1	-0.043	-7.2	0.56	0.55			
Dy		2	-0.002	0.000	-22			0.002	0.002			
Eu		2	0.002	0.000	6			0.002	0.002			
Fe	25.000	2	24.962	0.094	0	-0.038	-0.2	24.9	25.0			
K	40.000	2	38.169	0.770	2	-1.831	-4.6	38.7	37.6			
La		2	0.000	0.000	70			0.001	0.000			
Li		2	0.000	0.002	-637			0.001	0.002			
Mg	15.000	2	15.237	0.001	0	0.237	1.6	15.2	15.2			
Mn	0.400	2	0.412	0.001	0	0.012	3.0	0.41	0.41			
Mo	0.600	2	0.588	0.003	0	-0.012	-2.0	0.59	0.59			
Na	5.000	2	5.029	0.075	1	0.029	0.6	4.98	5.08			
Nd		2	-0.005	0.010	-206			0.002	0.011			
Ni	0.600	2	0.596	0.008	1	-0.004	-0.6	0.59	0.60			
P		2	0.048	0.005	10			0.045	0.052			
Pb	2.000	2	1.959	0.016	1	-0.041	-2.1	1.97	1.95			
Pd		2	-0.033	0.016	-48			0.022	0.045			
Rh		2	-0.016	0.008	-49			0.010	0.021			
Ru		2	-0.003	0.012	-486			0.011	0.006			
Sb	2.000	2	2.019	0.012	1	0.019	0.9	2.03	2.01			
Se	1.000	2	1.065	0.004	0	0.065	6.5	1.06	1.07			
Si	0.460	2	0.497	0.001	0	0.037	8.1	0.50	0.50			
Sn		2	0.200	0.035	18			0.22	0.17			
Sr		2	0.001	0.000	5			0.001	0.001			
Te		2	0.023	0.000	1			0.023	0.023			
Th		2	0.030	0.003	11			0.033	0.028			
Ti	2.000	2	1.954	0.014	1	-0.046	-2.3	1.94	1.96			
Tl	2.000	2	1.976	0.021	1	-0.024	-1.2	1.96	1.99			
U		2	-0.067	0.131	-195			0.025	0.16			
V	0.600	2	0.586	0.001	0	-0.014	-2.4	0.59	0.59			
W		2	0.036	0.002	7			0.038	0.035			
Y		2	0.001	0.000	39			0.001	0.001			
Zn	0.600	2	0.605	0.010	2	0.005	0.9	0.60	0.61			
Zr		2	-0.004	0.000	0			0.004	0.004			
TIME		2	10000.000	0.000	0			10,000	10,000			

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

(IV:CC	
Ag	
Al	
As	
B	
Ba	
Be	
Bi	
Ca	
Cd	
Ce	
Co	
Cr	
Cu	
Dy	
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Mo	
Na	
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Pd	
Rh	
Ru	
Sb	
Se	
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Sn	
Sr	
Te	
Th	
Ti	
Tl	
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V	
W	
Y	
Zn	
Zr	
TIME	

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

							QC	MCVA 96041	CVA 96041	CVA 96041	CVA 96041	CVA 96041
								A0114	A0114	A0114	A0114	A0114
								5/9/96	5/9/96	5/9/96	5/9/96	5/9/96
Statistical Summary for 'QC MCVA 960415/901'								09:58	10:41	11:35	12:07	13:14
(QC-MCVA)								CONC	CONC	CONC	CONC	CONC
	TRUE	N	Average	S.Dev	%RSD	Bias	Bias	1151	1197	1243	1289	1335
	(ug/mL)		(ug/mL)	(ug/mL)	(%)	(ug/mL)	(%)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Ag	0.500	5	0.479	0.003	1	-0.021	-4.3	0.48	0.48	0.48	0.47	0.48
Al	10.000	5	9.898	0.077	1	-0.102	-1.0	9.86	9.98	9.83	9.83	9.99
As	2.500	5	2.536	0.020	1	0.036	1.5	2.52	2.53	2.53	2.54	2.57
B	2.000	5	2.071	0.017	1	0.071	3.5	2.06	2.09	2.06	2.05	2.08
Ba	0.500	5	0.492	0.005	1	-0.008	-1.5	0.49	0.50	0.49	0.49	0.50
Be	0.100	5	0.097	0.001	1	-0.003	-2.8	0.097	0.098	0.096	0.097	0.098
Bi	25.000	5	24.066	0.206	1	-0.934	-3.7	24.0	24.3	23.9	23.9	24.2
Ca	25.000	5	24.984	0.174	1	-0.016	-0.1	24.9	25.1	24.8	24.8	25.2
Cd	0.500	5	0.482	0.005	1	-0.018	-3.5	0.49	0.49	0.48	0.47	0.48
Ce		5	-0.053	0.012	-23			0.048	0.060	0.036	0.052	0.069
Co	1.000	5	0.974	0.007	1	-0.026	-2.6	0.97	0.98	0.97	0.97	0.98
Cr	1.000	5	0.972	0.008	1	-0.028	-2.8	0.97	0.98	0.97	0.96	0.98
Cu	1.000	5	0.927	0.009	1	-0.073	-7.3	0.93	0.94	0.92	0.92	0.93
Dy		5	-0.009	0.002	-18			0.009	0.010	0.006	0.008	0.009
Eu		5	-0.001	0.000	-56			0.001	0.001	0.000	0.001	0.001
Fe	20.000	5	19.821	0.166	1	-0.179	-0.9	19.8	20.0	19.7	19.7	20.0
K	25.000	5	23.602	0.386	2	-1.398	-5.6	23.9	23.8	23.9	23.3	23.1
La		5	-0.011	0.002	-19			0.011	0.013	0.008	0.011	0.013
Li	2.000	5	1.983	0.023	1	-0.017	-0.8	2.00	2.01	1.97	1.95	1.99
Mg	31.200	5	31.619	0.233	1	0.419	1.3	31.6	31.9	31.4	31.4	31.8
Mn	0.500	5	0.512	0.005	1	0.012	2.3	0.51	0.52	0.51	0.51	0.52
Mo	1.000	5	0.983	0.009	1	-0.017	-1.7	0.98	0.99	0.97	0.98	0.99
Na	36.700	5	36.342	0.260	1	-0.358	-1.0	36.0	36.4	36.3	36.2	36.7
Nd		5	-0.050	0.011	-23			0.050	0.057	0.034	0.045	0.064
Ni	1.000	5	0.988	0.023	2	-0.012	-1.2	0.97	1.03	0.98	0.98	0.99
P	5.000	5	4.840	0.030	1	-0.160	-3.2	4.82	4.89	4.81	4.83	4.85
Pb	2.500	5	2.373	0.010	0	-0.127	-5.1	2.37	2.38	2.38	2.36	2.38
Pd		5	-0.163	0.030	-18			0.17	0.19	0.12	0.15	0.19
Rh		5	-0.070	0.013	-18			0.068	0.080	0.052	0.067	0.085
Ru		5	-0.019	0.009	-47			0.029	0.027	0.010	0.012	0.015
Sb	2.500	5	2.452	0.015	1	-0.048	-1.9	2.45	2.46	2.45	2.43	2.47
Se	2.500	5	2.537	0.036	1	0.037	1.5	2.52	2.54	2.51	2.53	2.60
Si	20.000	5	19.545	0.132	1	-0.455	-2.3	19.5	19.7	19.4	19.4	19.7
Sn		5	0.011	0.040	372			0.022	0.020	0.060	0.032	0.039
Sr	0.500	5	0.501	0.006	1	0.001	0.2	0.50	0.51	0.50	0.50	0.51
Te		5	0.005	0.007	148			0.009	0.002	0.009	0.012	0.007
Th		5	0.043	0.005	13			0.044	0.047	0.034	0.046	0.045
Ti	1.000	5	0.975	0.009	1	-0.025	-2.5	0.97	0.98	0.97	0.97	0.99
Tl	2.500	5	2.464	0.023	1	-0.036	-1.4	2.43	2.47	2.45	2.47	2.50
U		5	-0.802	0.153	-19			0.77	0.94	0.58	0.78	0.96
V	1.000	5	0.977	0.007	1	-0.023	-2.3	0.98	0.99	0.97	0.97	0.98
W		5	0.024	0.004	15			0.028	0.025	0.027	0.022	0.019
Y		5	-0.002	0.001	-26			0.002	0.002	0.001	0.002	0.002
Zn	1.000	5	0.976	0.011	1	-0.024	-2.4	0.96	0.98	0.97	0.97	0.99
Zr	2.000	5	1.956	0.021	1	-0.044	-2.2	1.94	1.96	1.94	1.95	1.99
TIME		5	10000.000	0.000	0			10,000	10,000	10,000	10,000	10,000

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

	1901
(QC-M	
Ag	
Al	
As	
B	
Ba	
Be	
Bi	
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Cd	
Ce	
Co	
Cr	
Cu	
Dy	
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K	
La	
Li	
Mg	
Mn	
Mo	
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Sb	
Se	
Si	
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Te	
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V	
W	
Y	
Zn	
Zr	
TIME	

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

								QC MCVB 96041	CVB 960418I902			
								A0114	A0114			
								5/9/96	5/9/96			
			Statistical Summary for 'QC MCVB 960418I902'					10:02	13:19			
(QC-MCVB)								CONC	CONC			
	TRUE	N	Average	S.Dev	%RSD	Bias	Bias	1381	1427			
	(ug/mL)		(ug/mL)	(ug/mL)	(%)	(ug/mL)	(%)	(ug/mL)	(ug/mL)			
Ag		2	-0.011	0.002	-19			0.010	0.013			
Al		2	1.695	0.065	4			1.65	1.74			
As		2	0.292	0.061	21			0.25	0.34			
B		2	6.110	0.024	0			6.09	6.13			
Ba		2	0.003	0.000	9			0.003	0.003			
Be		2	0.001	0.000	7			0.001	0.001			
Bi		2	0.072	0.001	2			0.072	0.073			
Ca		2	0.081	0.002	2			0.083	0.080			
Cd		2	0.003	0.001	18			0.004	0.003			
Ce	2.000	2	1.944	0.011	1	-0.056	-2.8	1.94	1.95			
Co		2	-0.004	0.001	-16			0.005	0.004			
Cr		2	0.006	0.002	34			0.004	0.007			
Cu		2	0.025	0.012	48			0.033	0.016			
Dy	2.000	2	1.889	0.009	0	-0.111	-5.6	1.88	1.89			
Eu	2.000	2	1.912	0.009	0	-0.088	-4.4	1.91	1.92			
Fe		2	0.045	0.004	9			0.043	0.048			
K		2	-2.488	0.514	-21			2.12	2.85			
La	1.000	2	0.940	0.010	1	-0.060	-6.0	0.93	0.95			
Li		2	-0.004	0.002	-53			0.002	0.005			
Mg		2	-0.165	0.015	-9			0.18	0.15			
Mn		2	0.001	0.000	7			0.001	0.001			
Mo		2	0.006	0.001	10			0.006	0.007			
Na		2	4.450	0.053	1			4.41	4.49			
Nd	2.000	2	1.850	0.013	1	-0.150	-7.5	1.84	1.86			
Ni		2	0.026	0.001	2			0.026	0.027			
P		2	0.102	0.008	8			0.096	0.11			
Pb		2	0.212	0.010	5			0.22	0.20			
Pd	2.000	2	2.109	0.087	4	0.109	5.4	2.05	2.17			
Rh	2.000	2	1.916	0.007	0	-0.084	-4.2	1.91	1.92			
Ru	2.000	2	1.902	0.001	0	-0.098	-4.9	1.90	1.90			
Sb		2	0.090	0.007	7			0.085	0.094			
Se		2	0.080	0.007	8			0.085	0.076			
Si		2	56.190	0.175	0			56.3	56.1			
Sn	2.000	2	1.961	0.023	1	-0.039	-2.0	1.98	1.94			
Sr		2	0.004	0.000	0			0.004	0.004			
Te	2.000	2	1.930	0.009	0	-0.070	-3.5	1.92	1.94			
Th	10.000	2	9.305	0.080	1	-0.695	-7.0	9.25	9.36			
Ti		2	0.008	0.000	4			0.008	0.008			
Tl		2	0.006	0.004	62			0.009	0.003			
U	25.000	2	23.740	0.241	1	-1.260	-5.0	23.9	23.6			
V		2	-0.004	0.001	-24			0.003	0.004			
W	2.000	2	1.937	0.001	0	-0.063	-3.1	1.94	1.94			
Y	1.000	2	0.953	0.006	1	-0.047	-4.7	0.96	0.95			
Zn		2	0.006	0.000	5			0.006	0.006			
Zr		2	0.023	0.008	36			0.029	0.017			
TIME		2	10000.000	0.000	0			10,000	10,000			

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

(QC-M	
Ag	
Al	
As	
B	
Ba	
Be	
Bi	
Ca	
Cd	
Ce	
Co	
Cr	
Cu	
Dy	
Eu	
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K	
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Li	
Mg	
Mn	
Mo	
Na	
Nd	
Ni	
P	
Pb	
Pd	
Rh	
Ru	
Sb	
Se	
Si	
Sn	
Sr	
Te	
Th	
Ti	
Tl	
U	
V	
W	
Y	
Zn	
Zr	
TIME	

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

								QC_SRM-1643d 1	RM-1643d 108520			
								A0114	A0114			
								5/9/96	5/9/96			
Statistical Summary for 'QC_SRM-1643d 108520'								10:07	13:23			
(NIST:SRM1643d)								CONC	CONC			
	TRUE	***N***	***Average***	***S.Dev***	***%RSD***	***Bias***	***Bias***	1473	1519			
	(ug/mL)		(ug/mL)	(ug/mL)	(%)	(ug/mL)	(%)	*(ug/mL)*	*(ug/mL)*			
Ag	0.001	2	-0.001	0.001	-117	-0.002	-181.5	-114% 0.00	-249% -0.002			
Al	0.128	2	0.125	0.000	0	-0.002	-1.9	0.13	0.13			
As	0.056	2	0.060	0.004	7	0.004	7.0	0.057	12% 0.063			
B	0.145	2	0.155	0.004	3	0.010	7.1	0.15	0.16			
Ba	0.507	2	0.505	0.007	1	-0.002	-0.3	0.50	0.51			
Be	0.013	2	0.012	0.000	1	0.000	-1.8	0.012	0.012			
Bi	0.013	2	0.010	0.003	27	-0.003	-23.7	-38% 0.008	0.012			
Ca	31.050	2	31.631	0.351	1	0.581	1.9	31.4	31.9			
Cd	0.006	2	0.006	0.002	28	0.000	-6.6	12% 0.007	-25% 0.005			
Ce		2	-0.013	0.019	-145			0.000	0.027			
Co	0.025	2	0.025	0.001	3	0.000	1.8	0.026	0.025			
Cr	0.019	2	0.021	0.001	5	0.002	9.4	13% 0.021	0.020			
Cu	0.021	2	0.014	0.003	22	-0.007	-33.2	-23% 0.016	-44% 0.012			
Dy		2	0.000	0.000	-10			0.000	0.000			
Eu		2	0.002	0.001	39			0.001	0.002			
Fe	0.091	2	0.087	0.002	2	-0.004	-4.7	0.086	0.088			
K	2.356	2	1.665	0.748	45	-0.691	-29.3	2.19	-52% 1.136			
La		2	0.002	0.002	99			0.003	0.001			
Li	0.017	2	0.017	0.002	14	0.001	5.5	16% 0.019	0.016			
Mg	7.989	2	8.358	0.076	1	0.369	4.6	8.30	8.41			
Mn	0.038	2	0.040	0.000	1	0.002	6.4	0.040	0.040			
Mo	0.113	2	0.112	0.001	1	-0.001	-1.2	0.11	0.11			
Na	22.070	2	21.707	0.442	2	-0.363	-1.6	21.4	22.0			
Nd		2	0.000	0.012	-5154			0.008	0.009			
Ni	0.058	2	0.052	0.001	2	-0.006	-9.8	0.053	-11% 0.052			
P		2	0.032	0.007	21			0.037	0.028			
Pb	0.018	2	-0.001	0.008	-570	-0.019	-107.4	-78% 0.004	-137% -0.007			
Pd		2	-0.010	0.027	-262			0.009	0.029			
Rh		2	-0.012	0.013	-106			0.003	0.021			
Ru		2	-0.002	0.002	-87			0.001	0.004			
Sb	0.054	2	0.052	0.004	8	-0.002	-4.5	-10% 0.049	0.055			
Se	0.011	2	0.024	0.000	2	0.012	106.8	104% 0.023	109% 0.024			
Si	2.700	2	2.955	0.046	2	0.255	9.5	2.92	11% 2.988			
Sn		2	-0.064	0.046	-72			0.031	0.097			
Sr	0.295	2	0.296	0.006	2	0.001	0.3	0.29	0.30			
Te	0.001	2	-0.008	0.007	-89	-0.009	-912.5	-404% -0.00	-1,421% -0.013			
Th		2	0.003	0.014	457			0.007	0.013			
Ti		2	0.000	0.001	-191			0.000	0.001			
Tl	0.007	2	-0.006	0.001	-20	-0.013	-184.3	-172% -0.00	-196% -0.007			
U		2	0.045	0.255	573			0.22	0.14			
V	0.035	2	0.032	0.001	3	-0.003	-8.3	0.033	-10% 0.032			
W		2	0.004	0.000	5			0.004	0.005			
Y		2	0.000	0.000	49			0.000	0.000			
Zn	0.072	2	0.078	0.001	1	0.005	7.1	0.077	0.078			
Zr		2	-0.003	0.001	-33			0.002	0.003			
TIME		2	10000.000	0.000	0			10,000	10,000			

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

(NIST:S	
Ag	
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Be	
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Ca	
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Ce	
Co	
Cr	
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Rh	
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Se	
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Ti	
Tl	
U	
V	
W	
Y	
Zn	
Zr	
TIME	

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

								ICP1.0 960318F	1.0 960318F	1.0 960318F	1.0 960318F	1.0 960318F
								A0114	A0114	A0114	A0114	A0114
								5/9/96	5/9/96	5/9/96	5/9/96	5/9/96
								09:56	10:31	10:45	11:40	12:12
Statistical Summary for 'ICP1.0 960318F100'								CONC	CONC	CONC	CONC	CONC
(ICP1.0 "Blank")								645	691	737	783	829
	TRUE	***N***	***Average***	***S.Dev***	***%RSD***	***Bias***	***Bias***	*(ug/mL)*	*(ug/mL)*	*(ug/mL)*	*(ug/mL)*	*(ug/mL)*
	(ug/mL)		(ug/mL)	(ug/mL)	(%)	(ug/mL)	(%)					
Ag		6	-0.002	0.002	-80			0.000	0.003	0.002	0.001	0.003
Al		6	0.016	0.033	203			0.010	0.004	0.000	0.019	0.004
As		6	0.000	0.004	-7680			0.004	0.004	0.003	0.002	0.004
B		6	0.001	0.003	594			0.001	0.001	0.004	0.005	0.000
Ba		6	0.000	0.001	-153			0.001	0.001	0.000	0.001	0.000
Be		6	0.000	0.000	-200			0.000	0.000	0.000	0.000	0.000
Bi		6	0.019	0.029	154			0.017	0.002	0.019	0.022	0.017
Ca		6	0.028	0.031	113			0.003	0.016	0.021	0.029	0.014
Cd		6	-0.001	0.002	-167			0.000	0.000	0.003	0.002	0.003
Ce		6	-0.028	0.009	-31			0.027	0.034	0.030	0.012	0.028
Co		6	-0.001	0.001	-103			0.002	0.003	0.001	0.001	0.001
Cr		6	0.000	0.001	433			0.000	0.002	0.001	0.002	0.001
Cu		6	-0.003	0.002	-70			0.004	0.006	0.002	0.000	0.002
Dy		6	-0.003	0.001	-44			0.004	0.005	0.003	0.001	0.003
Eu		6	-0.001	0.000	-50			0.001	0.001	0.001	0.000	0.001
Fe		6	0.015	0.026	168			0.008	0.008	0.009	0.015	0.003
K		6	-0.900	0.371	-41			0.66	1.14	0.80	0.38	0.97
La		6	-0.002	0.006	-332			0.005	0.004	0.006	0.001	0.006
Li		6	-0.002	0.002	-100			0.003	0.006	0.001	0.001	0.001
Mg		6	-0.006	0.018	-293			0.024	0.022	0.009	0.020	0.001
Mn		6	0.000	0.000	-785			0.000	0.001	0.000	0.001	0.000
Mo		6	0.000	0.001	2818			0.001	0.001	0.000	0.002	0.000
Na		6	-0.017	0.052	-311			0.050	0.069	0.006	0.071	0.006
Nd		6	-0.020	0.010	-50			0.017	0.031	0.018	0.004	0.018
Ni		6	0.031	0.052	168			0.006	0.061	0.011	0.000	0.004
P		6	0.023	0.036	151			0.016	0.000	0.012	0.023	0.035
Pb		6	-0.022	0.008	-37			0.020	0.029	0.016	0.010	0.023
Pd		6	-0.042	0.027	-63			0.048	0.076	0.034	0.002	0.038
Rh		6	-0.023	0.011	-49			0.026	0.036	0.024	0.003	0.021
Ru		6	-0.006	0.005	-81			0.008	0.012	0.005	0.002	0.005
Sb		6	-0.005	0.006	-128			0.005	0.013	0.007	0.006	0.006
Se		6	0.006	0.010	162			0.008	0.004	0.009	0.010	0.015
Si		6	0.009	0.018	203			0.005	0.008	0.015	0.040	0.014
Sn		6	-0.088	0.028	-32			0.071	0.13	0.079	0.050	0.096
Sr		6	0.000	0.000	808			0.000	0.000	0.000	0.001	0.000
Te		6	-0.015	0.005	-33			0.011	0.019	0.014	0.008	0.017
Th		6	0.010	0.001	7			0.009	0.010	0.010	0.011	0.010
Ti		6	-0.001	0.001	-81			0.001	0.002	0.001	0.000	0.001
Tl		6	-0.015	0.003	-23			0.019	0.018	0.012	0.011	0.012
U		6	-0.354	0.118	-33			0.36	0.47	0.37	0.13	0.35
V		6	-0.002	0.001	-60			0.003	0.004	0.002	0.000	0.002
W		6	-0.002	0.006	-283			0.006	0.006	0.008	0.003	0.008
Y		6	-0.001	0.001	-47			0.001	0.002	0.001	0.000	0.001
Zn		6	-0.001	0.001	-133			0.001	0.002	0.000	0.000	0.000
Zr		6	-0.004	0.002	-50			0.005	0.006	0.003	0.001	0.003
TIME		6	10000.000	0.000	0			10,000	10,000	10,000	10,000	10,000

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

	1.0 960318F
	A0114
	5/9/96
	13:43
(ICP1.0	CONC
	875
	(ug/mL)
Ag	0.004
Al	0.081
As	0.005
B	0.004
Ba	0.001
Be	0.000
Bi	0.069
Ca	0.088
Cd	0.001
Ce	0.037
Co	0.002
Cr	0.000
Cu	0.005
Dy	0.004
Eu	0.001
Fe	0.065
K	1.44
La	0.010
Li	0.003
Mg	0.020
Mn	0.000
Mo	0.001
Na	0.052
Nd	0.029
Ni	0.12
P	0.087
Pb	0.032
Pd	0.061
Rh	0.030
Ru	0.009
Sb	0.003
Se	0.015
Si	0.011
Sn	0.10
Sr	0.000
Te	0.019
Th	0.010
Ti	0.002
Tl	0.016
U	0.43
V	0.004
W	0.004
Y	0.002
Zn	0.001
Zr	0.005
TIME	10,000

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

								QC_SSTMCV 9604	TMCV 960403I904			
								A0114	A0114			
								5/9/96	5/9/96			
			Statistical Summary for 'QC_SSTMCV 960403I904'					10:17	13:32			
("QC-SSTMCV" SST Midrange Cal. Check Std.)								CONC	CONC			
	TRUE	N	Average	S.Dev	%RSD	Bias	Bias	1657	1703			
	(ug/mL)		(ug/mL)	(ug/mL)	(%)	(ug/mL)	(%)	(ug/mL)	(ug/mL)			
Ag	0.500	2	0.501	0.001	0	0.001	0.2	0.50	0.50			
Al	5.000	2	5.014	0.055	1	0.014	0.3	4.98	5.05			
As	2.000	2	2.109	0.035	2	0.109	5.5	2.08	2.13			
B		2	0.000	0.001	2065			0.001	0.001			
Ba	0.100	2	0.100	0.001	1	0.000	0.0	0.099	0.10			
Be	0.100	2	0.101	0.000	0	0.001	0.9	0.10	0.10			
Bi	1.500	2	1.542	0.005	0	0.042	2.8	1.54	1.55			
Ca	1.000	2	1.076	0.013	1	0.076	7.6	1.07	1.08			
Cd	0.200	2	0.200	0.003	1	0.000	0.0	0.20	0.20			
Ce		2	-0.018	0.020	-116			0.003	0.032			
Co		2	-0.003	0.000	-1			0.003	0.003			
Cr	0.300	2	0.304	0.001	0	0.004	1.3	0.30	0.30			
Cu		2	-0.004	0.004	-89			0.001	0.006			
Dy		2	-0.003	0.001	-27			0.003	0.004			
Eu		2	0.006	0.000	7			0.006	0.006			
Fe	0.500	2	0.525	0.012	2	0.025	5.1	0.52	0.53			
K	50.000	2	49.032	0.738	2	-0.968	-1.9	49.6	48.5			
La		2	-0.004	0.003	-64			0.002	0.006			
Li		2	-0.003	0.001	-59			0.001	0.004			
Mg		2	-0.118	0.013	-11			0.13	0.11			
Mn	0.100	2	0.106	0.001	1	0.006	5.6	0.11	0.11			
Mo		2	0.005	0.001	15			0.004	0.006			
Na	5.000	2	5.028	0.058	1	0.028	0.6	4.99	5.07			
Nd		2	-0.023	0.017	-72			0.011	0.035			
Ni	0.500	2	0.516	0.010	2	0.016	3.2	0.51	0.52			
P	4.000	2	4.043	0.005	0	0.043	1.1	4.05	4.04			
Pb	3.000	2	2.993	0.004	0	-0.007	-0.2	3.00	2.99			
Pd		2	-0.007	0.052	-747			0.030	0.044			
Rh		2	-0.022	0.016	-73			0.010	0.033			
Ru		2	-0.008	0.006	-73			0.004	0.012			
Sb	2.000	2	2.077	0.000	0	0.077	3.8	2.08	2.08			
Se	2.500	2	2.617	0.065	2	0.117	4.7	2.57	2.66			
Si	3.000	2	3.066	0.005	0	0.066	2.2	3.06	3.07			
Sn		2	-0.010	0.039	-408			0.018	0.037			
Sr		2	0.001	0.000	6			0.001	0.001			
Te		2	0.000	0.009	18328			0.007	0.006			
Th		2	-0.026	0.021	-79			0.041	0.011			
Ti		2	-0.001	0.001	-78			0.000	0.001			
Tl		2	-0.006	0.007	-129			0.001	0.011			
U	20.000	2	19.874	0.004	0	-0.126	-0.6	19.9	19.9			
V	0.500	2	0.504	0.002	0	0.004	0.9	0.50	0.51			
W		2	0.022	0.004	17			0.024	0.019			
Y		2	-0.001	0.001	-51			0.001	0.002			
Zn		2	0.002	0.000	9			0.002	0.002			
Zr	0.500	2	0.500	0.007	1	0.000	0.1	0.50	0.51			
TIME	10000	2	10000.000	0.000	0	0.000	0.0	10,000	10,000			

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

(*QC-S	
Ag	
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Rh	
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Sb	
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Ti	
Tl	
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V	
W	
Y	
Zn	
Zr	
TIME	

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

								QC_SSTA 96040	SSTA 9604031903
								A0114	A0114
								5/9/96	5/9/96
			Statistical Summary for 'QC_SSTA 9604031903'					10:22	13:37
("QC-SSTA" Interference Check Std.)								CONC	CONC
	TRUE	*N*	*Average*	*S.Dev*	*%RSD*	*Bias*	*Bias*	1565	1611
	(ug/mL)		(ug/mL)	(ug/mL)	(%)	(ug/mL)	(%)	*(ug/mL)*	*(ug/mL)*
Ag		2	-0.034	0.001	-4			0.033	0.035
Al	250.0	2	250.100	1.799	1	0.100	0.0	251	249
As		2	0.335	0.002	0			0.33	0.34
B		2	0.041	0.004	10			0.044	0.038
Ba		2	0.008	0.000	0			0.008	0.008
Be		2	-0.001	0.000	-3			0.001	0.001
Bi	200.0	2	195.068	2.697	1	-4.932	-2.5	197	193
Ca	250.0	2	247.495	1.688	1	-2.505	-1.0	249	246
Cd		2	0.064	0.000	0			0.064	0.064
Ce		2	0.081	0.022	27			0.097	0.066
Co		2	0.004	0.001	14			0.003	0.004
Cr		2	0.232	0.002	1			0.23	0.23
Cu		2	-0.137	0.009	-6			0.13	0.14
Dy		2	0.008	0.000	0			0.008	0.008
Eu		2	0.081	0.001	1			0.082	0.081
Fe	200.0	2	191.970	1.389	1	-8.030	-4.0	193	191
K	100.0	2	98.968	2.262	2	-1.032	-1.0	101	97.4
La	50.0	2	47.938	0.191	0	-2.062	-4.1	48.1	47.8
Li		2	0.028	0.001	3			0.028	0.029
Mg		2	-1.114	0.134	-12			1.21	1.02
Mn		2	0.018	0.000	0			0.018	0.018
Mo		2	0.098	0.001	1			0.099	0.097
Na		2	0.774	0.017	2			0.79	0.76
Nd		2	0.086	0.004	5			0.089	0.083
Ni	200.0	2	187.877	0.165	0	-12.123	-6.1	188	188
P	200.0	2	197.382	3.262	2	-2.618	-1.3	200	195
Pb		2	0.881	0.014	2			0.89	0.87
Pd		2	1.068	0.211	20			1.22	0.92
Rh		2	0.136	0.011	8			0.13	0.14
Ru		2	0.043	0.082	191			0.015	0.10
Sb		2	0.401	0.017	4			0.41	0.39
Se		2	1.530	0.001	0			1.53	1.53
Si		2	-0.244	0.004	-2			0.25	0.24
Sn		2	2.968	0.016	1			2.98	2.96
Sr		2	0.019	0.000	1			0.019	0.019
Te		2	0.645	0.015	2			0.66	0.63
Th		2	-0.406	0.187	-46			0.54	0.27
Ti		2	-0.004	0.001	-21			0.003	0.004
Tl		2	0.317	0.014	4			0.33	0.31
U	200.0	2	201.523	1.687	1	1.523	0.8	203	200
V		2	0.034	0.002	6			0.032	0.035
W		2	0.533	0.012	2			0.54	0.52
Y		2	0.015	0.001	4			0.015	0.015
Zn		2	0.070	0.006	8			0.074	0.066
Zr		2	0.066	0.015	22			0.077	0.056
TIME		2	10000.000	0.000	0			10,000	10,000

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

"QC-S	
Ag	
Al	
As	
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Ba	
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Ce	
Co	
Cr	
Cu	
Dy	
Eu	
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Li	
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Mn	
Mo	
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Nd	
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Pb	
Pd	
Rh	
Ru	
Sb	
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Zn	
Zr	
TIME	

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

								MCVA @2
								A0114
								5/9/96
								11:08
Statistical Summary for 'MCVA @2'								CONC
(MCVA @2 Post Digestion Spike)								921
	TRUE	***N***	***Average***	***S.Dev***	***%RSD***	***Bias***	***Bias***	
	(ug/mL)		(ug/mL)	(ug/mL)	(%)	(ug/mL)	(%)	*(ug/mL)*
Ag	0.250	1	0.244	#DIV/0!	#DIV/0!	-0.006	-2.6	0.24
Al	5.000	1	5.007	#DIV/0!	#DIV/0!	0.007	0.1	5.01
As	1.250	1	1.286	#DIV/0!	#DIV/0!	0.036	2.9	1.29
B	1.000	1	1.052	#DIV/0!	#DIV/0!	0.052	5.2	1.05
Ba	0.250	1	0.247	#DIV/0!	#DIV/0!	-0.003	-1.1	0.25
Be	0.050	1	0.049	#DIV/0!	#DIV/0!	-0.001	-1.5	0.049
Bi	12.500	1	12.229	#DIV/0!	#DIV/0!	-0.271	-2.2	12.2
Ca	12.500	1	12.764	#DIV/0!	#DIV/0!	0.264	2.1	12.8
Cd	0.250	1	0.250	#DIV/0!	#DIV/0!	0.000	0.0	0.25
Ce		1	-0.034	#DIV/0!	#DIV/0!			0.034
Co	0.500	1	0.498	#DIV/0!	#DIV/0!	-0.002	-0.5	0.50
Cr	0.500	1	0.499	#DIV/0!	#DIV/0!	-0.001	-0.1	0.50
Cu	0.500	1	0.462	#DIV/0!	#DIV/0!	-0.038	-7.5	0.46
Dy		1	-0.006	#DIV/0!	#DIV/0!			0.006
Eu		1	-0.001	#DIV/0!	#DIV/0!			0.001
Fe	10.000	1	10.090	#DIV/0!	#DIV/0!	0.090	0.9	10.1
K	12.500	1	11.689	#DIV/0!	#DIV/0!	-0.811	-6.5	11.7
La		1	-0.008	#DIV/0!	#DIV/0!			0.008
Li	1.000	1	1.003	#DIV/0!	#DIV/0!	0.003	0.3	1.00
Mg	15.600	1	16.215	#DIV/0!	#DIV/0!	0.615	3.9	16.2
Mn	0.250	1	0.261	#DIV/0!	#DIV/0!	0.011	4.5	0.26
Mo	0.500	1	0.499	#DIV/0!	#DIV/0!	-0.001	-0.1	0.50
Na	18.350	1	18.886	#DIV/0!	#DIV/0!	0.536	2.9	18.9
Nd		1	-0.029	#DIV/0!	#DIV/0!			0.029
Ni	0.500	1	0.513	#DIV/0!	#DIV/0!	0.013	2.6	0.51
P	2.500	1	2.522	#DIV/0!	#DIV/0!	0.022	0.9	2.52
Pb	1.250	1	1.208	#DIV/0!	#DIV/0!	-0.042	-3.4	1.21
Pd		1	-0.099	#DIV/0!	#DIV/0!			0.099
Rh		1	-0.046	#DIV/0!	#DIV/0!			0.046
Ru		1	-0.010	#DIV/0!	#DIV/0!			0.010
Sb	1.250	1	1.242	#DIV/0!	#DIV/0!	-0.008	-0.7	1.24
Se	1.250	1	1.303	#DIV/0!	#DIV/0!	0.053	4.2	1.30
Si	10.000	1	10.032	#DIV/0!	#DIV/0!	0.032	0.3	10.0
Sn		1	-0.016	#DIV/0!	#DIV/0!			0.016
Sr	0.250	1	0.252	#DIV/0!	#DIV/0!	0.002	0.8	0.25
Te		1	0.003	#DIV/0!	#DIV/0!			0.003
Th		1	0.030	#DIV/0!	#DIV/0!			0.030
Ti	0.500	1	0.491	#DIV/0!	#DIV/0!	-0.009	-1.8	0.49
Tl	1.250	1	1.248	#DIV/0!	#DIV/0!	-0.002	-0.2	1.25
U		1	-0.541	#DIV/0!	#DIV/0!			0.54
V	0.500	1	0.494	#DIV/0!	#DIV/0!	-0.006	-1.2	0.49
W		1	0.016	#DIV/0!	#DIV/0!			0.016
Y		1	-0.001	#DIV/0!	#DIV/0!			0.001
Zn	0.500	1	0.499	#DIV/0!	#DIV/0!	-0.001	-0.1	0.50
Zr	1.000	1	0.981	#DIV/0!	#DIV/0!	-0.019	-1.9	0.98
TIME		1	10000.000	#DIV/0!	#DIV/0!			10,000

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

(MCVA	
Ag	
Al	
As	
B	
Ba	
Be	
Bi	
Ca	
Cd	
Ce	
Co	
Cr	
Cu	
Dy	
Eu	
Fe	
K	
La	
Li	
Mg	
Mn	
Mo	
Na	
Nd	
Ni	
P	
Pb	
Pd	
Rh	
Ru	
Sb	
Se	
Si	
Sn	
Sr	
Te	
Th	
Ti	
Tl	
U	
V	
W	
Y	
Zn	
Zr	
TIME	

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

								MCVB @2
								A0114
								5/9/96
								11:19
Statistical Summary for 'MCVB @2'								CONC
(MCVB @2 Post Digestion Spike)								967
	TRUE	***N***	***Average***	***S.Dev***	***%RSD***	***Bias***	***Bias***	
	(ug/mL)		(ug/mL)	(ug/mL)	(%)	(ug/mL)	(%)	*(ug/mL)*
Ag		1	-0.006	#DIV/0!	#DIV/0!			0.006
Al		1	0.873	#DIV/0!	#DIV/0!			0.87
As		1	0.165	#DIV/0!	#DIV/0!			0.16
B		1	3.160	#DIV/0!	#DIV/0!			3.16
Ba		1	0.001	#DIV/0!	#DIV/0!			0.001
Be		1	0.000	#DIV/0!	#DIV/0!			0.000
Bi		1	0.034	#DIV/0!	#DIV/0!			0.034
Ca		1	0.039	#DIV/0!	#DIV/0!			0.039
Cd		1	0.003	#DIV/0!	#DIV/0!			0.003
Ce	1.000	1	0.988	#DIV/0!	#DIV/0!	-0.012	-1.2	0.99
Co		1	-0.002	#DIV/0!	#DIV/0!			0.002
Cr		1	0.005	#DIV/0!	#DIV/0!			0.005
Cu		1	0.009	#DIV/0!	#DIV/0!			0.009
Dy	1.000	1	0.962	#DIV/0!	#DIV/0!	-0.038	-3.8	0.96
Eu	1.000	1	0.975	#DIV/0!	#DIV/0!	-0.025	-2.5	0.98
Fe		1	0.011	#DIV/0!	#DIV/0!			0.011
K		1	-1.429	#DIV/0!	#DIV/0!			1.43
La	0.500	1	0.478	#DIV/0!	#DIV/0!	-0.022	-4.4	0.48
Li		1	-0.004	#DIV/0!	#DIV/0!			0.004
Mg		1	-0.095	#DIV/0!	#DIV/0!			0.095
Mn		1	0.001	#DIV/0!	#DIV/0!			0.001
Mo		1	0.003	#DIV/0!	#DIV/0!			0.003
Na		1	2.542	#DIV/0!	#DIV/0!			2.54
Nd	1.000	1	0.940	#DIV/0!	#DIV/0!	-0.060	-6.0	0.94
Ni		1	0.018	#DIV/0!	#DIV/0!			0.018
P		1	0.095	#DIV/0!	#DIV/0!			0.095
Pb		1	0.107	#DIV/0!	#DIV/0!			0.11
Pd	1.000	1	1.057	#DIV/0!	#DIV/0!	0.057	5.7	1.06
Rh	1.000	1	0.986	#DIV/0!	#DIV/0!	-0.014	-1.4	0.99
Ru	1.000	1	0.988	#DIV/0!	#DIV/0!	-0.012	-1.2	0.99
Sb		1	0.051	#DIV/0!	#DIV/0!			0.051
Se		1	0.040	#DIV/0!	#DIV/0!			0.040
Si		1	29.039	#DIV/0!	#DIV/0!			29.0
Sn	1.000	1	1.030	#DIV/0!	#DIV/0!	0.030	3.0	1.03
Sr		1	0.002	#DIV/0!	#DIV/0!			0.002
Te	1.000	1	1.015	#DIV/0!	#DIV/0!	0.015	1.5	1.01
Th	5.000	1	4.794	#DIV/0!	#DIV/0!	-0.206	-4.1	4.79
Ti		1	0.004	#DIV/0!	#DIV/0!			0.004
Tl		1	0.001	#DIV/0!	#DIV/0!			0.001
U	12.500	1	12.113	#DIV/0!	#DIV/0!	-0.387	-3.1	12.1
V		1	-0.002	#DIV/0!	#DIV/0!			0.002
W	1.000	1	1.005	#DIV/0!	#DIV/0!	0.005	0.5	1.00
Y	0.500	1	0.491	#DIV/0!	#DIV/0!	-0.009	-1.7	0.49
Zn		1	0.004	#DIV/0!	#DIV/0!			0.004
Zr		1	0.007	#DIV/0!	#DIV/0!			0.007
TIME		1	10000.000	#DIV/0!	#DIV/0!			10,000

Battelle PNL/ACL/Inorganic Analysis Group QC Summary ICPAES

(MCVB	
Ag	
Al	
As	
B	
Ba	
Be	
Bi	
Ca	
Cd	
Ce	
Co	
Cr	
Cu	
Dy	
Eu	
Fe	
K	
La	
Li	
Mg	
Mn	
Mo	
Na	
Nd	
Ni	
P	
Pb	
Pd	
Rh	
Ru	
Sb	
Se	
Si	
Sn	
Sr	
Te	
Th	
Ti	
Tl	
U	
V	
W	
Y	
Zn	
Zr	
TIME	

Battelle PNNL/ACL/Inorganic Analysis Group ... ICPAES Data Report

Det. Limit (ug/mL)	Multiplier= / ALO#= / Client ID= / Run Date= (Analyte)	91.6 / 96-2607 / 118.2A.W2 / 5/9/96 ug/g	88.2 / 96-2607-DUP / 118.2A.W2 (/ 5/9/96 ug/g	(Tol.±20%) Duplicates (%RPD)	94.6 / 96-2608 / 118.2B.W2 / 5/9/96 ug/g	93.6 / 96-2608-DUP / 118.2B.W2 (/ 5/9/96 ug/g	(Tol.±20%) Duplicates (%RPD)
0.015	Ag	--	--		--	--	
0.060	Al	729.84	705.84	-3.3	603.91	674.95	11.1
0.080	As	--	--		--	--	
0.050	B	[5.59]	[6.75]	18.6	[6.03]	[6.70]	10.5
0.010	Ba	--	--		--	--	
0.005	Be	--	--		--	--	
0.100	Bi	[59.72]	[24.18]	-84.7	[28.99]	[48.71]	50.8
0.250	Ca	[48.94]	[37.75]	-25.8	[95.29]	[103.06]	7.8
0.015	Cd	--	--		--	--	
0.100	Ce	--	--		--	--	
0.050	Co	--	--		--	--	
0.020	Cr	279.09	278.92	-0.1	273.73	280.80	2.6
0.050	Cu	--	--		--	--	
0.050	Dy	--	--		--	--	
0.100	Eu	--	--		--	--	
0.050	Fe	[18.38]	[6.76]	-92.5	[8.65]	[14.98]	53.6
2.000	K	[437.28]	[483.91]	10.1	[481.51]	[458.64]	-4.9
0.050	La	--	--		--	--	
0.030	Li	[13.59]	[13.64]	0.4	36.68	36.11	-1.5
0.100	Mg	[25.45]	[22.35]	-13.0	[40.03]	[40.55]	1.3
0.050	Mn	--	--		--	--	
0.030	Mo	[26.51]	26.53	0.1	[25.72]	[26.35]	2.4
0.250	Na	65262.43	65051.71	-0.3	65825.98	67068.29	1.9
0.100	Nd	--	--		--	--	
0.030	Ni	--	--		--	--	
0.250	P	5572.90	5434.74	-2.5	5390.69	5449.06	1.1
0.100	Pb	--	--		--	--	
0.300	Pd	--	--		--	--	
0.300	Rh	--	--		--	--	
0.100	Ru	--	--		--	--	
0.100	Sb	--	--		--	--	
0.100	Se	--	--		--	--	
0.500	Si	--	[48.00]		--	--	
1.000	Sn	--	--		--	--	
0.015	Sr	--	--		--	--	
0.500	Te	--	--		--	--	
0.800	Th	--	--		--	--	
0.025	Ti	--	--		--	--	
0.500	Tl	--	--		--	--	
2.000	U	--	[202.28]		[195.46]	[215.58]	9.8
0.015	V	--	--		--	--	
0.500	W	--	--		--	--	
0.010	Y	--	--		--	--	
0.020	Zn	--	--		--	--	
0.025	Zr	--	--		--	--	

Note: 1) Overall error greater than 10-times detection limit is estimated to be within +/- 15%.
2) Values in brackets [] are within 10-times detection limit with errors likely to exceed 15%.
3) "--" indicate measurement is below detection. Sample detection limit may be found by multiplying "det. limit" (far left column) by "multiplier" (top of each column).

Battelle PNNL/ACL/Inorganic Analysis Group ... ICPAES Data Report

Det. Limit (ug/mL)	Multiplier= / ALO#= / Client ID= / Run Date= (Analyte)	91.2 / 96-2613 / 119.2A.W2 / 5/9/96 ug/g	92.7 / 96-2613-DUP / 119.2A.W2 / 5/9/96 ug/g	(Tol.±20%) Duplicates (%RPD)	97.4 / 96-2614 / 119.2B.W2 / 5/9/96 ug/g	93.1 / 96-2614-DUP / 119.2B.W2 / 5/9/96 ug/g	(Tol.±20%) Duplicates (%RPD)
0.015	Ag	--	--		--	--	
0.060	Al	58.00	80.87	32.9	292.30	238.95	-20.1
0.080	As	--	--		--	--	
0.050	B	[5.13]	[6.19]	18.8	[6.30]	[5.94]	-5.9
0.010	Ba	--	--		--	--	
0.005	Be	--	--		--	--	
0.100	Bi	--	--		--	--	
0.250	Ca	[115.19]	[91.64]	-22.8	[75.60]	[79.88]	5.5
0.015	Cd	--	--		--	--	
0.100	Ce	--	--		--	--	
0.050	Co	--	--		--	--	
0.020	Cr	233.93	236.08	0.9	224.60	225.36	0.3
0.050	Cu	--	--		--	--	
0.050	Dy	--	--		--	--	
0.100	Eu	--	--		--	--	
0.050	Fe	--	--		--	--	
2.000	K	[341.86]	[354.48]	3.6	[337.73]	[348.78]	3.2
0.050	La	--	--		--	--	
0.030	Li	29.12	29.26	0.5	[11.35]	[11.29]	-0.5
0.100	Mg	[45.18]	[44.57]	-1.4	[40.72]	[43.91]	7.5
0.050	Mn	--	--		--	--	
0.030	Mo	[24.91]	[25.29]	1.5	[23.51]	[23.72]	0.9
0.250	Na	65707.75	66179.86	0.7	64383.75	64845.31	0.7
0.100	Nd	--	--		--	--	
0.030	Ni	--	--		--	--	
0.250	P	5119.48	5175.45	1.1	5380.43	5333.72	-0.9
0.100	Pb	--	--		--	--	
0.300	Pd	--	--		--	--	
0.300	Rh	--	--		--	--	
0.100	Ru	--	--		--	--	
0.100	Sb	--	--		--	--	
0.100	Se	--	--		--	--	
0.500	Si	[70.04]	[69.43]	-0.9	[51.78]	[52.46]	1.3
1.000	Sn	--	--		--	--	
0.015	Sr	--	--		--	--	
0.500	Te	--	--		--	--	
0.800	Th	--	--		--	--	
0.025	Ti	--	--		--	--	
0.500	Tl	--	--		--	--	
2.000	U	--	--		--	--	
0.015	V	--	--		--	--	
0.500	W	--	--		--	--	
0.010	Y	--	--		--	--	
0.020	Zn	--	--		--	--	
0.025	Zr	--	--		--	--	

Note: 1) Overall error greater than 10-times detection limit is estimated to be within +/- 15%.
2) Values in brackets [] are within 10-times detection limit with errors likely to exceed 15%.
3) "--" indicate measurement is below detection. Sample detection limit may be found by multiplying "det. limit" (far left column) by "multiplier" (top of each column).

Battelle PNNL/ACL/Inorganic Analysis Group ... ICPAES Data Report

Det. Limit (ug/mL)	Multiplier= / ALO#= / Client ID= / Run Date= (Analyte)	1.0 / 96-2607 / 118.2A.W2 / 5/9/96 (ug/mL)	5.0 / 96-2607 @5 / 118.2A.W2 / 5/9/96 (ug/mL)	(Tol.<10%) Serial Dilution (%D)	1.0 / 96-4349 / HDEHP Acid Wash#2 / 5/9/96 (ug/mL)	5.0 / 96-4349 @5 / HDEHP Acl / 5/9/96 (ug/mL)	(Tol.<10%) Serial Dilution (%D)
0.015	Ag	--	--		--	--	
0.060	Al	7.97	7.46	-6.8	[0.30]	--	
0.080	As	--	--		--	--	
0.050	B	[0.06]	--		4.04	4.09	1.2
0.010	Ba	--	--		--	--	
0.005	Be	--	--		--	--	
0.100	Bi	[0.65]	--		--	--	
0.250	Ca	[0.53]	--		--	--	
0.015	Cd	--	--		--	--	
0.100	Ce	--	--		--	--	
0.050	Co	--	--		--	--	
0.020	Cr	3.05	3.00	-1.6	--	--	
0.050	Cu	--	--		--	--	
0.050	Dy	--	--		--	--	
0.100	Eu	--	--		--	--	
0.050	Fe	[0.20]	--		--	--	
2.000	K	[4.77]	--		--	--	
0.050	La	--	--		--	--	
0.030	Li	[0.15]	--		--	--	
0.100	Mg	[0.28]	--		--	--	
0.050	Mn	--	--		--	--	
0.030	Mo	[0.29]	[0.27]		--	--	
0.250	Na	712.59	717.33	0.7	3.76	[3.63]	-3.6
0.100	Nd	--	--		--	--	
0.030	Ni	--	--		[0.15]	[0.37]	
0.250	P	60.85	58.51	-4.0	--	--	
0.100	Pb	--	--		--	--	
0.300	Pd	--	--		--	--	
0.300	Rh	--	--		--	--	
0.100	Ru	--	--		--	--	
0.100	Sb	--	--		--	--	
0.100	Se	--	--		--	--	
0.500	Si	--	--		--	--	
1.000	Sn	--	--		--	--	
0.015	Sr	--	--		--	--	
0.500	Te	--	--		--	--	
0.800	Th	--	--		--	--	
0.025	Ti	--	--		--	--	
0.500	Tl	--	--		--	--	
2.000	U	--	--		--	--	
0.015	V	--	--		--	--	
0.500	W	--	--		--	--	
0.010	Y	--	--		--	--	
0.020	Zn	--	--		[0.03]	--	
0.025	Zr	--	--		--	--	

Note: 1) Overall error greater than 10-times detection limit is estimated to be within +/- 15%.

2) Values in brackets [] are within 10-times detection limit with errors likely to exceed 15%.

3) "--" indicate measurement is below detection. Sample detection limit may be found by multiplying "det. limit" (far left column) by "multiplier" (top of each column).

Battelle PNNL/ACL/Inorganic Analysis Group ... ICPAES Data Report

MCVA@2 Expected Spike Conc. (ug/mL)	Upper Cal. (ug/mL)	Det. Limit (ug/mL)	Multiplier= ALO#= Client ID= Run Date= (Analyte)	1.0 96-2607 5/9/96 (ug/mL)	1.0 96-2607-PSA 5/9/96 (ug/mL)	(Tol.75-125%) Spike Recovery (%)
0.250	10.0	0.015	Ag	–	0.19	77.28
5.000	500.0	0.060	Al	7.97	8.67	93.76
1.250	100.0	0.080	As	–	1.32	105.76
1.000	50.0	0.020	B	[0.06]	1.08	105.04
0.250	10.0	0.010	Ba	–	0.25	98.50
0.050	1.0	0.005	Be	–	0.05	100.16
12.500	100.0	0.100	Bi	[0.65]	12.35	96.21
12.500	250.0	0.050	Ca	0.53	12.92	101.24
0.250	10.0	0.015	Cd	–	0.25	101.44
	50.0	0.100	Ce	–	–	
0.500	20.0	0.010	Co	–	0.49	98.79
0.500	20.0	0.020	Cr	3.05	1.96	87.76
0.500	20.0	0.010	Cu	–	0.48	95.23
	50.0	0.050	Dy	–	–	
	20.0	0.100	Eu	–	–	
10.000	200.0	0.020	Fe	0.20	10.05	99.54
12.500	500.0	2.000	K	[4.77]	[14.24]	94.81
	20.0	0.050	La	–	–	
1.000	50.0	0.030	Li	[0.15]	1.06	98.45
16.000	250.0	0.100	Mg	[0.28]	16.22	100.52
0.250	10.0	0.005	Mn	–	0.26	103.96
0.500	20.0	0.030	Mo	[0.29]	0.64	98.25
18.350	250.0	0.080	Na	712.59	365.71	51.33
	50.0	0.050	Nd	–	–	
0.500	20.0	0.030	Ni	–	0.50	100.56
2.500	100.0	0.100	P	60.85	30.99	22.45
1.250	50.0	0.060	Pb	–	1.21	96.72
	50.0	0.300	Pd	–	–	
	50.0	0.300	Rh	–	–	
	50.0	0.100	Ru	–	–	
1.250	100.0	0.050	Sb	–	1.26	101.07
1.250	20.0	0.100	Se	–	1.34	107.56
10.000	200.0	0.500	Si	–	10.25	102.53
	50.0	1.000	Sn	–	–	
0.250	10.0	0.005	Sr	–	0.25	100.48
	50.0	0.500	Te	–	–	
	50.0	0.800	Th	–	–	
0.500	20.0	0.005	Ti	–	0.49	98.15
1.250	20.0	0.500	Tl	–	[1.26]	100.51
	500.0	2.000	U	–	–	
0.500	20.0	0.010	V	–	0.49	98.91
	50.0	0.500	W	–	–	
	10.0	0.010	Y	–	–	
0.500	20.0	0.020	Zn	–	0.50	100.15
1.000	50.0	0.010	Zr	–	0.99	98.55

Battelle PNNL/ACL/Inorganic Analysis Group ... ICPAES Data Report

MCVB@2 Expected Spike Conc. (ug/mL)	Upper Cal. (ug/mL)	Det. Limit (ug/mL)	Multiplier= ALO#= Client ID= Run Date= (Analyte)	1.0 96-2607 5/9/96 (ug/mL)	1.0 96-2607-PSB 5/9/96 (ug/mL)	(Tol.75-125%) Spike Recovery (%)
	10.0	0.015	Ag	–	–	
	500.0	0.060	Al	7.97	5.89	
	100.0	0.080	As	–	[0.17]	
	50.0	0.020	B	[0.06]	3.20	
	10.0	0.010	Ba	–	–	
	1.0	0.005	Be	–	–	
	100.0	0.100	Bi	[0.65]	2.16	
	250.0	0.050	Ca	0.53	0.93	
	10.0	0.015	Cd	–	–	
1.000	50.0	0.100	Ce	–	[0.99]	99.38
	20.0	0.010	Co	–	–	
	20.0	0.020	Cr	3.05	1.51	
	20.0	0.010	Cu	–	–	
1.000	50.0	0.050	Dy	–	0.97	96.60
1.000	20.0	0.100	Eu	–	[0.98]	97.72
	200.0	0.020	Fe	0.20	0.69	
	500.0	2.000	K	[4.77]	–	
0.500	20.0	0.050	La	–	[0.48]	95.85
	50.0	0.030	Li	[0.15]	[0.07]	
	250.0	0.100	Mg	[0.28]	[0.16]	
	10.0	0.005	Mn	–	–	
	20.0	0.030	Mo	[0.29]	[0.14]	
	250.0	0.080	Na	712.59	353.58	
1.000	50.0	0.050	Nd	–	0.94	93.68
	20.0	0.030	Ni	–	–	
	100.0	0.100	P	60.85	29.81	
	50.0	0.060	Pb	–	[0.11]	
1.000	50.0	0.300	Pd	–	[1.03]	103.05
1.000	50.0	0.300	Rh	–	[0.98]	97.80
1.000	50.0	0.100	Ru	–	[0.99]	99.23
	100.0	0.050	Sb	–	–	
	20.0	0.100	Se	–	–	
	200.0	0.500	Si	–	29.41	
1.000	50.0	0.750	Sn	–	[0.95]	95.29
	10.0	0.005	Sr	–	[0.01]	
1.000	50.0	0.500	Te	–	[1.01]	100.94
5.000	50.0	0.800	Th	–	[4.82]	96.32
	20.0	0.005	Ti	–	–	
	20.0	0.500	Tl	–	–	
12.500	500.0	2.000	U	–	[13.04]	104.31
	20.0	0.010	V	–	–	
1.000	50.0	0.500	W	–	[1.00]	100.11
0.500	10.0	0.010	Y	–	0.49	98.54
	20.0	0.020	Zn	–	–	
	50.0	0.010	Zr	–	[0.04]	

Analysis Report Summary Thu 05-09-96 02:25:26 PM page 1

A0114
ICP-325-405-1
5/9/96 DB

	#	Sample Name	File	Method	Date	Time	OpID	Type	Mode
	1	SPC-BLK 108449	A0114	ICP1A	05/09/96	08:50	DRS	S	INT
	2	SPC-BLK 108449	A0114	ICP1A	05/09/96	08:50	DRS	S	CONC
	3	SPC-STD 960318I100	A0114	ICP1A	05/09/96	08:53	DRS	S	INT
	4	SPC-STD 960318I100	A0114	ICP1A	05/09/96	08:53	DRS	S	CONC
	5	ICP1.0	A0114	ICP1A	05/09/96	09:04		X	IR
	6	ICP1.1B	A0114	ICP1A	05/09/96	09:06		X	IR
	7	ICP1.1A	A0114	ICP1A	05/09/96	09:10		X	IR
	8	ICP1.2	A0114	ICP1A	05/09/96	09:13		X	IR
	9	ICP1.3	A0114	ICP1A	05/09/96	09:17		X	IR
	10	ICP1.4	A0114	ICP1A	05/09/96	09:21		X	IR
	11	ICP1.5	A0114	ICP1A	05/09/96	09:24		X	IR
	12	ICP1.6	A0114	ICP1A	05/09/96	09:28		X	IR
	13	ICP1.7	A0114	ICP1A	05/09/96	09:32		X	IR
	14	ICP1.8	A0114	ICP1A	05/09/96	09:35		X	IR
	15	ICP1.0 960318F100	A0114	ICP1A	05/09/96	09:56	DRS	S	CONC
PASS	16	QC_MCVA 960415I901	A0114	ICP1A	05/09/96	09:58	DRS	Q	CONC
PASS	17	QC_MCVB 960418I902	A0114	ICP1A	05/09/96	10:02	DRS	Q	CONC
	18	QC_SRM-1643d 108520	A0114	ICP1A	05/09/96	10:07	DRS	Q	CONC
PASS	19	QC_CCV1 960403I901	A0114	ICP1A	05/09/96	10:13	DRS	Q	CONC
PASS	20	QC_SSTMCV 960403I904	A0114	ICP1A	05/09/96	10:17	DRS	Q	CONC
PASS	21	QC_SSTA 960403I903	A0114	ICP1A	05/09/96	10:22	DRS	Q	CONC
	22	ICP1.0 960318F100	A0114	ICP1A	05/09/96	10:31	DRS	S	CONC
	23	96-4349 @5	A0114	ICP1A	05/09/96	10:34	DRS	S	CONC
	24	96-4349	A0114	ICP1A	05/09/96	10:37	DRS	S	CONC
PASS	25	QC_MCVA 960415I901	A0114	ICP1A	05/09/96	10:41	DRS	Q	CONC
	26	ICP1.0 960318F100	A0114	ICP1A	05/09/96	10:45	DRS	S	CONC
	27	96-2607-BLK	A0114	ICP1A	05/09/96	10:54	DRS	S	CONC
	28	96-2607 @5	A0114	ICP1A	05/09/96	10:58	DRS	S	CONC
	29	96-2607	A0114	ICP1A	05/09/96	11:01	DRS	S	CONC
	30	96-2607-PSA	A0114	ICP1A	05/09/96	11:05	DRS	S	CONC
	31	MCVA @2	A0114	ICP1A	05/09/96	11:08	DRS	S	CONC
	32	96-2607-PSB	A0114	ICP1A	05/09/96	11:15	DRS	S	CONC
	33	MCVB @2	A0114	ICP1A	05/09/96	11:19	DRS	S	CONC
	34	96-2607-DUP	A0114	ICP1A	05/09/96	11:23	DRS	S	CONC
977	35	Na @1000 ppm	A0114	ICP1A	05/09/96	11:28	DRS	S	CONC
PASS	36	QC_MCVA 960415I901	A0114	ICP1A	05/09/96	11:35	DRS	Q	CONC
	37	ICP1.0 960318F100	A0114	ICP1A	05/09/96	11:40	DRS	S	CONC
	38	96-2608	A0114	ICP1A	05/09/96	11:42	DRS	S	CONC
	39	96-2608-DUP	A0114	ICP1A	05/09/96	11:46	DRS	S	CONC
	40	96-2613	A0114	ICP1A	05/09/96	11:50	DRS	S	CONC
	41	96-2613-DUP	A0114	ICP1A	05/09/96	11:53	DRS	S	CONC
	42	96-2614	A0114	ICP1A	05/09/96	11:57	DRS	S	CONC
	43	96-2614-DUP	A0114	ICP1A	05/09/96	12:01	DRS	S	CONC
PASS	44	QC_MCVA 960415I901	A0114	ICP1A	05/09/96	12:07	DRS	Q	CONC
	45	ICP1.0 960318F100	A0114	ICP1A	05/09/96	12:12	DRS	S	CONC
PASS	46	QC_MCVA 960415I901	A0114	ICP1A	05/09/96	13:14	DRS	Q	CONC
PASS	47	QC_MCVB 960418I902	A0114	ICP1A	05/09/96	13:19	DRS	Q	CONC
	48	QC_SRM-1643d 108520	A0114	ICP1A	05/09/96	13:23	DRS	Q	CONC
PASS	49	QC_CCV1 960403I901	A0114	ICP1A	05/09/96	13:28	DRS	Q	CONC
PASS	50	QC_SSTMCV 960403I904	A0114	ICP1A	05/09/96	13:32	DRS	Q	CONC
PASS	51	QC_SSTA 960403I903	A0114	ICP1A	05/09/96	13:37	DRS	Q	CONC
	52	ICP1.0 960318F100	A0114	ICP1A	05/09/96	13:43	DRS	S	CONC

PSA - Post spike A (1:1) MCVA : Sample

PSB - Post spike B (1:1) MCVB : Sample

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#	Sample Name	Ag	Al	As	B	Ba	Be
1	SPC-BLK 108449	6974	2163	1644.33	1096	321	185.333
2	SPC-BLK 108449	-.0046	-.0264	-.0149	-.0097	-.0016	-.0004
3	SPC-STD 960318I100	7054	2195	1692.67	1124.33	323.333	186.333
4	SPC-STD 960318I100	-.0018	-.0227	.0083	-.0062	-.0013	-.0004
5	ICP1.0	.7124	.2202	.16783	.1124	.03283	.01886
6	ICP1.1B					.75303	
7	ICP1.1A					7.12166	
8	ICP1.2		59.9518		38.8621		
9	ICP1.3						
10	ICP1.4			20.49			
11	ICP1.5						
12	ICP1.6						1.58793
13	ICP1.7	27.368					
14	ICP1.8						
15	ICP1.0 960318F100	.0003	-.0098	-.0042	-.0008	-.0005	-.0000
16	QC_MCVA 960415I901	.4800	9.865	2.517	2.064	.4908	.0971
17	QC_MCVB 960418I902	-.0095	1.649	.2486	6.093	.0029	.0007
18	QC_SRM-1643d 108520	Q-.0002	.1251	Q.0569	.1519	.5002	Q.0122
19	QC_CCV1 960403I901	.5880	5.925	2.024	1.046	.5798	.1978
20	QC_SSTMCV 960403I904	.5004	4.976	2.084	.0008	.0995	.1006
21	QC_SSTA 960403I903	-.0331	251.4	.3343	.0440	.0081	-.0010
22	ICP1.0 960318F100	-.0035	.0038	.0035	-.0011	-.0008	-.0001
23	96-4349 @5	-.0040	.0572	-.0027	.8188	-.0009	-.0001
24	96-4349	-.0055	.2988	-.0053	4.045	-.0008	-.0001
25	QC_MCVA 960415I901	.4813	9.976	2.530	2.093	.4982	.0983
26	ICP1.0 960318F100	-.0025	-.0002	.0029	.0043	-.0001	.0000
27	96-2607-BLK	-.0006	.0008	-.0084	.0133	.0010	-.0000
28	96-2607 @5	-.0037	1.492	.0092	.0093	-.0008	-.0001
29	96-2607	-.0001	7.969	.0643	.0611	.0000	.0000
30	96-2607-FSA	.1932	8.673	1.322	1.081	.2463	.0501
31	MCVA @2	.2435	5.007	1.286	1.052	.2473	.0493
32	96-2607-FSB	-.0069	5.890	.1686	3.195	.0031	.0003
33	MCVB @2	-.0065	.8729	.1650	3.160	.0012	.0003
34	96-2607-DUP	.0014	8.001	.0713	.0765	.0002	.0000
35	Na @1000 ppm	-.0021	.0074	-.0008	.0242	-.0002	-.0001
36	QC_MCVA 960415I901	.4770	9.834	2.527	2.059	.4872	.0962
37	ICP1.0 960318F100	-.0006	.0189	-.0018	.0047	.0005	.0001
38	96-2608	-.0014	6.386	.0600	.0638	.0002	.0001
39	96-2608-DUP	-.0028	7.208	.0635	.0715	.0001	.0000
40	96-2613	-.0013	.6358	.0618	.0562	.0001	.0000
41	96-2613-DUP	-.0021	.8725	.0589	.0668	-.0005	-.0000
42	96-2614	-.0019	3.002	.0583	.0647	-.0002	.0000
43	96-2614-DUP	-.0014	2.567	.0505	.0638	-.0002	.0000
44	QC_MCVA 960415I901	.4744	9.830	2.540	2.052	.4884	.0965
45	ICP1.0 960318F100	-.0027	.0041	.0039	-.0003	-.0003	-.0000
46	QC_MCVA 960415I901	.4804	9.986	2.568	2.084	.4971	.0980
47	QC_MCVB 960418I902	-.0125	1.741	.3355	6.127	.0026	.0006
48	QC_SRM-1643d 108520	Q-.0019	.1254	Q.0630	Q.1582	.5095	Q.0124
49	QC_CCV1 960403I901	.5861	5.960	2.068	1.055	.5825	.1979
50	QC_SSTMCV 960403I904	.5013	5.053	2.134	-.0007	.1005	.1012
51	QC_SSTA 960403I903	-.0350	248.8	.3366	.0383	.0080	-.0009
52	ICP1.0 960318F100	-.0045	.0811	-.0046	-.0035	-.0009	-.0001

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#	Sample Name	Bi	Ca	Cd	Ce	Co	Cr
1	SPC-BLK 108449	1499.67	1248.67	491	6671	1478	469
2	SPC-BLK 108449	-.0119	-.0532	.0005	-.0102	-.0010	-.0050
3	SPC-STD 960318I100	1739.67	1373	489.333	6691	1472.67	474.333
4	SPC-STD 960318I100	-.0002	-.0132	.0000	-.0057	-.0017	-.0041
5	ICP1.0	.15323	.1269	.0504	.68103	.14826	.04769
6	ICP1.1B					1.83376	1.2122
7	ICP1.1A					16.0634	11.152
8	ICP1.2		75.66	8.7086			
9	ICP1.3						
10	ICP1.4				20.7723		
11	ICP1.5						
12	ICP1.6						
13	ICP1.7	22.0524					
14	ICP1.8						
15	ICP1.0 960318F100	-.0173	-.0027	.0002	-.0271	-.0025	-.0002
16	QC_MCVA 960415I901	24.03	24.92	.4853	-.0475	.9690	.9725
17	QC_MCVB 960418I902	.0715	.0827	.0037	1.936	-.0048	.0045
18	QC_SRM-1643d 108520	.0081	Q31.38	Q.0073	.0004	Q.0260	Q.0215
19	QC_CCV1 960403I901	.0281	29.96	.6011	-.0127	.5932	.5850
20	QC_SSTMCV 960403I904	1.538	1.067	.2021	-.0032	-.0027	.3031
21	QC_SSTA 960403I903	197.0	248.7	.0638	.0967	.0034	.2314
22	ICP1.0 960318F100	.0019	.0164	-.0004	-.0343	-.0028	-.0016
23	96-4349 @5	-.0051	.0234	-.0029	-.0385	-.0024	-.0002
24	96-4349	.0111	.0042	-.0022	-.0614	-.0027	.0018
25	QC_MCVA 960415I901	24.33	25.13	.4873	-.0597	.9790	.9831
26	ICP1.0 960318F100	.0191	.0205	-.0027	-.0296	-.0014	.0005
27	96-2607-BLK	-.0011	.7534	.0006	.0007	-.0015	-.0013
28	96-2607 @5	.0120	.0950	-.0017	-.0362	-.0025	.5999
29	96-2607	.6521	.5344	.0009	-.0076	-.0008	3.047
30	96-2607-PSA	12.35	12.92	.2536	-.0398	.4939	1.962
31	MCVA @2	12.23	12.76	.2501	-.0344	.4977	.4994
32	96-2607-PSB	2.157	.9261	.0029	.9938	-.0040	1.510
33	MCVB @2	.0338	.0395	.0026	.9879	-.0020	.0049
34	96-2607-DUP	.2741	.4279	-.0005	-.0023	.0002	3.162
35	Na @1000 ppm	-.0039	.0386	.0002	-.0261	-.0005	.0019
36	QC_MCVA 960415I901	23.88	24.85	.4834	-.0364	.9682	.9682
37	ICP1.0 960318F100	.0216	.0294	-.0017	-.0121	.0011	.0016
38	96-2608	.3065	1.008	-.0004	-.0058	.0009	2.894
39	96-2608-DUP	.5203	1.101	-.0005	-.0121	-.0012	2.999
40	96-2613	.0607	1.263	-.0025	-.0151	-.0004	2.564
41	96-2613-DUP	.0355	.9886	-.0024	-.0229	-.0006	2.547
42	96-2614	.0571	.7765	-.0025	-.0141	-.0009	2.307
43	96-2614-DUP	.0548	.8581	-.0029	-.0137	.0004	2.421
44	QC_MCVA 960415I901	23.87	24.82	.4747	-.0517	.9692	.9607
45	ICP1.0 960318F100	.0173	.0138	-.0033	-.0279	-.0006	.0014
46	QC_MCVA 960415I901	24.22	25.21	.4816	-.0686	.9845	.9767
47	QC_MCVB 960418I902	.0733	.0800	.0029	1.951	-.0038	.0073
48	QC_SRM-1643d 108520	.0118	Q31.88	Q.0048	-.0266	.0249	Q.0201
49	QC_CCV1 960403I901	.0254	30.09	.5937	-.0332	.5999	.5843
50	QC_SSTMCV 960403I904	1.546	1.085	.1981	-.0322	-.0026	.3048
51	QC_SSTA 960403I903	193.2	246.3	.0639	.0661	.0041	.2335
52	ICP1.0 960318F100	.0689	.0875	.0014	-.0374	-.0023	-.0001

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#	Sample Name	Cu	Dy	Eu	Fe	K	La
1	SPC-BLK 108449	526.333	2014.33	359.333	593.333	2148	1046
2	SPC-BLK 108449	-.0045	-.0019	-.0009	-.0473	-.2947	-.0034
3	SPC-STD 960318I100	20410.3	2221.33	360.667	655.667	2152.33	1048.33
4	SPC-STD 960318I100	10.19	.0018	-.0006	-.0447	-.1965	-.0026
5	ICP1.0	.05389	.20513	.03669	.06053	.21786	.10663
6	ICP1.1B	.45296			7.02656		
7	ICP1.1A	3.92643			65.2757		
8	ICP1.2					2.37513	
9	ICP1.3		41.1784	10.0847			5.27683
10	ICP1.4						
11	ICP1.5						
12	ICP1.6						
13	ICP1.7						
14	ICP1.8						
15	ICP1.0 960318F100	-.0036	-.0038	-.0008	-.0080	-.6644	-.0050
16	QC_MCVA 960415I901	.9308	-.0091	-.0009	19.77	23.91	-.0106
17	QC_MCVB 960418I902	.0329	1.883	1.905	.0427	-2.125	.9326
18	QC_SRM-1643d 108520	Q.0159	-.0005	.0013	Q.0856	Q2.194	.0033
19	QC_CCV1 960403I901	.5591	-.0018	.0017	24.90	38.71	.0006
20	QC_SSTMCV 960403I904	-.0015	-.0028	.0063	.5172	49.55	-.0024
21	QC_SSTA 960403I903	-.1313	.0082	.0819	193.0	100.6	48.07
22	ICP1.0 960318F100	-.0059	-.0047	-.0013	.0081	-1.143	-.0040
23	96-4349 @5	.0012	-.0052	-.0016	.0084	-1.267	-.0074
24	96-4349	.0302	-.0082	-.0023	.0202	-1.947	-.0137
25	QC_MCVA 960415I901	.9388	-.0102	-.0012	19.96	23.76	-.0129
26	ICP1.0 960318F100	-.0021	-.0032	-.0010	.0086	-.8035	-.0061
27	96-2607-BLK	-.0007	-.0001	.0003	-.0046	.2472	.0002
28	96-2607 @5	-.0059	-.0050	-.0011	-.0004	.0000	-.0076
29	96-2607	-.0047	-.0024	.0006	.2007	4.775	-.0043
30	96-2607-PSA	.4762	-.0057	-.0001	10.05	14.24	-.0078
31	MCVA @2	.4625	-.0056	-.0008	10.09	11.69	-.0077
32	96-2607-PSB	.0052	.9660	.9772	.6932	.7958	.4792
33	MCVB @2	.0087	.9622	.9752	.0112	-1.429	.4781
34	96-2607-DUP	-.0033	-.0002	.0019	.0766	5.485	.0005
35	Na @1000 ppm	-.0022	-.0031	-.0004	-.0052	-.7880	-.0036
36	QC_MCVA 960415I901	.9187	-.0062	-.0001	19.65	23.94	-.0077
37	ICP1.0 960318F100	.0000	-.0006	-.0001	.0151	-.3786	-.0007
38	96-2608	-.0026	-.0010	.0013	.0914	5.091	-.0001
39	96-2608-DUP	-.0049	-.0021	.0009	.1600	4.898	-.0026
40	96-2613	-.0035	-.0019	.0005	.0260	3.747	-.0020
41	96-2613-DUP	-.0042	-.0022	.0002	.0122	3.824	-.0025
42	96-2614	-.0045	-.0019	.0003	.0162	3.469	-.0027
43	96-2614-DUP	-.0035	-.0011	.0005	.0214	3.747	-.0014
44	QC_MCVA 960415I901	.9184	-.0078	-.0007	19.69	23.32	-.0110
45	ICP1.0 960318F100	-.0021	-.0031	-.0009	.0026	-.9735	-.0057
46	QC_MCVA 960415I901	.9268	-.0092	-.0013	20.03	23.08	-.0128
47	QC_MCVB 960418I902	.0163	1.895	1.918	.0482	-2.851	.9466
48	QC_SRM-1643d 108520	Q.0116	-.0004	.0023	.0882	Q1.136	.0006
49	QC_CCV1 960403I901	.5541	-.0024	.0016	25.03	37.62	.0002
50	QC_SSTMCV 960403I904	-.0065	-.0041	.0057	.5337	48.51	-.0063
51	QC_SSTA 960403I903	-.1434	.0083	.0809	191.0	97.37	47.80
52	ICP1.0 960318F100	-.0054	-.0037	-.0011	.0653	-1.437	.0102

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#	Sample Name	Li	Mg	Mn	Mo	Na	Nd
1	SPC-BLK 108449	417.333	2493	202.667	818.667	424	3900
2	SPC-BLK 108449	-.0019	-.0471	-.0010	-.0054	-.0350	-.0110
3	SPC-STD 960318I100	21276.7	2582	62039.3	856.333	431	3923
4	SPC-STD 960318I100	10.04	-.0518	10.26	-.0026	.0037	-.0029
5	ICP1.0	.04243	.25493	.02073	.08383	.0434	.3982
6	ICP1.1B		4.4836		1.20913	.49243	
7	ICP1.1A		38.6045		10.826	4.46026	
8	ICP1.2	10.2367		5.91816			
9	ICP1.3						14.0723
10	ICP1.4						
11	ICP1.5						
12	ICP1.6						
13	ICP1.7						
14	ICP1.8						
15	ICP1.0 960318F100	-.0031	-.0237	-.0003	-.0007	-.0503	-.0172
16	QC_MCVA 960415I901	1.998	31.60	.5094	.9803	36.02	-.0499
17	QC_MCVB 960418I902	-.0025	-.1762	.0013	.0059	4.413	1.840
18	QC_SRM-1643d 108520	Q.0191	Q8.304	Q.0398	Q.1109	Q21.39	.0083
19	QC_CCV1 960403I901	.0011	15.24	.4114	.5861	4.976	.0021
20	QC_SSTMCV 960403I904	-.0015	-.1271	.1052	.0045	4.987	-.0113
21	QC_SSTA 960403I903	.0276	-1.208	.0183	.0989	.7861	.0891
22	ICP1.0 960318F100	-.0057	-.0222	-.0006	-.0010	-.0690	-.0314
23	96-4349 @5	-.0043	-.0214	-.0006	-.0016	.7262	-.0302
24	96-4349	-.0060	-.0149	-.0002	-.0011	3.763	-.0464
25	QC_MCVA 960415I901	2.008	31.91	.5173	.9903	36.44	-.0573
26	ICP1.0 960318F100	-.0011	.0094	.0002	.0001	-.0055	-.0179
27	96-2607-BLK	.0002	.2251	.0006	-.0006	.3761	.0024
28	96-2607 @5	.0260	.0293	-.0006	.0547	143.5	-.0269
29	96-2607	.1484	.2779	.0011	.2895	712.6	-.0118
30	96-2607-PSA	1.059	16.22	.2599	.6360	365.7	-.0354
31	MCVA @2	1.003	16.21	.2612	.4994	18.89	-.0287
32	96-2607-PSB	.0698	.1550	.0044	.1428	353.6	.9368
33	MCVB @2	-.0038	-.0953	.0006	.0035	2.542	.9401
34	96-2607-DUP	.1547	.2533	.0008	.3008	737.4	-.0016
35	Na @1000 ppm	-.0010	-.0122	.0000	.0000	977.0	-.0134
36	QC_MCVA 960415I901	1.975	31.43	.5063	.9736	36.29	-.0343
37	ICP1.0 960318F100	.0008	.0196	.0006	.0022	.0711	-.0043
38	96-2608	.3878	.4233	.0009	.2720	696.0	-.0023
39	96-2608-DUP	.3857	.4331	.0012	.2814	716.3	-.0109
40	96-2613	.3191	.4952	.0005	.2730	720.2	-.0057
41	96-2613-DUP	.3157	.4808	.0002	.2729	714.0	-.0111
42	96-2614	.1166	.4183	.0001	.2415	661.3	-.0126
43	96-2614-DUP	.1213	.4717	.0004	.2548	696.7	-.0060
44	QC_MCVA 960415I901	1.949	31.36	.5082	.9785	36.25	-.0447
45	ICP1.0 960318F100	-.0011	-.0009	.0002	.0003	.0057	-.0177
46	QC_MCVA 960415I901	1.986	31.80	.5164	.9940	36.72	-.0642
47	QC_MCVB 960418I902	-.0054	-.1547	.0015	.0069	4.488	1.659
48	QC_SRM-1643d 108520	Q.0157	Q8.411	Q.0404	.1121	22.02	-.0088
49	QC_CCV1 960403I901	-.0018	15.24	.4128	.5902	5.082	-.0113
50	QC_SSTMCV 960403I904	-.0036	-.1086	.1060	.0055	5.069	-.0347
51	QC_SSTA 960403I903	.0289	-1.020	.0182	.0969	.7615	.0828
52	ICP1.0 960318F100	-.0033	-.0197	-.0005	-.0006	-.0522	-.0292

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#	Sample Name	Ni	P	Pb	Pd	Rh	Ru
1	SPC-BLK 108449	513	1311.67	14050	15681	15710.3	4395.33
2	SPC-BLK 108449	.0019	-.0168	-.0217	-.0531	-.0244	-.0080
3	SPC-STD 960318I100	525.667	1420	126742	15767.3	15798	4432.33
4	SPC-STD 960318I100	.0064	-.0714	9.851	-.0313	-.0142	-.0026
5	ICP1.0	.05246	.1306	1.4397	1.60063	1.606	.44886
6	ICP1.1B	.61893		7.22143			
7	ICP1.1A	5.38696		56.2009			
8	ICP1.2		11.5232				
9	ICP1.3						33.668
10	ICP1.4						
11	ICP1.5						
12	ICP1.6						
13	ICP1.7						
14	ICP1.8				17.8965	41.7835	
15	ICP1.0 960318F100	-.0062	-.0157	-.0205	-.0481	-.0260	-.0081
16	QC_MCVA 960415I901	.9657	4.821	2.367	-.1692	-.0681	-.0290
17	QC_MCVB 960418I902	.0257	.0960	.2194	2.048	1.911	1.902
18	QC_SRM-1643d 108520	0.0531	.0370	0.0041	.0087	-.0030	-.0009
19	QC_CCV1 960403I901	.5911	.0447	1.970	-.0220	-.0102	-.0113
20	QC_SSTMCV 960403I904	.5089	4.046	2.996	.0301	-.0104	-.0038
21	QC_SSTA 960403I903	187.8	199.7	.8914	1.217	.1283	-.0151
22	ICP1.0 960318F100	.0613	.0001	-.0287	-.0759	-.0358	-.0124
23	96-4349 @5	.0733	.0483	-.0251	-.0739	-.0389	-.0106
24	96-4349	.1532	.1016	-.0269	-.1300	-.0640	-.0125
25	QC_MCVA 960415I901	1.027	4.889	2.381	-.1864	-.0805	-.0270
26	ICP1.0 960318F100	.0107	.0124	-.0163	-.0342	-.0242	-.0046
27	96-2607-BLK	.0078	.2633	-.0188	.0225	.0017	-.0004
28	96-2607 @5	.0031	11.70	-.0300	-.0537	-.0289	-.0034
29	96-2607	.0043	60.85	-.0042	.0082	.0142	.0376
30	96-2607-PSA	.5028	30.99	1.209	-.0826	-.0333	.0069
31	MCVA @2	.5130	2.522	1.208	-.0988	-.0457	-.0104
32	96-2607-PSB	.0168	29.81	.1054	1.030	.9780	.9923
33	MCVB @2	.0185	.0950	.1066	1.057	.9858	.9882
34	96-2607-DUP	-.0003	61.61	.0025	.0511	.0293	.0427
35	Na @1000 ppm	-.0032	.0385	-.0141	-.0207	-.0162	.0000
36	QC_MCVA 960415I901	.9810	4.814	2.379	-.1160	-.0522	-.0105
37	ICP1.0 960318F100	.0002	.0229	-.0100	.0022	-.0028	.0023
38	96-2608	-.0010	57.00	.0035	.0402	.0264	.0371
39	96-2608-DUP	-.0015	58.19	-.0009	.0133	.0127	.0358
40	96-2613	-.0021	56.11	-.0152	.0222	.0191	.0383
41	96-2613-DUP	-.0027	55.84	-.0131	.0124	.0124	.0385
42	96-2614	-.0034	55.26	-.0159	.0174	.0102	.0303
43	96-2614-DUP	-.0061	57.30	-.0144	.0302	.0207	.0357
44	QC_MCVA 960415I901	.9773	4.828	2.359	-.1546	-.0668	-.0120
45	ICP1.0 960318F100	-.0042	.0345	-.0226	-.0378	-.0206	-.0054
46	QC_MCVA 960415I901	.9894	4.849	2.378	-.1878	-.0847	-.0148
47	QC_MCVB 960418I902	.0265	.1078	.2048	2.170	1.921	1.903
48	QC_SRM-1643d 108520	0.0517	.0275	0-.0067	-.0292	-.0210	-.0039
49	QC_CCV1 960403I901	.6018	.0518	1.947	-.0447	-.0208	.0062
50	QC_SSTMCV 960403I904	.5228	4.039	2.990	-.0441	-.0329	-.0119
51	QC_SSTA 960403I903	188.0	195.1	.8714	.9188	.1437	.1009
52	ICP1.0 960318F100	.1230	.0867	-.0318	-.0605	-.0296	-.0086

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#	Sample Name	Sb	Se	Si	Sn	Sr	Te
1	SPC-BLK 108449	2609	1451.33	4128.67	7035.33	153.667	10355.3
2	SPC-BLK 108449	-.0222	-.0222	-.0527	-.0721	-.0004	-.0261
3	SPC-STD 960318I100	2725.33	1485.67	4169.67	7143.67	154.667	11128.3
4	SPC-STD 960318I100	.0154	.0009	-.0416	-.0294	-.0003	.0150
5	ICP1.0	.26899	.14749	.4203	.71869	.01566	1.06443
6	ICP1.1B					.81883	
7	ICP1.1A					7.89253	
8	ICP1.2						
9	ICP1.3						
10	ICP1.4	24.8259					
11	ICP1.5						
12	ICP1.6			65.7424			
13	ICP1.7		3.01756				45.3211
14	ICP1.8				7.20163		
15	ICP1.0 960318F100	-.0055	-.0084	.0048	-.0710	-.0002	-.0107
16	QC_MCVA 960415I901	2.447	2.519	19.54	.0217	.4980	.0092
17	QC_MCVB 960418I902	.0852	.0850	56.31	1.977	.0039	1.924
18	QC_SRM-1643d 108520	Q.0487	Q.0233	2.923	-.0314	.2917	-.0030
19	QC_CCV1 960403I901	2.027	1.062	.4983	.2249	.0005	.0230
20	QC_SSTMCV 960403I904	2.077	2.572	3.062	.0181	.0015	.0065
21	QC_SSTA 960403I903	.4126	1.531	-.2469	2.979	.0190	.6562
22	ICP1.0 960318F100	-.0127	-.0041	-.0080	-.1306	-.0003	-.0195
23	96-4349 @5	-.0089	-.0025	.0911	-.1211	-.0003	-.0185
24	96-4349	-.0118	-.0015	.4816	-.1227	-.0003	-.0205
25	QC_MCVA 960415I901	2.458	2.535	19.70	-.0200	.5056	.0023
26	ICP1.0 960318F100	-.0067	.0091	.0145	-.0787	.0002	-.0136
27	96-2607-BLK	-.0162	-.0009	.0236	-.0575	.0033	-.0128
28	96-2607 @5	-.0125	.0083	.0718	-.1383	.0000	-.0170
29	96-2607	.0141	.0414	.4860	-.0541	.0031	.0118
30	96-2607-PSA	1.263	1.344	10.25	-.0429	.2512	.0086
31	MCVA @2	1.242	1.303	10.03	-.0160	.2521	.0030
32	96-2607-PSB	.0430	.0555	29.41	.9529	.0095	1.009
33	MCVB @2	.0506	.0401	29.04	1.030	.0017	1.015
34	96-2607-DUP	.0125	.0584	.5441	-.0164	.0021	.0224
35	Na @1000 ppm	-.0014	.0076	.0616	-.0384	.0003	.0008
36	QC_MCVA 960415I901	2.447	2.505	19.43	.0596	.4956	.0086
37	ICP1.0 960318F100	.0058	.0102	.0398	-.0499	.0006	-.0078
38	96-2608	.0115	.0575	.4413	-.0351	.0036	.0183
39	96-2608-DUP	.0039	.0499	.4219	-.0656	.0040	.0087
40	96-2613	.0003	.0258	.7677	-.0736	.0036	.0062
41	96-2613-DUP	.0009	.0325	.7490	-.0664	.0024	.0059
42	96-2614	.0032	.0356	.5318	-.0832	.0023	.0072
43	96-2614-DUP	.0063	.0297	.5636	-.0558	.0025	.0090
44	QC_MCVA 960415I901	2.433	2.527	19.40	.0315	.4973	.0118
45	ICP1.0 960318F100	-.0064	.0153	.0141	-.0964	.0002	-.0170
46	QC_MCVA 960415I901	2.474	2.598	19.65	-.0392	.5085	-.0068
47	QC_MCVB 960418I902	.0945	.0758	56.07	1.944	.0039	1.936
48	QC_SRM-1643d 108520	Q.0547	Q.0239	2.988	-.0970	.2996	-.0132
49	QC_CCV1 960403I901	2.010	1.068	.4965	.1749	.0006	.0232
50	QC_SSTMCV 960403I904	2.076	2.663	3.069	-.0372	.0013	-.0064
51	QC_SSTA 960403I903	.3887	1.530	-.2417	2.957	.0188	.6345
52	ICP1.0 960318F100	-.0030	.0151	-.0106	-.1041	-.0002	-.0193

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#	Sample Name	Th	Ti	Tl	U	V	W
1	SPC-BLK 108449	2441.67	679.333	416	17783.3	1020.67	331
2	SPC-BLK 108449	-.0026	-.0039	-.0057	-.1778	-.0026	-.0114
3	SPC-STD 960318I100	2452	685.667	434.667	17815	1028.67	343.667
4	SPC-STD 960318I100	.0001	-.0030	.0243	-.1463	-.0012	.0111
5	ICP1.0	.2478	.0693	.0425	1.81516	.10429	.03343
6	ICP1.1B		1.40069				
7	ICP1.1A		13.2204				
8	ICP1.2						
9	ICP1.3	11.2279					
10	ICP1.4					10.9007	
11	ICP1.5				43.0655		
12	ICP1.6						
13	ICP1.7			1.21653			
14	ICP1.8						2.79369
15	ICP1.0 960318F100	.0090	-.0014	-.0190	-.3628	-.0030	-.0058
16	QC_MCVA 960415I901	.0441	.9702	2.433	-.7671	.9761	.0282
17	QC_MCVB 960418I902	9.248	.0083	.0086	23.91	-.0030	1.938
18	QC_SRM-1643d 108520	-.0070	.0001	Q-.0053	.2247	Q.0328	.0043
19	QC_CCV1 960403I901	.0326	1.944	1.961	.0254	.5853	.0382
20	QC_SSTMCV 960403I904	-.0407	-.0003	-.0005	19.87	.5032	.0244
21	QC_SSTA 960403I903	-.5387	-.0030	.3264	202.7	.0325	.5415
22	ICP1.0 960318F100	.0105	-.0021	-.0182	-.4748	-.0040	-.0061
23	96-4349 @5	.0061	-.0019	-.0150	-.5175	-.0039	-.0036
24	96-4349	.0193	-.0014	-.0110	-.8143	-.0052	-.0129
25	QC_MCVA 960415I901	.0471	.9837	2.468	-.9358	.9853	.0246
26	ICP1.0 960318F100	.0102	-.0007	-.0123	-.3739	-.0022	.0078
27	96-2607-BLK	-.0047	-.0004	-.0135	.0034	-.0007	.0086
28	96-2607 @5	.0091	-.0020	-.0118	-.0390	-.0037	-.0013
29	96-2607	.0019	-.0013	.0041	1.932	-.0010	.0163
30	96-2607-FSA	.0252	.4908	1.256	.5153	.4946	.0355
31	MCVA @2	.0295	.4909	1.248	-.5414	.4941	.0156
32	96-2607-FSB	4.816	.0030	.0041	13.04	-.0024	1.001
33	MCVB @2	4.794	.0036	.0011	12.11	-.0020	1.005
34	96-2607-DUP	-.0019	-.0006	.0169	2.293	.0004	.0179
35	Na @1000 ppm	.0047	-.0013	-.0004	-.2493	-.0019	.0156
36	QC_MCVA 960415I901	.0338	.9666	2.455	-.5764	.9703	.0269
37	ICP1.0 960318F100	.0110	.0003	-.0113	-.1344	.0001	.0025
38	96-2608	.0032	-.0004	.0033	2.067	.0002	.0242
39	96-2608-DUP	.0020	-.0012	.0042	2.302	-.0006	.0293
40	96-2613	.0047	-.0009	.0062	.5602	-.0007	.0157
41	96-2613-DUP	-.0002	-.0011	.0060	.2373	-.0013	.0226
42	96-2614	.0087	-.0012	.0066	.4890	-.0008	.0079
43	96-2614-DUP	.0031	-.0007	.0051	.5860	-.0004	.0126
44	QC_MCVA 960415I901	.0462	.9691	2.470	-.7764	.9694	.0217
45	ICP1.0 960318F100	.0096	-.0010	-.0122	-.3466	-.0020	-.0075
46	QC_MCVA 960415I901	.0451	.9861	2.496	-.9555	.9830	.0191
47	QC_MCVB 960418I902	9.361	.0078	.0034	23.57	-.0042	1.937
48	QC_SRM-1643d 108520	.0132	-.0010	Q-.0070	-.1357	Q.0316	.0046
49	QC_CCV1 960403I901	.0281	1.963	1.990	-.1604	.5863	.0348
50	QC_SSTMCV 960403I904	-.0115	-.0011	-.0106	19.88	.5055	.0192
51	QC_SSTA 960403I903	-.2739	-.0040	.3067	200.3	.0352	.5243
52	ICP1.0 960318F100	.0095	-.0023	-.0163	-.4323	-.0036	-.0037

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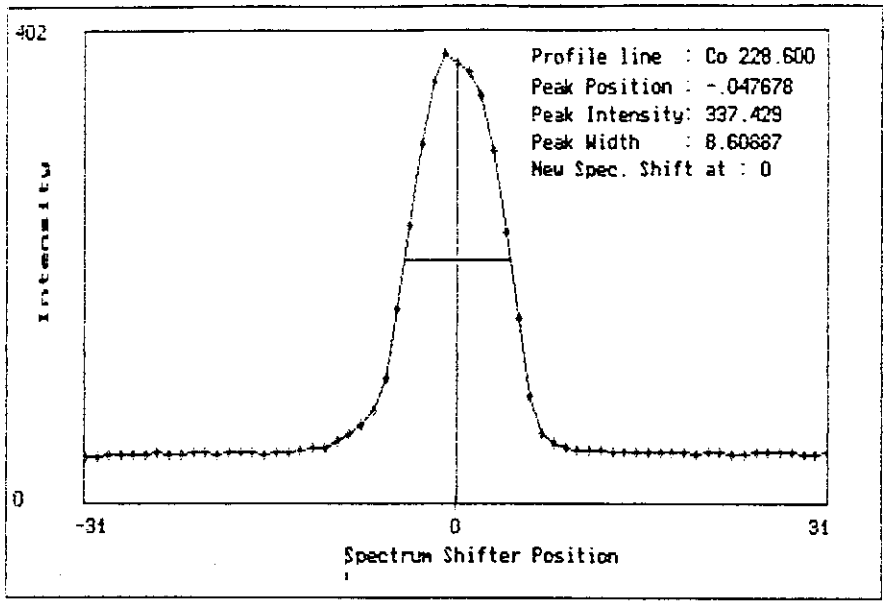
#	Sample Name	Y	Zn	Zr
1	SPC-BLK 108449	262.667	348	812.667
2	SPC-BLK 108449	-.0006	-.0013	-.0020
3	SPC-STD 960318I100	262.667	130396	818
4	SPC-STD 960318I100	-.0006	9.735	-.0011
5	ICP1.0	.02669	.03576	.08316
6	ICP1.1B		2.7169	2.43893
7	ICP1.1A		25.4931	22.8725
8	ICP1.2			
9	ICP1.3			
10	ICP1.4	2.86789		
11	ICP1.5			
12	ICP1.6			
13	ICP1.7			
14	ICP1.8			
15	ICP1.0 960318F100	-.0009	-.0008	-.0047
16	QC_MCVA 960415I901	-.0018	.9619	1.943
17	QC_MCVB 960418I902	.9569	.0061	.0290
18	QC_SRM-1643d 108520	.0005	0.0768	-.0020
19	QC_CCV1 960403I901	.0011	.5987	-.0043
20	QC_SSTMCV 960403I904	-.0009	.0023	.4957
21	QC_SSTA 960403I903	.0154	.0744	.0769
22	ICP1.0 960318F100	-.0017	-.0015	-.0059
23	96-4349 @5	-.0019	.0062	-.0060
24	96-4349	-.0027	.0262	-.0085
25	QC_MCVA 960415I901	-.0024	.9794	1.965
26	ICP1.0 960318F100	-.0008	.0003	-.0033
27	96-2607-BLK	.0000	.0030	-.0017
28	96-2607 @5	-.0017	.0003	-.0047
29	96-2607	-.0011	-.0001	.0064
30	96-2607-PSA	-.0012	.5007	.9855
31	MCVA @2	-.0011	.4995	.9809
32	96-2607-PSB	.4927	.0048	.0384
33	MCVB @2	.4913	.0039	.0071
34	96-2607-DUP	-.0002	-.0001	.0023
35	Na @1000 ppm	-.0005	.0012	-.0039
36	QC_MCVA 960415I901	-.0012	.9733	1.937
37	ICP1.0 960318F100	-.0004	.0002	-.0005
38	96-2608	-.0005	-.0005	.0040
39	96-2608-DUP	-.0010	.0000	.0074
40	96-2613	-.0009	-.0006	-.0014
41	96-2613-DUP	-.0009	-.0008	-.0021
42	96-2614	-.0010	-.0004	-.0019
43	96-2614-DUP	-.0007	-.0008	-.0011
44	QC_MCVA 960415I901	-.0019	.9730	1.945
45	ICP1.0 960318F100	-.0012	-.0003	-.0034
46	QC_MCVA 960415I901	-.0025	.9928	1.989
47	QC_MCVB 960418I902	.9483	.0057	.0171
48	QC_SRM-1643d 108520	.0002	0.0784	-.0032
49	QC_CCV1 960403I901	.0006	.6123	-.0043
50	QC_SSTMCV 960403I904	-.0019	.0020	.5052
51	QC_SSTA 960403I903	.0146	.0662	.0560
52	ICP1.0 960318F100	-.0017	-.0010	-.0049



A#114
ICP-325-405-1
5/9/96 DRS

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Method: ICP1A Sample Name: SPC-BLK 108449 Operator: DRS
Run Time: 05/09/96 08:50:21
Comment: SPC-BLK FOR Mn/Cu RATIO
Mode: INT Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Avge	6974	2163	1644	1096	321	185	1500
SDev	13	3	35	17	0	1	16
%RSD	.1897	.1223	2.100	1.583	.0000	.3115	1.042
#1	6969	2166	1646	1081	321	185	1502
#2	6964	2161	1678	1092	321	185	1514
#3	6989	2162	1609	1115	321	186	1483

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Avge	1249	491	6671	1478	469	526	2014
SDev	4	11	40	3	9	1	6
%RSD	.2813	2.155	.5972	.2030	1.859	.1097	.3192
#1	1249	495	6694	1478	459	526	2017
#2	1245	479	6625	1475	475	527	2007
#3	1252	499	6694	1481	473	526	2019

Elem	Eu	Fe	K	La	Li	Mg	Mn
Avge	359	593	2148	1046	417	2493	203
SDev	1	1	4	3	2	12	2
%RSD	.3213	.0973	.1862	.3312	.4988	.4626	.7537
#1	360	593	2148	1048	419	2504	201
#2	358	593	2144	1042	415	2494	204
#3	360	594	2152	1048	418	2481	203

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Avge	819	424	3900	513	1312	14050	15680
SDev	2	5	9	6	14	35	27
%RSD	.1866	1.226	.2350	1.085	1.035	.2491	.1700
#1	819	418	3902	512	1310	14090	15700
#2	820	427	3890	519	1299	14030	15650
#3	817	427	3908	508	1326	14040	15690

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Avge	15710	4395	2609	1451	4129	7035	154
SDev	27	15	26	4	11	39	1
%RSD	.1720	.3475	.9966	.2420	.2668	.5498	.3757
#1	15740	4412	2579	1448	4140	7031	154
#2	15690	4382	2625	1455	4118	6999	153
#3	15700	4392	2623	1451	4128	7076	154

Elem	Te	Th	Ti	Tl	U	V	W
Avge	10360	2442	679	416	17780	1021	331
SDev	49	2	3	3	30	3	8
%RSD	.4694	.0626	.4497	.8327	.1663	.3149	2.281
#1	10340	2440	680	414	17780	1022	332
#2	10320	2442	676	414	17760	1017	323
#3	10410	2443	682	420	17810	1023	338

Elem	Y	Zn	Zr
Avge	263	348	813
SDev	1	7	1
%RSD	.4396	2.011	.0710
#1	262	351	813
#2	262	353	813
#3	264	340	812

Analysis Report Thu 05-09-96 08:52:26 AM page 1

Method: ICP1A Sample Name: SPC-BLK 108449 Operator: DRS
Run Time: 05/09/96 08:50:21
Comment: SPC-BLK FOR Mn/Cu RATIO
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0046	-.0264	-.0149	-.0097	-.0016	-.0004	-.0119
SDev	.0004	.0023	.0169	.0022	.0000	.0000	.0071
%RSD	8.640	8.563	113.8	22.11	.0000	6.912	59.30
#1	-.0047	-.0238	-.0141	-.0116	-.0016	-.0005	-.0109
#2	-.0048	-.0272	.0017	-.0102	-.0016	-.0005	-.0054
#3	-.0041	-.0281	-.0321	-.0074	-.0016	-.0004	-.0194

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0532	.0005	-.0102	-.0010	-.0050	-.0045	-.0019
SDev	.0009	.0014	.0095	.0003	.0015	.0004	.0007
%RSD	1.778	292.8	93.00	33.01	30.37	8.029	37.46
#1	-.0531	.0009	-.0046	-.0010	-.0067	-.0047	-.0016
#2	-.0543	-.0011	-.0211	-.0013	-.0039	-.0041	-.0027
#3	-.0524	.0016	-.0048	-.0007	-.0043	-.0048	-.0014

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0009	-.0473	-.2947	-.0034	-.0019	-.0471	-.0010
SDev	.0002	.0001	.0907	.0013	.0010	.0080	.0003
%RSD	24.66	.2522	30.77	37.67	52.04	17.01	26.64
#1	-.0008	-.0473	-.2947	-.0026	-.0011	-.0402	-.0013
#2	-.0011	-.0473	-.3854	-.0049	-.0031	-.0452	-.0007
#3	-.0008	-.0471	-.2040	-.0027	-.0016	-.0559	-.0009

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0054	-.0350	-.0110	.0019	-.0168	-.0217	-.0531
SDev	.0003	.0288	.0031	.0020	.0116	.0030	.0068
%RSD	5.148	82.34	28.41	104.5	68.76	13.90	12.81
#1	-.0054	-.0682	-.0103	.0015	-.0184	-.0182	-.0467
#2	-.0052	-.0183	-.0144	.0040	-.0275	-.0237	-.0602
#3	-.0057	-.0184	-.0083	.0001	-.0046	-.0232	-.0526

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0244	-.0080	-.0222	-.0222	-.0527	-.0721	-.0004
SDev	.0033	.0023	.0084	.0025	.0030	.0315	.0001
%RSD	13.40	28.27	37.86	11.28	5.653	43.70	19.04
#1	-.0207	-.0055	-.0319	-.0245	-.0493	-.0762	-.0003
#2	-.0267	-.0099	-.0170	-.0195	-.0549	-.1014	-.0005
#3	-.0260	-.0086	-.0177	-.0225	-.0538	-.0388	-.0003

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0261	-.0026	-.0039	-.0057	-.1776	-.0026	-.0114
SDev	.0053	.0017	.0004	.0052	.0328	.0005	.0136

%RSD	20.09	65.80	10.90	91.37	18.47	20.99	118.5
#1	-.0280	-.0031	-.0038	-.0092	-.1816	-.0024	-.0097
#2	-.0302	-.0007	-.0044	-.0083	-.2085	-.0032	-.0258
#3	-.0202	-.0040	-.0036	.0003	-.1431	-.0022	.0011

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0006	-.0013	-.0020
SDev	.0004	.0005	.0001
%RSD	66.04	40.13	4.751
#1	-.0008	-.0011	-.0019
#2	-.0008	-.0009	-.0020
#3	-.0001	-.0019	-.0021

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Method: ICP1A Sample Name: SPC-STD 960318I100 Operator: DRS
Run Time: 05/09/96 08:53:07
Comment: SPC-STD FOR Mn/Cu RATIO
Mode: INT Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Avge	7054	2195	1693	1124	323	186	1740
SDev	24	8	13	7	1	1	11
%RSD	.3376	.3645	.7481	.6310	.3571	.6197	.6146
#1	7036	2187	1683	1118	322	185	1749
#2	7045	2195	1688	1123	324	187	1728
#3	7081	2203	1707	1132	324	187	1742

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Avge	1373	489	6691	1473	474	20410	2221
SDev	4	14	14	3	4	105	6
%RSD	.3175	2.871	.2022	.2183	.7982	.5150	.2638
#1	1368	488	6678	1474	476	20470	2219
#2	1376	476	6690	1469	470	20470	2217
#3	1375	504	6705	1475	477	20290	2228

Elem	Eu	Fe	K	La	Li	Mg	Mn
Avge	361	656	2152	1048	21280	2582	62040
SDev	2	1	3	3	178	10	219
%RSD	.4235	.1761	.1494	.2401	.8345	.3735	.3537
#1	359	657	2150	1046	21440	2578	62140
#2	361	655	2151	1048	21300	2575	62190
#3	362	655	2156	1051	21090	2593	61790

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Avge	856	431	3923	526	1420	126700	15770
SDev	8	2	14	10	15	217	57
%RSD	.8842	.4640	.3614	1.952	1.042	.1711	.3583
#1	851	429	3928	517	1427	126700	15710
#2	853	433	3907	537	1430	127000	15770
#3	865	431	3934	523	1403	126500	15820

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Avge	15800	4432	2725	1486	4170	7144	155
SDev	39	10	6	2	16	38	1
%RSD	.2438	.2348	.2150	.1554	.3877	.5305	.3733
#1	15760	4444	2721	1487	4155	7150	154
#2	15800	4424	2732	1487	4167	7103	155
#3	15840	4429	2723	1483	4187	7178	155

Elem	Te	Th	Ti	Tl	U	V	W
Avge	11130	2452	686	435	17820	1029	344
SDev	64	14	3	7	35	4	2
%RSD	.5741	.5607	.4210	1.664	.1942	.3680	.6057
#1	11080	2440	684	431	17820	1027	343
#2	11100	2449	684	430	17780	1026	342
#3	11200	2467	689	443	17850	1033	346

Analysis Report

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Elem	Y	Zn	Zr
Avge	263	130400	818
SDev	1	282	1
%RSD	.2198	.2165	.1222
#1	263	130500	817
#2	263	130600	818
#3	262	130100	819

Analysis Report Thu 05-09-96 08:55:32 AM page 1

Method: ICP1A Sample Name: SPC-STD 960318I100 Operator: DRS
Run Time: 05/09/96 08:53:07
Comment: SPC-STD FOR Mn/Cu RATIO
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0018	-.0227	.0083	-.0062	-.0013	-.0004	-.0002
SDev	.0008	.0055	.0059	.0009	.0002	.0001	.0049
%RSD	42.88	24.34	71.55	13.99	12.17	18.16	1999.
#1	-.0024	-.0287	.0037	-.0070	-.0015	-.0005	.0037
#2	-.0020	-.0217	.0062	-.0064	-.0012	-.0003	-.0058
#3	-.0009	-.0178	.0150	-.0053	-.0012	-.0004	.0014

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0132	.0000	-.0057	-.0017	-.0041	10.19	.0018
SDev	.0015	.0015	.0032	.0004	.0007	.05	.0007
%RSD	11.05	7577.	56.14	21.51	16.09	.5300	39.24
#1	-.0148	-.0001	-.0089	-.0015	-.0038	10.22	.0015
#2	-.0120	-.0015	-.0056	-.0021	-.0048	10.22	.0013
#3	-.0127	.0016	-.0025	-.0014	-.0036	10.13	.0027

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	-.0447	-.1965	-.0026	10.04	-.0518	10.26
SDev	.0003	.0003	.0729	.0009	.09	.0046	.04
%RSD	46.50	.6906	37.09	34.74	.8514	8.887	.3551
#1	-.0010	-.0444	-.2494	-.0035	10.12	-.0545	10.28
#2	-.0006	-.0449	-.2267	-.0027	10.05	-.0544	10.29
#3	-.0004	-.0449	-.1133	-.0017	9.954	-.0465	10.22

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0026	.0037	-.0029	.0064	-.0714	9.851	-.0313
SDev	.0014	.0111	.0049	.0037	.0124	.019	.0130
%RSD	52.77	302.5	169.6	57.03	17.33	.1952	41.34
#1	-.0036	-.0074	-.0011	.0033	-.0656	9.849	-.0446
#2	-.0032	.0148	-.0085	.0104	-.0630	9.871	-.0306
#3	-.0010	.0037	.0009	.0055	-.0856	9.832	-.0188

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0142	-.0026	.0154	.0009	-.0416	-.0294	-.0003
SDev	.0044	.0015	.0019	.0016	.0044	.0313	.0001
%RSD	30.97	57.96	12.40	180.0	10.61	106.5	28.59
#1	-.0188	-.0009	.0140	.0019	-.0460	-.0238	-.0003
#2	-.0140	-.0037	.0176	.0018	-.0416	-.0632	-.0002
#3	-.0100	-.0032	.0146	-.0010	-.0372	-.0013	-.0002

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0150	.0001	-.0030	.0243	-.1463	-.0012	.0111
SDev	.0070	.0053	.0004	.0119	.0384	.0006	.0037

%RSD	46.70	3879.	13.30	48.76	26.26	51.61	33.15
#1	.0098	-.0056	-.0033	.0183	-.1407	-.0015	.0100
#2	.0123	.0012	-.0032	.0167	-.1872	-.0016	.0081
#3	.0230	.0048	-.0026	.0380	-.1109	-.0005	.0152

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0006	9.735	-.0011
SDev	.0002	.021	.0002
%RSD	37.00	.2166	17.61
#1	-.0005	9.740	-.0009
#2	-.0005	9.753	-.0012
#3	-.0009	9.712	-.0013

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Method: ICP1A Standard: ICP1.0

Elem	Ag	Al	As	B	Ba	Be	Bi
Avge	.7124	.2202	.1678	.1124	.0328	.0189	.1532
SDev	.0028	.0007	.0013	.0004	.0001	.0001	.0019
%RSD	.3908	.2978	.7753	.3559	.1758	.3060	1.266
#1	.7154	.2209	.1665	.1124	.0329	.0189	.1510
#2	.7099	.2196	.1691	.1128	.0328	.0189	.1545
#3	.7119	.2201	.1679	.1120	.0328	.0188	.1542

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Avge	.1269	.0504	.6810	.1483	.0477	.0539	.2051
SDev	.0003	.0013	.0024	.0005	.0008	.0000	.0005
%RSD	.2085	2.486	.3598	.3395	1.716	.0000	.2405
#1	.1272	.0505	.6835	.1482	.0479	.0539	.2057
#2	.1267	.0516	.6786	.1488	.0484	.0539	.2049
#3	.1268	.0491	.6810	.1478	.0468	.0539	.2048

Elem	Eu	Fe	K	La	Li	Mg	Mn
Avge	.0367	.0605	.2179	.1066	.0424	.2549	.0207
SDev	.0000	.0002	.0003	.0003	.0003	.0006	.0001
%RSD	.0000	.3815	.1155	.3015	.5931	.2160	.2785
#1	.0367	.0604	.2181	.1070	.0422	.2553	.0207
#2	.0367	.0608	.2176	.1065	.0424	.2543	.0208
#3	.0367	.0604	.2179	.1064	.0427	.2552	.0207

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Avge	.0838	.0434	.3982	.0525	.1306	1.440	1.601
SDev	.0005	.0004	.0007	.0009	.0013	.009	.002
%RSD	.5509	.8308	.1811	1.771	.9776	.6281	.1262
#1	.0833	.0430	.3980	.0531	.1303	1.450	1.602
#2	.0841	.0437	.3976	.0529	.1320	1.434	1.598
#3	.0841	.0435	.3990	.0514	.1295	1.435	1.602

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Avge	1.606	.4489	.2690	.1475	.4203	.7187	.0157
SDev	.001	.0020	.0019	.0007	.0009	.0029	.0001
%RSD	.0543	.4424	.7122	.4746	.2060	.4054	.3685
#1	1.607	.4503	.2712	.1482	.4213	.7155	.0157
#2	1.606	.4466	.2681	.1475	.4198	.7212	.0156
#3	1.605	.4497	.2677	.1468	.4198	.7194	.0157

Elem	Te	Th	Ti	Tl	U	V	W
Avge	1.064	.2478	.0693	.0425	1.815	.1043	.0334
SDev	.003	.0014	.0001	.0002	.003	.0004	.0004
%RSD	.3043	.5459	.1443	.4706	.1636	.3457	1.209
#1	1.066	.2465	.0693	.0425	1.819	.1044	.0338
#2	1.061	.2492	.0692	.0427	1.813	.1046	.0330
#3	1.066	.2477	.0694	.0423	1.814	.1039	.0335

Elem	Y	Zn	Zr
Avge	.0267	.0358	.0832
SDev	.0000	.0009	.0003

%RSD	.0000	2.643	.3026
#1	.0267	.0365	.0832
#2	.0267	.0361	.0829
#3	.0267	.0347	.0834

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Method: ICP1A Standard: ICP1.1B

Elem	Ba	Co	Cr	Cu	Fe	Mg	Mn
Avge	.7530	1.834	1.212	.4530	7.027	4.484	1.209
SDev	.0016	.004	.005	.0013	.014	.004	.004
%RSD	.2126	.1936	.4002	.2881	.1974	.0957	.3216
#1	.7546	1.833	1.207	.4540	7.038	4.485	1.214
#2	.7531	1.838	1.217	.4534	7.031	4.487	1.207
#3	.7514	1.831	1.212	.4515	7.011	4.479	1.207

Elem	Na	Ni	Pb	Sr	Ti	Zn	Zr
Avge	.4924	.6189	7.221	.8188	1.401	2.717	2.439
SDev	.0006	.0011	.010	.0015	.002	.008	.004
%RSD	.1321	.1728	.1452	.1780	.1299	.2937	.1759
#1	.4924	.6196	7.224	.8200	1.402	2.714	2.442
#2	.4918	.6195	7.230	.8193	1.402	2.726	2.441
#3	.4931	.6177	7.210	.8172	1.399	2.711	2.434

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Method: ICP1A Standard: ICP1.1A

Elem	Ba	Co	Cr	Cu	Fe	Mg	Mo
Avge	7.122	16.06	11.15	3.926	65.28	38.60	10.83
SDev	.068	.12	.10	.036	.49	.27	.09
%RSD	.9505	.7549	.9157	.9137	.7566	.6892	.9268
#1	7.065	15.95	11.06	3.896	64.84	38.36	10.74
#2	7.196	16.19	11.26	3.966	65.81	38.89	10.92
#3	7.104	16.04	11.13	3.918	65.17	38.56	10.82

Elem	Na	Ni	Pb	Sr	Ti	Zn	Zr
Avge	4.460	5.387	56.20	7.893	13.22	25.49	22.87
SDev	.041	.034	.35	.075	.12	.15	.20
%RSD	.9179	.6218	.6203	.9522	.8903	.5867	.8686
#1	4.425	5.358	55.87	7.825	13.12	25.35	22.70
#2	4.505	5.424	56.56	7.973	13.35	25.65	23.09
#3	4.450	5.379	56.17	7.879	13.19	25.48	22.82

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Method: ICP1A Standard: ICP1.2

Elem	Al	B	Ca	Cd	K	Li	Mn
Avge	59.95	38.86	75.66	8.709	2.375	10.24	5.918
SDev	.19	.12	.16	.029	.007	.04	.015
%RSD	.3138	.3072	.2180	.3387	.2906	.4263	.2456
#1	59.81	38.79	75.52	8.677	2.370	10.21	5.906
#2	60.17	39.00	75.84	8.735	2.383	10.29	5.934
#3	59.88	38.79	75.61	8.715	2.373	10.21	5.914

Elem	P
Avge	11.52
SDev	.04
%RSD	.3757
#1	11.49
#2	11.57
#3	11.51

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Method: ICP1A Standard: ICP1.3

Elem	Dy	Eu	La	Nd	Ru	Th
Avge	41.18	10.08	5.277	14.07	33.67	11.23
SDev	.16	.05	.029	.07	.16	.05
%RSD	.3937	.4875	.5458	.4876	.4667	.4452
#1	41.02	10.04	5.248	14.01	33.52	11.18
#2	41.16	10.08	5.277	14.06	33.65	11.22
#3	41.35	10.14	5.306	14.15	33.83	11.28

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Method: ICP1A Standard: ICP1.4

Elem	As	Ce	Sb	V	Y
Avge	20.49	20.77	24.83	10.90	2.868
SDev	.04	.06	.03	.04	.010
%RSD	.1958	.3023	.1131	.3812	.3619
#1	20.53	20.83	24.85	10.93	2.877
#2	20.50	20.79	24.83	10.91	2.870
#3	20.45	20.70	24.79	10.85	2.856

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Method: ICP1A Standard: ICP1.5

Elem	U
Avge	43.07
SDev	.22
%RSD	.5027
#1	43.26
#2	42.83
#3	43.11

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Method: ICP1A Standard: ICP1.6

Elem	Be	Si	Te
Avge	1.588	65.74	45.32
SDev	.014	.52	.35
%RSD	.8691	.7929	.7617
#1	1.574	65.23	45.01
#2	1.588	65.73	45.26
#3	1.602	66.27	45.69

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Method: ICP1A Standard: ICP1.7

Elem	Ag	Bi	Se	Tl
Avge	27.37	22.05	3.018	1.217
SDev	.08	.07	.009	.005
%RSD	.2806	.2962	.2824	.4148
#1	27.44	22.08	3.021	1.220
#2	27.29	21.98	3.008	1.211
#3	27.37	22.10	3.024	1.219

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Method: ICP1A Standard: ICP1.8

Elem	Pd	Rh	Sn	W
Avge	17.90	41.78	7.202	2.794
SDev	.12	.28	.033	.021
%RSD	.6524	.6780	.4522	.7507
#1	17.94	41.87	7.209	2.805
#2	17.76	41.47	7.167	2.770
#3	17.99	42.01	7.231	2.807

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Method: ICP1A Slope = Conc(SIR)/IR

Element	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
Ag	328.068	ICP1.7	ICP1.0	.375155	-.267261	05/09/96 09:35:35
Al	308.215	ICP1.2	ICP1.0	8.37077	-1.84324	05/09/96 09:35:35
As	193.600	ICP1.4	ICP1.0	4.92073	-.825862	05/09/96 09:35:35
B	249.600	ICP1.2	ICP1.0	1.29033	-.145034	05/09/96 09:35:35
Ba	493.400	Multiple	Standards	1.39955	-.046023	05/09/96 09:10:07
Be	313.042	ICP1.6	ICP1.0	.637322	-.012024	05/09/96 09:35:35
Bi	223.061	ICP1.7	ICP1.0	4.56638	-.699721	05/09/96 09:35:35
Ca	317.900	ICP1.2	ICP1.0	3.30981	-.420015	05/09/96 09:35:35
Cd	228.800	ICP1.2	ICP1.0	1.15497	-.058211	05/09/96 09:35:35
Ce	418.659	ICP1.4	ICP1.0	2.48865	-1.69485	05/09/96 09:35:35
Co	228.600	Multiple	Standards	1.22080	-.181318	05/09/96 09:10:07
Cr	205.500	Multiple	Standards	1.75850	-.084307	05/09/96 09:10:07
Cu	324.700	Multiple	Standards	5.08736	-.274478	05/09/96 09:10:07
Dy	353.170	ICP1.3	ICP1.0	1.22031	-.250326	05/09/96 09:35:35
Eu	381.900	ICP1.3	ICP1.0	1.99045	-.073049	05/09/96 09:35:35
Fe	259.900	Multiple	Standards	2.96618	-.185462	05/09/96 09:10:07
K	766.500	ICP1.2	ICP1.0	231.775	-50.4960	05/09/96 09:35:35
La	398.852	ICP1.3	ICP1.0	3.86832	-.412492	05/09/96 09:35:35
Li	670.700	ICP1.2	ICP1.0	4.90470	-.208123	05/09/96 09:35:35
Mg	279.078	Multiple	Standards	6.20218	-1.59209	05/09/96 09:10:07
Mn	257.600	ICP1.2	ICP1.0	1.69565	-.035157	05/09/96 09:35:35
Mo	202.000	Multiple	Standards	1.81879	-.152892	05/09/96 09:10:07
Na	588.900	Multiple	Standards	56.1366	-2.43818	05/09/96 09:10:07
Nd	406.106	ICP1.3	ICP1.0	3.65654	-1.45603	05/09/96 09:35:35
Ni	231.600	Multiple	Standards	3.63718	-.191369	05/09/96 09:10:07
P	214.900	ICP1.2	ICP1.0	8.77763	-1.14636	05/09/96 09:35:35
Pb	220.300	Multiple	Standards	.888388	-1.28023	05/09/96 09:10:07
Pd	360.959	ICP1.8	ICP1.0	3.06826	-4.91116	05/09/96 09:35:35
Rh	343.489	ICP1.8	ICP1.0	1.24448	-1.99863	05/09/96 09:35:35
Ru	240.271	ICP1.3	ICP1.0	1.50516	-.675614	05/09/96 09:35:35
Sb	206.838	ICP1.4	ICP1.0	3.25774	-.876332	05/09/96 09:35:35
Se	196.026	ICP1.7	ICP1.0	6.96848	-1.02785	05/09/96 09:35:35
Si	288.100	ICP1.6	ICP1.0	3.06175	-1.28685	05/09/96 09:35:35
Sn	242.950	ICP1.8	ICP1.0	8.75908	-6.29515	05/09/96 09:35:35
Sr	421.500	Multiple	Standards	1.25725	-.019764	05/09/96 09:10:07
Te	214.275	ICP1.6	ICP1.0	1.12977	-1.20257	05/09/96 09:35:35
Th	283.730	ICP1.3	ICP1.0	4.55368	-1.12840	05/09/96 09:35:35
Ti	334.900	Multiple	Standards	1.51147	-.104855	05/09/96 09:10:07
Tl	190.864	ICP1.7	ICP1.0	17.0353	-.724000	05/09/96 09:35:35
U	378.280	ICP1.5	ICP1.0	12.1211	-22.0018	05/09/96 09:35:35
V	292.402	ICP1.4	ICP1.0	1.85248	-.193213	05/09/96 09:35:35
W	224.875	ICP1.8	ICP1.0	18.3659	-.614032	05/09/96 09:35:35
Y	371.030	ICP1.4	ICP1.0	3.51964	-.093974	05/09/96 09:35:35
Zn	213.800	Multiple	Standards	.765375	-.027839	05/09/96 09:10:07
Zr	339.100	Multiple	Standards	2.15781	-.180201	05/09/96 09:10:07

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Method: ICP1A Slope = IR/Conc(SIR)

Element	Wavelen	High std	Low std	Slope	BEC	Date Standardized
Ag	328.068	ICP1.7	ICP1.0	2.66556	.267261	05/09/96 09:35:35
Al	308.215	ICP1.2	ICP1.0	.119463	1.84324	05/09/96 09:35:35
As	193.600	ICP1.4	ICP1.0	.203222	.825862	05/09/96 09:35:35
B	249.600	ICP1.2	ICP1.0	.774993	.145034	05/09/96 09:35:35
Ba	493.400	Multiple	Standards	.714514	.046023	05/09/96 09:10:07
Be	313.042	ICP1.6	ICP1.0	1.56907	.012024	05/09/96 09:35:35
Bi	223.061	ICP1.7	ICP1.0	.218992	.699721	05/09/96 09:35:35
Ca	317.900	ICP1.2	ICP1.0	.302132	.420015	05/09/96 09:35:35
Cd	228.800	ICP1.2	ICP1.0	.865820	.056211	05/09/96 09:35:35
Ce	418.659	ICP1.4	ICP1.0	.401825	1.69485	05/09/96 09:35:35
Co	228.600	Multiple	Standards	.819138	.181518	05/09/96 09:10:07
Cr	205.500	Multiple	Standards	.568665	.084307	05/09/96 09:10:07
Cu	324.700	Multiple	Standards	.196565	.274478	05/09/96 09:10:07
Dy	353.170	ICP1.3	ICP1.0	.819465	.250326	05/09/96 09:35:35
Eu	381.900	ICP1.3	ICP1.0	.502400	.073049	05/09/96 09:35:35
Fe	259.900	Multiple	Standards	.337134	.185462	05/09/96 09:10:07
K	766.500	ICP1.2	ICP1.0	.004315	50.4960	05/09/96 09:35:35
La	398.852	ICP1.3	ICP1.0	.258510	.412492	05/09/96 09:35:35
Li	670.700	ICP1.2	ICP1.0	.203886	.208123	05/09/96 09:35:35
Mg	279.078	Multiple	Standards	.161234	1.59209	05/09/96 09:10:07
Mn	257.600	ICP1.2	ICP1.0	.589743	.035157	05/09/96 09:35:35
Mo	202.000	Multiple	Standards	.549815	.152892	05/09/96 09:10:07
Na	588.900	Multiple	Standards	.017814	2.43818	05/09/96 09:10:07
Nd	406.106	ICP1.3	ICP1.0	.273483	1.45603	05/09/96 09:35:35
Ni	231.600	Multiple	Standards	.274938	.191369	05/09/96 09:10:07
P	214.900	ICP1.2	ICP1.0	.113926	1.14636	05/09/96 09:35:35
Pb	220.300	Multiple	Standards	1.12563	1.28023	05/09/96 09:10:07
Pd	360.959	ICP1.8	ICP1.0	.325917	4.91116	05/09/96 09:35:35
Rh	343.489	ICP1.8	ICP1.0	.803549	1.99863	05/09/96 09:35:35
Ru	240.271	ICP1.3	ICP1.0	.664383	.675614	05/09/96 09:35:35
Sb	206.838	ICP1.4	ICP1.0	.306961	.876332	05/09/96 09:35:35
Se	196.026	ICP1.7	ICP1.0	.143503	1.02785	05/09/96 09:35:35
Si	288.100	ICP1.6	ICP1.0	.326610	1.28685	05/09/96 09:35:35
Sn	242.950	ICP1.8	ICP1.0	.114167	6.29515	05/09/96 09:35:35
Sr	421.500	Multiple	Standards	.795389	.019784	05/09/96 09:10:07
Te	214.275	ICP1.6	ICP1.0	.885134	1.20257	05/09/96 09:35:35
Th	283.730	ICP1.3	ICP1.0	.219603	1.12840	05/09/96 09:35:35
Ti	334.900	Multiple	Standards	.661608	.104855	05/09/96 09:10:07
Tl	190.864	ICP1.7	ICP1.0	.058702	.724000	05/09/96 09:35:35
U	378.280	ICP1.5	ICP1.0	.082501	22.0018	05/09/96 09:35:35
V	292.402	ICP1.4	ICP1.0	.539818	.193213	05/09/96 09:35:35
W	224.875	ICP1.8	ICP1.0	.054449	.614032	05/09/96 09:35:35
Y	371.030	ICP1.4	ICP1.0	.284120	.093974	05/09/96 09:35:35
Zn	213.800	Multiple	Standards	1.30655	.027839	05/09/96 09:10:07
Zr	339.100	Multiple	Standards	.463432	.180201	05/09/96 09:10:07

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Method: ICP1A

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Ag	328.068	ICP1.0	.000000	-.000000	.000000
		ICP1.7	10.0000	10.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Al	308.215	ICP1.0	.000000	-.000000	.000000
		ICP1.2	500.000	500.000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
As	193.600	ICP1.0	.000000	.000000	-.000000
		ICP1.4	100.000	100.000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
B	249.600	ICP1.0	.000000	-.000000	.000000
		ICP1.2	50.0000	50.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Ba	493.400	ICP1.0	.000000	-.000071	.000071
		ICP1.1B	1.00000	1.00789	-.007887
		ICP1.1A	10.0000	9.92113	.078872

CorCoef: 1.00000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Be	313.042	ICP1.0	.000000	-.000000	.000000
		ICP1.6	1.00000	1.00000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Bi	223.061	ICP1.0	.000000	.000000	-.000000
		ICP1.7	100.000	100.0000	.000008

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Ca	317.900	ICP1.0	.000000	-.000000	.000000
		ICP1.2	250.000	250.000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Cd	228.800	ICP1.0	.000000	.000000	-.000000
		ICP1.2	10.0000	10.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Ce	418.659	ICP1.0	.000000	-.000000	.000000
		ICP1.4	50.0000	50.0000	.000000

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Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Co	228.600	ICP1.0	.000000	-.000514	.000514
		ICP1.1B	2.00000	2.05714	-.057138
		ICP1.1A	20.0000	19.4286	.571379

CorCoef: 0.99998

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Cr	205.500	ICP1.0	.000000	-.000426	.000426
		ICP1.1B	2.00000	2.04735	-.047352
		ICP1.1A	20.0000	19.5265	.473524

CorCoef: 0.99999

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Cu	324.700	ICP1.0	.000000	-.000269	.000269
		ICP1.1B	2.00000	2.02993	-.029929
		ICP1.1A	20.0000	19.7007	.299282

CorCoef: 1.00000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Dy	353.170	ICP1.0	.000000	.000000	-.000000
		ICP1.3	50.0000	50.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Eu	381.900	ICP1.0	.000000	-.000000	.000000
		ICP1.3	20.0000	20.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Fe	259.900	ICP1.0	.000000	-.005909	.005909
		ICP1.1B	20.0000	20.6566	-.656597
		ICP1.1A	200.000	193.434	6.56598

CorCoef: 0.99998

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
K	766.500	ICP1.0	.000000	-.000001	.000001
		ICP1.2	500.000	500.000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
La	398.852	ICP1.0	.000000	-.000000	.000000
		ICP1.3	20.0000	20.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Li	670.700	ICP1.0	.000000	.000000	-.000000
		ICP1.2	50.0000	50.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Mg	279.078	ICP1.0	.000000	-.010944	.010944
		ICP1.1B	25.0000	26.2160	-1.21601
		ICP1.1A	250.000	237.840	12.1600

CorCoef: 0.99995

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Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Mn	257.600	ICP1.0	.000000	-.000000	.000000
		ICP1.2	10.0000	10.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Mo	202.000	ICP1.0	.000000	-.000416	.000416
		ICP1.1B	2.00000	2.04627	-.046271
		ICP1.1A	20.0000	19.5373	.462706

CorCoef: 0.99999

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Na	588.900	ICP1.0	.000000	-.001848	.001848
		ICP1.1B	25.0000	25.2054	-.205378
		ICP1.1A	250.000	247.946	2.05377

CorCoef: 1.00000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Nd	406.106	ICP1.0	.000000	.000000	-.000000
		ICP1.3	50.0000	50.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Ni	231.600	ICP1.0	.000000	-.000538	.000538
		ICP1.1B	2.00000	2.05980	-.059802
		ICP1.1A	20.0000	19.4020	.598015

CorCoef: 0.99998

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
P	214.900	ICP1.0	.000000	.000000	-.000000
		ICP1.2	100.000	100.000	-.000008

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Pb	220.300	ICP1.0	.000000	-.001217	.001217
		ICP1.1B	5.00000	5.13520	-.135204
		ICP1.1A	50.0000	48.6480	1.35204

CorCoef: 0.99999

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Pd	360.959	ICP1.0	.000000	.000000	-.000000
		ICP1.8	50.0000	50.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Rh	343.489	ICP1.0	.000000	-.000000	.000000
		ICP1.8	50.0000	50.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Ru	240.271	ICP1.0	.000000	.000000	-.000000
		ICP1.3	50.0000	50.0000	.000004

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Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Sb	206.838	ICP1.0	.000000	.000000	-.000000
		ICP1.4	80.0000	80.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Se	196.026	ICP1.0	.000000	.000000	-.000000
		ICP1.7	20.0000	20.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Si	288.100	ICP1.0	.000000	-.000000	.000000
		ICP1.6	200.000	200.000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Sn	242.950	ICP1.0	.000000	.000000	-.000000
		ICP1.8	50.0000	56.7845	-6.78455

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Sr	421.500	ICP1.0	.000000	-.000087	.000087
		ICP1.1B	1.00000	1.00969	-.009692
		ICP1.1A	10.0000	9.90308	.096919

CorCoef: 1.00000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Te	214.275	ICP1.0	.000000	-.000000	.000000
		ICP1.6	50.0000	50.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Th	283.730	ICP1.0	.000000	.000000	-.000000
		ICP1.3	50.0000	50.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Ti	334.900	ICP1.0	.000000	-.000110	.000110
		ICP1.1B	2.00000	2.01226	-.012259
		ICP1.1A	20.0000	19.8774	.122587

CorCoef: 1.00000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Tl	190.864	ICP1.0	.000000	-.000000	.000000
		ICP1.7	20.0000	20.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
U	378.280	ICP1.0	.000000	-.000000	.000000
		ICP1.5	500.000	500.000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
V	292.402	ICP1.0	.000000	-.000000	.000000
		ICP1.4	20.0000	20.0000	.000000

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Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
W	224.875	ICP1.0	.000000	.000000	-.000000
		ICP1.8	50.0000	50.6947	-.694698

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Y	371.030	ICP1.0	.000000	-.000000	.000000
		ICP1.4	10.0000	10.0000	.000000

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Zn	213.800	ICP1.0	.000000	-.000464	.000464
		ICP1.1B	2.00000	2.05161	-.051608
		ICP1.1A	20.0000	19.4839	.516081

CorCoef: 0.99999

Element	Wavelength	Standard	Known Concentration	Measured Concentration	Residual Concentration
Zr	339.100	ICP1.0	.000000	-.000743	.000743
		ICP1.1B	5.00000	5.08256	-.082561
		ICP1.1A	50.0000	49.1744	.825619

CorCoef: 0.99999

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Method: ICP1A Sample Name: ICP1.0 960318F100 Operator: DRS
Run Time: 05/09/96 09:56:06
Comment: (HDEHP Acid Wash)K.Carson
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0098	-.0042	-.0008	-.0005	-.0000	-.0173
SDev	.0002	.0068	.0044	.0028	.0002	.0000	.0037
%RSD	71.43	69.20	104.7	333.2	45.10	144.8	21.22
#1	.0004	-.0048	-.0061	.0023	-.0008	.0000	-.0211
#2	.0001	-.0175	.0008	-.0015	-.0004	-.0000	-.0170
#3	.0004	-.0071	-.0074	-.0032	-.0004	-.0000	-.0138

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0027	.0002	-.0271	-.0025	-.0002	-.0036	-.0038
SDev	.0017	.0008	.0054	.0003	.0009	.0007	.0005
%RSD	62.38	415.7	20.01	11.45	402.2	18.70	13.20
#1	-.0040	.0004	-.0295	-.0027	-.0013	-.0040	-.0033
#2	-.0032	.0009	-.0308	-.0026	.0005	-.0040	-.0043
#3	-.0008	-.0007	-.0209	-.0022	.0001	-.0028	-.0038

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0008	-.0080	-.6644	-.0050	-.0031	-.0237	-.0003
SDev	.0001	.0008	.0232	.0014	.0015	.0030	.0001
%RSD	14.74	10.01	3.488	28.69	47.37	12.75	25.43
#1	-.0009	-.0071	-.6876	-.0052	-.0031	-.0243	-.0003
#2	-.0007	-.0087	-.6644	-.0064	-.0016	-.0204	-.0003
#3	-.0007	-.0083	-.6412	-.0035	-.0046	-.0264	-.0004

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0007	-.0503	-.0172	-.0062	-.0157	-.0205	-.0481
SDev	.0017	.0141	.0024	.0028	.0129	.0055	.0113
%RSD	225.3	28.06	13.87	45.58	82.10	26.94	23.48
#1	-.0017	-.0354	-.0157	-.0030	-.0049	-.0223	-.0600
#2	-.0017	-.0634	-.0159	-.0081	-.0122	-.0143	-.0467
#3	.0012	-.0522	-.0200	-.0077	-.0299	-.0249	-.0375

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0260	-.0082	-.0055	-.0084	.0048	-.0710	-.0002
SDev	.0046	.0001	.0057	.0138	.0049	.0104	.0000
%RSD	17.67	1.540	105.1	164.4	101.2	14.71	.1727
#1	-.0299	-.0082	-.0045	-.0067	.0041	-.0646	-.0002
#2	-.0272	-.0083	-.0116	-.0229	.0003	-.0830	-.0002
#3	-.0209	-.0080	-.0003	.0045	.0100	-.0653	-.0002

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0108	.0090	-.0014	-.0190	-.3628	-.0030	-.0058
SDev	.0061	.0048	.0003	.0062	.0406	.0006	.0121

%RSD	56.71	53.45	17.79	32.70	11.20	20.32	209.8
#1	-.0109	.0145	-.0016	-.0128	-.3657	-.0032	-.0039
#2	-.0168	.0059	-.0015	-.0252	-.3209	-.0036	.0053
#3	-.0046	.0066	-.0011	-.0189	-.4020	-.0024	-.0187

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0009	-.0008	-.0047
SDev	.0002	.0001	.0004
%RSD	24.01	9.969	9.006
#1	-.0008	-.0008	-.0051
#2	-.0012	-.0007	-.0047
#3	-.0008	-.0009	-.0042

Analysis Report QC Standard Thu 05-09-96 10:00:14 AM Page 1

Method: ICP1A Sample Name: QC_MCVA 9604151901 Operator: DRS
Run Time: 05/09/96 09:58:55
Comment: (HDEHP Acid Wash)K.Carson
Mode: CONC Corr. Factor: 1

PASS 5/9/96

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4800	9.865	2.517	2.064	.4908	.0971	24.03
SDev	.0043	.096	.039	.025	.0054	.0009	.22
%RSD	.8965	.9750	1.566	1.219	1.096	.9619	.9288
#1	.4756	9.759	2.471	2.036	.4848	.0961	23.78
#2	.4801	9.887	2.539	2.076	.4921	.0972	24.11
#3	.4842	9.948	2.539	2.082	.4953	.0980	24.21
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.5000	10.00	2.500	2.000	.5000	.1000	25.00
Range	.0500	1.000	.2500	.2000	.0500	.0100	2.500

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.92	.4853	-.0475	.9690	.9725	.9308	-.0091
SDev	.22	.0024	.0064	.0062	.0093	.0101	.0004
%RSD	.8671	.4887	13.42	.6380	.9562	1.085	4.118
#1	24.69	.4855	-.0402	.9628	.9626	.9209	-.0087
#2	24.94	.4829	-.0511	.9691	.9738	.9304	-.0092
#3	25.12	.4876	-.0513	.9752	.9810	.9411	-.0095
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK
Value	25.00	.5000		1.000	1.000	1.000	
Range	2.500	.0500		.1000	.1000	.1000	

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0009	19.77	23.91	-.0106	1.998	31.60	.5094
SDev	.0002	.18	.18	.0010	.024	.32	.0047
%RSD	23.77	.9176	.7403	9.571	1.224	1.004	.9217
#1	-.0007	19.57	23.72	-.0096	1.971	31.26	.5047
#2	-.0010	19.80	23.95	-.0116	2.003	31.65	.5096
#3	-.0010	19.93	24.07	-.0105	2.019	31.89	.5140
Errors	NOCHECK	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass
Value		20.00	25.00		2.000	31.20	.5000
Range		2.000	2.500		.2000	3.120	.0500

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9803	36.02	-.0499	.9657	4.821	2.367	-.1692
SDev	.0116	.43	.0052	.0089	.072	.010	.0174
%RSD	1.179	1.206	10.44	.9196	1.494	.4379	10.28
#1	.9678	35.54	-.0444	.9579	4.808	2.362	-.1529
#2	.9824	36.11	-.0504	.9637	4.756	2.360	-.1671
#3	.9906	36.40	-.0548	.9754	4.898	2.379	-.1875
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	NOCHECK	QC Pass	NOCHECK
Value	1.000	36.70		1.000		2.500	

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Range	.1000	3.670		.1000		.2500	
Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0681	-.0290	2.447	2.519	19.54	.0217	.4980
SDev	.0058	.0062	.030	.041	.17	.0205	.0059
%RSD	8.488	21.43	1.220	1.621	.8911	94.62	1.181
#1	-.0621	-.0218	2.413	2.479	19.35	.0406	.4918
#2	-.0736	-.0325	2.459	2.516	19.56	.0247	.4987
#3	-.0687	-.0326	2.470	2.561	19.70	-.0002	.5035
Errors	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass
Value			2.500	2.500	20.00		.5000
Range			.2500	.2500	2.000		.0500

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0092	.0441	.9702	2.433	-.7671	.9761	.0282
SDev	.0061	.0082	.0094	.038	.1027	.0086	.0081
%RSD	65.89	18.58	.9649	1.570	13.39	.8855	28.83
#1	.0077	.0357	.9599	2.402	-.6619	.9666	.0197
#2	.0040	.0445	.9725	2.422	-.7721	.9782	.0288
#3	.0159	.0521	.9782	2.476	-.8672	.9836	.0359
Errors	NOCHECK	NOCHECK	QC Pass	QC Pass	NOCHECK	QC Pass	NOCHECK
Value			1.000	2.500		1.000	
Range			.1000	.2500		.1000	

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0018	.9619	1.943
SDev	.0003	.0094	.020
%RSD	16.12	.9771	1.013
#1	-.0015	.9516	1.922
#2	-.0018	.9640	1.946
#3	-.0021	.9700	1.960
Errors	NOCHECK	QC Pass	QC Pass
Value		1.000	2.000
Range		.1000	.2000

Analysis Report Thu 05-09-96 10:55:28 AM page 1

Method: ICP1A Sample Name: 96-2607-BLK Operator: DRS
Run Time: 05/09/96 10:54:09
Comment: Process Blank (BX11C Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	.0008	-.0084	.0133	.0010	-.0000	-.0011
SDev	.0004	.0036	.0107	.0016	.0001	.0000	.0028
%RSD	64.21	460.4	126.8	12.02	13.97	35.63	255.8
#1	-.0008	.0047	.0005	.0150	.0009	-.0000	-.0038
#2	-.0002	-.0024	-.0203	.0131	.0011	-.0001	.0017
#3	-.0008	.0001	-.0055	.0119	.0010	-.0000	-.0011

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.7534	.0006	.0007	-.0015	-.0013	-.0007	-.0001
SDev	.0014	.0014	.0069	.0009	.0006	.0006	.0006
%RSD	.1825	229.2	934.7	61.02	46.36	91.35	447.1
#1	.7544	-.0010	-.0039	-.0015	-.0017	-.0001	-.0005
#2	.7518	.0015	.0086	-.0005	-.0006	-.0006	.0005
#3	.7540	.0014	-.0026	-.0023	-.0017	-.0013	-.0004

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0046	.2472	.0002	.0002	.2251	.0006
SDev	.0003	.0004	.1095	.0010	.0003	.0124	.0000
%RSD	108.7	8.941	44.30	420.2	173.2	5.490	5.167
#1	.0002	-.0044	.2859	-.0005	.0003	.2391	.0007
#2	.0006	-.0044	.3322	.0015	.0003	.2157	.0006
#3	.0000	-.0051	.1236	-.0002	-.0002	.2205	.0006

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	.3761	.0024	.0078	.2633	-.0188	.0225
SDev	.0002	.0129	.0076	.0012	.0371	.0072	.0121
%RSD	34.93	3.444	315.2	14.92	14.09	38.52	53.90
#1	-.0008	.3686	.0016	.0083	.3023	-.0133	.0218
#2	-.0005	.3911	.0104	.0087	.2590	-.0161	.0350
#3	-.0005	.3687	-.0047	.0065	.2285	-.0270	.0108

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0017	-.0004	-.0162	-.0009	.0236	-.0575	.0033
SDev	.0036	.0011	.0059	.0061	.0040	.0298	.0000
%RSD	207.7	245.1	36.52	710.3	17.19	51.80	.0278
#1	.0038	.0004	-.0205	.0061	.0221	-.0889	.0033
#2	.0038	-.0001	-.0094	-.0036	.0281	-.0296	.0033
#3	-.0024	-.0017	-.0185	-.0051	.0205	-.0539	.0033

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0126	-.0047	-.0004	-.0135	.0034	-.0007	.0086
SDev	.0047	.0086	.0001	.0098	.1038	.0006	.0115

%RSD	37.05	182.3	40.88	72.58	3058.	79.51	134.3
#1	-.0103	-.0014	-.0005	-.0090	-.0953	-.0007	.0122
#2	-.0098	-.0144	-.0002	-.0068	.1117	-.0002	-.0043
#3	-.0182	.0017	-.0004	-.0247	-.0063	-.0013	.0178

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0000	.0030	-.0017
SDev	.0006	.0004	.0015
%RSD	16850.	13.49	91.08
#1	-.0006	.0028	-.0026
#2	.0006	.0034	.0001
#3	.0000	.0027	-.0023

Analysis Report Thu 05-09-96 10:59:23 AM page 1

Method: ICP1A Sample Name: 96-2607 @5 Operator: DRS
Run Time: 05/09/96 10:58:05
Comment: 116.2A.W2 @5X DIL (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0037	1.492	.0092	.0093	-.0008	-.0001	.0120
SDev	.0004	.003	.0043	.0010	.0001	.0000	.0058
%RSD	9.596	.1971	46.35	10.97	17.12	23.62	48.32
#1	-.0034	1.495	.0141	.0103	-.0010	-.0001	.0109
#2	-.0037	1.490	.0073	.0082	-.0008	-.0001	.0068
#3	-.0041	1.491	.0062	.0095	-.0007	-.0001	.0182

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0950	-.0017	-.0362	-.0025	.5999	-.0059	-.0050
SDev	.0005	.0002	.0024	.0003	.0060	.0007	.0002
%RSD	.5014	14.41	6.623	11.43	.9979	12.07	3.958
#1	.0948	-.0020	-.0386	-.0026	.5996	-.0063	-.0051
#2	.0946	-.0016	-.0362	-.0021	.5941	-.0051	-.0052
#3	.0955	-.0016	-.0338	-.0027	.6061	-.0064	-.0048

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0011	-.0004	-.0000	-.0076	.0260	.0293	-.0006
SDev	.0002	.0008	.1143	.0010	.0011	.0008	.0001
%RSD	17.46	177.4	66e6	13.65	4.357	2.881	20.30
#1	-.0013	-.0011	-.1313	-.0070	.0253	.0295	-.0005
#2	-.0011	-.0005	.0773	-.0088	.0253	.0301	-.0007
#3	-.0009	.0004	.0541	-.0070	.0273	.0284	-.0005

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0547	143.5	-.0269	.0031	11.70	-.0300	-.0537
SDev	.0006	.5	.0017	.0030	.05	.0101	.0058
%RSD	1.175	.3735	6.343	95.46	.3995	33.72	10.75
#1	.0540	144.1	-.0288	.0010	11.75	-.0414	-.0494
#2	.0553	143.1	-.0265	.0065	11.68	-.0265	-.0515
#3	.0547	143.2	-.0254	.0018	11.67	-.0221	-.0603

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0289	-.0034	-.0125	.0083	.0718	-.1383	-.0000
SDev	.0045	.0012	.0081	.0137	.0041	.0233	.0001
%RSD	15.61	34.30	65.03	164.0	5.666	16.85	54290.
#1	-.0341	-.0046	-.0179	.0099	.0680	-.1613	-.0000
#2	-.0265	-.0031	-.0031	-.0060	.0712	-.1389	.0001
#3	-.0262	-.0024	-.0164	.0212	.0761	-.1147	-.0000

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0170	.0091	-.0020	-.0118	-.0390	-.0037	-.0013
SDev	.0046	.0101	.0002	.0024	.0808	.0001	.0030

%RSD	26.82	110.6	12.41	20.17	207.1	3.044	473.1
#1	-.0211	.0076	-.0022	-.0098	-.0795	-.0036	.0055
#2	-.0178	-.0001	-.0021	-.0112	.0540	-.0038	-.0056
#3	-.0121	.0199	-.0017	-.0145	-.0915	-.0038	-.0037

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0017	.0003	-.0047
SDev	.0000	.0008	.0007
%RSD	2.739	281.0	14.94
#1	-.0016	.0005	-.0048
#2	-.0017	-.0006	-.0039
#3	-.0016	.0010	-.0053

Analysis Report Thu 05-09-96 11:02:58 AM page 1

Method: ICP1A Sample Name: 96-2607 Operator: DRS
Run Time: 05/09/96 11:01:39
Comment: 118.2A.W2 (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	7.969	.0643	.0611	.0000	.0000	.6521
SDev	.0010	.625	.0051	.0020	.0005	.0000	.9171
%RSD	924.2	7.839	7.973	3.209	2261.	113.5	140.6
#1	-.0001	8.689	.0698	.0632	.0006	.0000	1.711
#2	-.0011	7.648	.0636	.0609	-.0004	.0000	.1432
#3	.0009	7.570	.0596	.0592	-.0001	.0001	.1022

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.5344	.0009	-.0076	-.0008	3.047	-.0047	-.0024
SDev	.3025	.0053	.0055	.0007	.014	.0012	.0009
%RSD	56.61	599.3	71.83	89.15	.4615	26.43	36.61
#1	.8836	.0069	-.0031	-.0007	3.064	-.0048	-.0029
#2	.3620	-.0013	-.0137	-.0015	3.039	-.0034	-.0030
#3	.3575	-.0030	-.0061	-.0001	3.039	-.0059	-.0014

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	.2007	4.775	-.0043	.1484	.2779	.0011
SDev	.0002	.2940	.193	.0015	.0020	.0554	.0016
%RSD	30.29	146.5	4.042	35.95	1.322	19.93	150.3
#1	.0006	.5401	4.713	-.0031	.1484	.3417	.0029
#2	.0004	.0368	4.620	-.0060	.1504	.2422	-.0001
#3	.0008	.0252	4.991	-.0036	.1465	.2497	.0004

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.2895	712.6	-.0118	.0043	60.85	-.0042	.0082
SDev	.0015	3.3	.0036	.0022	.68	.0039	.0067
%RSD	.5063	.4636	30.42	51.32	1.124	91.44	81.68
#1	.2879	713.5	-.0150	.0054	61.61	-.0014	.0120
#2	.2897	715.3	-.0125	.0058	60.66	-.0087	.0005
#3	.2908	708.9	-.0079	.0018	60.28	-.0027	.0122

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0142	.0376	.0141	.0414	.4860	-.0541	.0031
SDev	.0029	.0020	.0055	.0164	.0272	.0161	.0032
%RSD	20.74	5.264	38.78	39.54	5.595	29.67	101.9
#1	.0146	.0367	.0115	.0269	.5161	-.0427	.0067
#2	.0111	.0398	.0104	.0381	.4631	-.0725	.0013
#3	.0170	.0362	.0204	.0591	.4790	-.0471	.0012

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0118	.0019	-.0013	.0041	1.932	-.0010	.0163
SDev	.0019	.0017	.0003	.0030	.018	.0006	.0105

Analysis Report

Thu 05-09-96 11:02:58 AM

%RSD	16.22	91.28	23.59	74.21	.9401	60.80	64.28
#1	.0101	.0005	-.0013	.0048	1.938	-.0015	.0249
#2	.0114	.0014	-.0016	.0067	1.946	-.0013	.0195
#3	.0139	.0038	-.0010	.0008	1.911	-.0003	.0046

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0011	-.0001	.0064
SDev	.0004	.0002	.0136
%RSD	33.12	201.9	212.7
#1	-.0011	.0002	.0221
#2	-.0014	-.0002	-.0017
#3	-.0007	-.0003	-.0012

Analysis Report Thu 05-09-96 11:06:28 AM page 1

Method: ICP1A Sample Name: 96-2607-PSA Operator: DRS
Run Time: 05/09/96 11:05:10
Comment: 118.2A.W2 Post Spike A (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.1932	8.673	1.322	1.081	.2463	.0501	12.35
SDev	.0003	.027	.015	.008	.0003	.0002	.05
%RSD	.1431	.3089	1.098	.7317	.1430	.4485	.3764
#1	.1929	8.656	1.306	1.073	.2462	.0499	12.34
#2	.1934	8.659	1.327	1.088	.2459	.0500	12.31
#3	.1932	8.704	1.334	1.082	.2466	.0503	12.40

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	12.92	.2536	-.0398	.4939	1.962	.4762	-.0057
SDev	.04	.0027	.0034	.0010	.010	.0018	.0002
%RSD	.3056	1.043	8.565	.2014	.5153	.3754	3.989
#1	12.89	.2545	-.0358	.4940	1.951	.4748	-.0054
#2	12.92	.2557	-.0415	.4929	1.969	.4756	-.0059
#3	12.96	.2506	-.0419	.4949	1.968	.4782	-.0058

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	10.05	14.24	-.0078	1.059	16.22	.2599
SDev	.0002	.03	.02	.0006	.005	.02	.0014
%RSD	145.6	.3403	.1628	7.736	.4837	.1462	.5477
#1	-.0003	10.02	14.22	-.0081	1.053	16.20	.2590
#2	.0001	10.06	14.26	-.0071	1.061	16.24	.2592
#3	-.0003	10.09	14.24	-.0082	1.062	16.24	.2616

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.6360	365.7	-.0354	.5028	30.99	1.209	-.0826
SDev	.0009	1.0	.0048	.0017	.12	.006	.0054
%RSD	.1498	.2704	13.60	.3338	.3811	.4602	6.570
#1	.6366	364.8	-.0321	.5018	30.87	1.207	-.0802
#2	.6349	365.5	-.0331	.5018	31.10	1.215	-.0788
#3	.6365	366.8	-.0409	.5047	30.99	1.205	-.0888

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0333	.0069	1.263	1.344	10.25	-.0429	.2512
SDev	.0028	.0020	.002	.006	.03	.0305	.0009
%RSD	8.356	29.48	.1339	.4174	.3132	70.99	.3517
#1	-.0358	.0057	1.265	1.339	10.22	-.0100	.2503
#2	-.0303	.0057	1.264	1.344	10.25	-.0486	.2513
#3	-.0337	.0092	1.262	1.350	10.29	-.0701	.2520

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0086	.0252	.4908	1.256	.5153	.4946	.0355
SDev	.0027	.0086	.0020	.002	.0427	.0013	.0019

%RSD	31.41	34.19	.4025	.1529	8.281	.2616	5.317
#1	.0085	.0241	.4892	1.257	.4844	.4934	.0373
#2	.0060	.0172	.4901	1.254	.5639	.4942	.0336
#3	.0114	.0343	.4930	1.257	.4974	.4960	.0355

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0012	.5007	.9855
SDev	.0000	.0024	.0032
%RSD	1.960	.4875	.3297
#1	-.0012	.4980	.9820
#2	-.0012	.5026	.9863
#3	-.0012	.5017	.9883

Analysis Report Thu 05-09-96 11:10:03 AM page 1

Method: ICP1A Sample Name: MCVA 02 Operator: DRS
Run Time: 05/09/96 11:08:44
Comment: MCVA 960415I901 02X DIL (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.2435	5.007	1.286	1.052	.2473	.0493	12.23
SDev	.0007	.018	.016	.000	.0006	.0002	.04
%RSD	.2932	.3590	1.252	.0469	.2467	.4123	.2901
#1	.2429	4.990	1.269	1.053	.2469	.0491	12.20
#2	.2433	5.006	1.301	1.053	.2470	.0492	12.21
#3	.2443	5.026	1.288	1.052	.2480	.0495	12.27

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	12.76	.2501	-.0344	.4977	.4994	.4625	-.0056
SDev	.04	.0046	.0050	.0006	.0052	.0021	.0002
%RSD	.2907	1.851	14.59	.1260	1.038	.4484	4.250
#1	12.74	.2515	-.0389	.4973	.4975	.4612	-.0053
#2	12.75	.2449	-.0290	.4973	.4954	.4614	-.0057
#3	12.81	.2538	-.0354	.4984	.5052	.4649	-.0057

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0008	10.09	11.69	-.0077	1.003	16.21	.2612
SDev	.0002	.02	.02	.0005	.006	.04	.0008
%RSD	27.11	.2187	.1983	6.690	.5555	.2489	.2965
#1	-.0007	10.08	11.67	-.0072	.9965	16.18	.2604
#2	-.0007	10.08	11.69	-.0082	1.007	16.20	.2611
#3	-.0011	10.12	11.71	-.0078	1.005	16.26	.2619

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4994	18.89	-.0287	.5130	2.522	1.208	-.0988
SDev	.0034	.17	.0020	.0043	.026	.004	.0115
%RSD	.6755	.8941	7.003	.8277	1.046	.3697	11.63
#1	.4958	18.72	-.0264	.5084	2.548	1.206	-.0892
#2	.4998	18.87	-.0300	.5138	2.522	1.205	-.0956
#3	.5025	19.06	-.0296	.5167	2.495	1.213	-.1115

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0457	-.0104	1.242	1.303	10.03	-.0160	.2521
SDev	.0040	.0027	.006	.016	.02	.0239	.0011
%RSD	8.801	25.72	.4760	1.254	.2174	149.5	.4242
#1	-.0421	-.0134	1.245	1.284	10.01	-.0394	.2513
#2	-.0449	-.0091	1.235	1.308	10.03	.0084	.2517
#3	-.0500	-.0086	1.246	1.316	10.06	-.0170	.2533

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0030	.0295	.4909	1.248	-.5414	.4941	.0156
SDev	.0058	.0029	.0017	.010	.0485	.0011	.0094

%RSD	191.0	9.861	.3385	.7841	8.952	.2323	60.63
#1	.0029	.0264	.4897	1.243	-.4856	.4935	.0131
#2	-.0027	.0302	.4902	1.259	-.5662	.4934	.0076
#3	.0088	.0321	.4928	1.241	-.5725	.4954	.0260

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0011	.4995	.9809
SDev	.0002	.0010	.0031
%RSD	17.28	.1951	.3124
#1	-.0010	.4993	.9784
#2	-.0010	.5005	.9799
#3	-.0013	.4986	.9843

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Method: ICP1A Sample Name: 96-2607-PSB Operator: DRS
Run Time: 05/09/96 11:15:24
Comment: 118.2A.W2 Post Spike B (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0069	5.890	.1686	3.195	.0031	.0003	2.157
SDev	.0011	.036	.0081	.029	.0001	.0000	.026
%RSD	15.23	.6111	4.808	.9159	2.567	10.86	1.201
#1	-.0076	5.887	.1725	3.185	.0032	.0003	2.152
#2	-.0074	5.928	.1741	3.228	.0031	.0003	2.185
#3	-.0057	5.856	.1593	3.173	.0031	.0003	2.133

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9261	.0029	.9938	-.0040	1.510	.0052	.9660
SDev	.0034	.0029	.0044	.0010	.014	.0001	.0059
%RSD	.3683	98.09	.4468	25.12	.9066	2.637	.6101
#1	.9256	.0057	.9935	-.0050	1.505	.0052	.9663
#2	.9297	.0032	.9984	-.0042	1.526	.0054	.9718
#3	.9229	-.0001	.9895	-.0030	1.501	.0051	.9600

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9772	.6932	.7958	.4792	.0698	.1550	.0044
SDev	.0067	.0029	.1520	.0033	.0003	.0051	.0002
%RSD	.6836	.4195	19.10	.6979	.4056	3.280	4.382
#1	.9779	.6926	.6335	.4760	.0700	.1563	.0044
#2	.9835	.6963	.8189	.4827	.0700	.1494	.0043
#3	.9702	.6906	.9348	.4790	.0695	.1593	.0047

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.1428	353.6	.9368	.0168	29.81	.1054	1.030
SDev	.0009	2.8	.0056	.0024	.22	.0011	.006
%RSD	.6343	.8025	.5952	14.09	.7537	1.018	.5581
#1	.1437	353.8	.9368	.0192	29.62	.1042	1.024
#2	.1426	356.3	.9424	.0145	30.06	.1054	1.035
#3	.1420	350.6	.9312	.0167	29.75	.1064	1.033

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9780	.9923	.0430	.0555	29.41	.9529	.0095
SDev	.0136	.0104	.0012	.0077	.15	.0247	.0001
%RSD	1.387	1.044	2.811	13.92	.5236	2.594	1.525
#1	.9643	.9919	.0443	.0471	29.33	.9361	.0094
#2	.9914	1.003	.0429	.0622	29.59	.9414	.0096
#3	.9782	.9822	.0419	.0573	29.31	.9813	.0094

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.009	4.816	.0030	.0041	13.04	-.0024	1.001
SDev	.004	.046	.0003	.0056	.05	.0000	.009

%RSD	.4203	.9546	9.115	134.8	.3896	1.551	.8852
#1	1.005	4.810	.0028	.0098	12.99	-.0023	.9910
#2	1.010	4.865	.0030	-.0013	13.04	-.0024	1.007
#3	1.013	4.773	.0033	.0039	13.09	-.0024	1.005

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	.4927	.0048	.0384
SDev	.0032	.0002	.0008
%RSD	.6537	4.203	2.195
#1	.4935	.0049	.0394
#2	.4955	.0049	.0378
#3	.4892	.0045	.0380

Analysis Report

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Method: ICP1A Sample Name: MCVB @2 Operator: DRS
Run Time: 05/09/96 11:19:27
Comment: MCVB 960418I902 @2X DIL (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0065	.8729	.1650	3.160	.0012	.0003	.0338
SDev	.0005	.0051	.0093	.009	.0001	.0000	.0044
%RSD	7.702	.5797	5.652	.2812	6.798	13.45	13.07
#1	-.0059	.8782	.1633	3.167	.0011	.0003	.0388
#2	-.0067	.8681	.1750	3.150	.0013	.0003	.0305
#3	-.0069	.8724	.1566	3.163	.0011	.0003	.0319

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0395	.0026	.9879	-.0020	.0049	.0087	.9622
SDev	.0011	.0018	.0063	.0008	.0010	.0019	.0014
%RSD	2.775	70.27	.6363	40.87	19.76	22.15	.1496
#1	.0383	.0018	.9894	-.0015	.0058	.0067	.9637
#2	.0403	.0046	.9933	-.0015	.0049	.0089	.9609
#3	.0399	.0012	.9810	-.0029	.0039	.0106	.9621

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9752	.0112	-1.429	.4781	-.0038	-.0953	.0006
SDev	.0016	.0005	.084	.0007	.0016	.0007	.0000
%RSD	.1636	4.770	5.847	.1426	41.93	.7346	3.936
#1	.9767	.0116	-1.452	.4776	-.0026	-.0946	.0006
#2	.9735	.0114	-1.337	.4789	-.0031	-.0954	.0006
#3	.9753	.0106	-1.499	.4778	-.0056	-.0960	.0006

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0035	2.542	.9401	.0185	.0950	.1066	1.057
SDev	.0011	.012	.0007	.0016	.0092	.0129	.004
%RSD	31.86	.4597	.0723	8.574	9.664	12.08	.3343
#1	.0044	2.545	.9408	.0192	.1030	.1214	1.057
#2	.0037	2.551	.9402	.0167	.0969	.1000	1.053
#3	.0023	2.529	.9394	.0196	.0850	.0983	1.060

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9858	.9882	.0506	.0401	29.04	1.030	.0017
SDev	.0037	.0033	.0054	.0046	.06	.031	.0000
%RSD	.3745	.3358	10.75	11.44	.1989	3.024	.0048
#1	.9844	.9919	.0568	.0398	29.02	1.047	.0017
#2	.9829	.9855	.0464	.0356	28.99	.9937	.0017
#3	.9899	.9871	.0487	.0448	29.10	1.048	.0017

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.015	4.794	.0036	.0011	12.11	-.0020	1.005
SDev	.008	.010	.0003	.0069	.05	.0002	.007

%RSD	.7761	.2186	7.036	633.3	.3980	12.57	.7421
#1	1.006	4.806	.0036	-.0060	12.15	-.0022	1.009
#2	1.021	4.787	.0033	.0077	12.12	-.0018	1.009
#3	1.018	4.789	.0038	.0016	12.06	-.0019	.9961

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	.4913	.0039	.0071
SDev	.0016	.0010	.0001
%RSD	.3205	24.29	1.326
#1	.4929	.0045	.0070
#2	.4897	.0045	.0072
#3	.4912	.0028	.0071

Analysis Report Thu 05-09-96 11:25:07 AM page 1

Method: ICP1A Sample Name: 96-2607-DUP Operator: DRS
Run Time: 05/09/96 11:23:48
Comment: 118.2A.W2 Duplicate (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	8.001	.0713	.0765	.0002	.0000	.2741
SDev	.0015	.068	.0060	.0014	.0002	.0000	.0423
%RSD	106.6	.8558	8.388	1.870	149.4	53.38	15.42
#1	.0012	8.013	.0688	.0779	.0003	.0001	.3227
#2	.0030	7.927	.0781	.0751	.0003	.0000	.2455
#3	.0000	8.063	.0669	.0764	-.0001	.0000	.2542

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4279	-.0005	-.0023	.0002	3.162	-.0033	-.0002
SDev	.0157	.0016	.0120	.0015	.022	.0007	.0014
%RSD	3.668	300.1	530.5	712.2	.6872	20.08	597.9
#1	.4428	.0012	.0063	.0012	3.158	-.0040	.0004
#2	.4115	-.0008	.0028	.0009	3.142	-.0032	.0008
#3	.4294	-.0020	-.0159	-.0015	3.185	-.0027	-.0018

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0019	.0766	5.485	.0005	.1547	.2533	.0008
SDev	.0006	.0175	.193	.0016	.0020	.0011	.0003
%RSD	29.31	22.84	3.518	319.8	1.282	.4507	34.32
#1	.0022	.0965	5.640	.0019	.1543	.2529	.0011
#2	.0022	.0638	5.547	.0010	.1529	.2525	.0006
#3	.0012	.0694	5.269	-.0013	.1568	.2546	.0006

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.3008	737.4	-.0016	-.0003	61.61	.0025	.0511
SDev	.0018	8.3	.0098	.0008	.78	.0028	.0246
%RSD	.5947	1.128	622.5	255.0	1.265	109.6	48.12
#1	.2988	732.5	.0074	-.0001	61.17	.0018	.0683
#2	.3014	732.7	-.0000	.0003	61.14	.0056	.0622
#3	.3022	747.0	-.0121	-.0011	62.50	.0002	.0229

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0293	.0427	.0125	.0584	.5441	-.0164	.0021
SDev	.0080	.0029	.0081	.0114	.0040	.0155	.0003
%RSD	27.39	6.694	64.83	19.57	.7349	94.18	13.58
#1	.0325	.0436	.0219	.0679	.5473	-.0128	.0025
#2	.0351	.0451	.0077	.0617	.5396	-.0031	.0020
#3	.0201	.0396	.0079	.0457	.5454	-.0334	.0020

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0224	-.0019	-.0006	.0169	2.293	.0004	.0179
SDev	.0114	.0042	.0005	.0070	.069	.0009	.0040

%RSD	50.83	219.1	84.26	41.71	3.023	216.8	22.25
#1	.0263	-.0059	-.0004	.0088	2.373	.0011	.0191
#2	.0313	.0025	-.0003	.0213	2.248	.0008	.0135
#3	.0096	-.0023	-.0012	.0207	2.258	-.0006	.0212

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0002	-.0001	.0023
SDev	.0003	.0003	.0018
%RSD	145.5	210.6	81.67
#1	-.0003	-.0002	.0043
#2	.0001	-.0004	.0018
#3	-.0005	.0002	.0007

Analysis Report Thu 05-09-96 11:29:43 AM Page 1

Method: ICP1A Sample Name: Na @1000 ppm Operator: DRS
Run Time: 05/09/96 11:28:24
Comment: I.V. Na 106357 @10X DIL (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0021	.0074	-.0008	.0242	-.0002	-.0001	-.0039
SDev	.0023	.0090	.0168	.0009	.0004	.0000	.0089
%RSD	113.1	120.9	2046.	3.626	213.3	35.48	225.4
#1	.0006	.0177	.0040	.0237	.0003	-.0001	.0062
#2	-.0038	.0034	.0130	.0252	-.0004	-.0001	-.0102
#3	-.0030	.0012	-.0195	.0236	-.0005	-.0001	-.0079

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0386	.0002	-.0261	-.0005	.0019	-.0022	-.0031
SDev	.0028	.0004	.0144	.0019	.0006	.0017	.0025
%RSD	7.184	189.8	55.15	367.1	32.66	77.94	82.65
#1	.0417	.0004	-.0096	.0012	.0015	-.0002	-.0003
#2	.0364	.0004	-.0361	-.0025	.0015	-.0034	-.0047
#3	.0376	-.0002	-.0326	-.0003	.0026	-.0029	-.0043

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	-.0052	-.7880	-.0036	-.0010	-.0122	.0000
SDev	.0005	.0009	.5287	.0037	.0010	.0149	.0002
%RSD	124.1	17.56	67.09	102.4	104.1	122.6	861.4
#1	.0002	-.0042	-.1777	.0006	-.0002	.0020	.0003
#2	-.0007	-.0054	-1.082	-.0052	-.0007	-.0107	-.0001
#3	-.0007	-.0060	-1.105	-.0064	-.0021	-.0278	-.0001

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	977.0	-.0134	-.0032	.0385	-.0141	-.0207
SDev	.0020	24.1	.0163	.0017	.0194	.0102	.0397
%RSD	8909.	2.466	122.0	53.55	50.36	72.46	192.2
#1	.0017	949.9	.0052	-.0019	.0171	-.0091	.0251
#2	-.0023	985.3	-.0252	-.0051	.0550	-.0258	-.0464
#3	.0006	995.9	-.0202	-.0026	.0436	-.0073	-.0407

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0162	.0000	-.0014	.0076	.0616	-.0384	.0003
SDev	.0183	.0032	.0099	.0115	.0039	.0453	.0001
%RSD	113.4	17370.	694.2	150.9	6.373	118.1	49.11
#1	.0050	.0033	.0087	.0130	.0661	.0072	.0005
#2	-.0274	-.0002	-.0110	-.0056	.0591	-.0834	.0002
#3	-.0261	-.0031	-.0020	.0153	.0596	-.0388	.0002

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	.0047	-.0013	-.0004	-.2493	-.0019	.0156
SDev	.0159	.0009	.0006	.0067	.1988	.0014	.0031

%RSD	1955.	19.76	48.79	1823.	79.75	74.07	20.12
#1	.0192	.0043	-.0006	.0062	-.0201	-.0004	.0121
#2	-.0082	.0058	-.0016	-.0002	-.3752	-.0031	.0165
#3	-.0085	.0040	-.0016	-.0071	-.3527	-.0022	.0183

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0005	.0012	-.0039
SDev	.0008	.0006	.0016
%RSD	152.0	44.23	41.13
#1	.0004	.0007	-.0021
#2	-.0011	.0018	-.0051
#3	-.0008	.0012	-.0045

Analysis Report QC Standard Thu 05-09-96 11:37:09 AM Page 1

Method: ICP1A Sample Name: QC_MCVA 9604151901 Operator: DRS
Run Time: 05/09/96 11:35:50
Comment: (8X112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

PASS
RKB 5/9/96

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4770	9.834	2.527	2.059	.4872	.0962	23.88
SDev	.0023	.056	.009	.006	.0028	.0006	.16
%RSD	.4811	.5727	.3656	.3084	.5705	.6346	.6743
#1	.4796	9.897	2.537	2.065	.4903	.0969	24.06
#2	.4754	9.790	2.519	2.052	.4850	.0958	23.80
#3	.4760	9.813	2.526	2.060	.4862	.0960	23.76
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.5000	10.00	2.500	2.000	.5000	.1000	25.00
Range	.0500	1.000	.2500	.2000	.0500	.0100	2.500

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.85	.4834	-.0364	.9682	.9682	.9187	-.0062
SDev	.11	.0021	.0055	.0037	.0077	.0012	.0006
%RSD	.4617	.4425	15.03	.3769	.7977	.1304	9.332
#1	24.97	.4859	-.0394	.9717	.9752	.9186	-.0068
#2	24.75	.4823	-.0301	.9644	.9599	.9175	-.0061
#3	24.81	.4821	-.0398	.9683	.9694	.9199	-.0057
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK
Value	25.00	.5000		1.000	1.000	1.000	
Range	2.500	.0500		.1000	.1000	.1000	

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	19.65	23.94	-.0077	1.975	31.43	.5063
SDev	.0003	.11	.12	.0003	.016	.19	.0032
%RSD	199.7	.5770	.4873	4.155	.8045	.6008	.6334
#1	-.0005	19.78	24.07	-.0076	1.993	31.65	.5097
#2	.0001	19.57	23.83	-.0080	1.965	31.31	.5034
#3	-.0001	19.61	23.93	-.0074	1.967	31.34	.5058
Errors	NOCHECK	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass
Value		20.00	25.00		2.000	31.20	.5000
Range		2.000	2.500		.2000	3.120	.0500

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9736	36.29	-.0343	.9810	4.814	2.379	-.1160
SDev	.0049	.25	.0034	.0069	.073	.020	.0026
%RSD	.5010	.7012	9.920	.7073	1.516	.8325	2.210
#1	.9791	36.58	-.0314	.9888	4.868	2.391	-.1176
#2	.9717	36.14	-.0381	.9783	4.731	2.356	-.1130
#3	.9699	36.14	-.0335	.9758	4.844	2.390	-.1172
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	NOCHECK	QC Pass	NOCHECK
Value	1.000	36.70		1.000		2.500	

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Range	.1000	3.670		.1000		.2500	
Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0522	-.0105	2.447	2.505	19.43	.0596	.4956
SDev	.0027	.0010	.013	.025	.10	.0298	.0032
%RSD	5.134	9.585	.5302	.9833	.5189	50.08	.6424
#1	-.0552	-.0109	2.448	2.528	19.54	.0334	.4992
#2	-.0501	-.0093	2.433	2.479	19.34	.0532	.4932
#3	-.0512	-.0112	2.459	2.508	19.40	.0921	.4944
Errors	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass
Value			2.500	2.500	20.00		.5000
Range			.2500	.2500	2.000		.0500

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0086	.0338	.9666	2.455	-.5764	.9703	.0269
SDev	.0082	.0017	.0050	.038	.1091	.0064	.0178
%RSD	94.80	4.928	.5140	1.539	18.92	.6557	66.24
#1	.0001	.0333	.9720	2.498	-.7005	.9775	.0066
#2	.0164	.0356	.9622	2.427	-.5328	.9655	.0343
#3	.0094	.0324	.9656	2.440	-.4959	.9679	.0397
Errors	NOCHECK	NOCHECK	QC Pass	QC Pass	NOCHECK	QC Pass	NOCHECK
Value			1.000	2.500		1.000	
Range			.1000	.2500		.1000	

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0012	.9733	1.937
SDev	.0001	.0047	.014
%RSD	4.836	.4839	.7046
#1	-.0012	.9783	1.952
#2	-.0013	.9689	1.927
#3	-.0013	.9727	1.931
Errors	NOCHECK	QC Pass	QC Pass
Value		1.000	2.000
Range		.1000	.2000

Analysis Report Thu 05-09-96 11:41:44 AM page 1

Method: ICP1A Sample Name: ICP1.0 960318F100 Operator: DRS
Run Time: 05/09/96 11:40:26
Comment: I.V. Na 106357 @10X DIL (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	.0189	-.0018	.0047	.0005	.0001	.0216
SDev	.0004	.0062	.0010	.0024	.0001	.0000	.0053
%RSD	75.43	32.86	56.99	50.39	15.09	62.00	24.60
#1	-.0008	.0222	-.0021	.0028	.0006	.0001	.0277
#2	-.0008	.0117	-.0026	.0040	.0006	.0000	.0181
#3	-.0001	.0227	-.0007	.0074	.0004	.0001	.0190

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0294	-.0017	-.0121	.0011	.0016	.0000	-.0006
SDev	.0026	.0022	.0038	.0003	.0016	.0018	.0007
%RSD	8.820	125.6	31.49	23.84	100.7	59000.	127.5
#1	.0316	-.0040	-.0158	.0010	-.0001	-.0017	-.0013
#2	.0300	-.0014	-.0082	.0009	.0017	.0018	.0001
#3	.0265	.0002	-.0122	.0014	.0031	-.0001	-.0005

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0151	-.3786	-.0007	.0008	.0196	.0006
SDev	.0001	.0028	.1045	.0012	.0022	.0050	.0003
%RSD	201.7	18.49	27.61	176.0	275.0	25.45	55.07
#1	-.0002	.0173	-.4790	-.0016	-.0011	.0190	.0005
#2	.0000	.0160	-.2704	.0007	.0003	.0149	.0010
#3	.0000	.0119	-.3863	-.0011	.0033	.0248	.0003

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0022	.0711	-.0043	.0002	.0229	-.0100	.0022
SDev	.0017	.0148	.0028	.0019	.0182	.0072	.0110
%RSD	77.03	20.83	64.01	995.6	79.73	71.40	503.0
#1	.0008	.0543	-.0075	.0018	.0368	-.0092	-.0098
#2	.0017	.0823	-.0023	.0007	.0296	-.0176	.0046
#3	.0041	.0767	-.0032	-.0019	.0022	-.0033	.0118

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0028	.0023	.0059	.0102	.0398	-.0499	.0006
SDev	.0059	.0029	.0038	.0105	.0025	.0251	.0000
%RSD	213.7	128.2	66.03	103.4	6.273	50.31	.0582
#1	-.0092	.0000	.0068	.0224	.0404	-.0788	.0006
#2	-.0015	.0055	.0016	.0041	.0420	-.0340	.0006
#3	.0024	.0012	.0090	.0041	.0371	-.0369	.0006

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0078	.0110	.0003	-.0113	-.1345	.0001	.0025
SDev	.0101	.0022	.0004	.0043	.1129	.0004	.0045

%RSD	129.6	20.52	121.2	38.24	83.95	429.4	180.2
#1	-.0194	.0126	.0001	-.0114	-.2623	-.0002	-.0023
#2	-.0017	.0118	.0008	-.0069	-.0487	.0006	.0031
#3	-.0023	.0084	.0001	-.0156	-.0923	-.0001	.0067

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0004	.0002	-.0005
SDev	.0001	.0005	.0003
%RSD	35.81	309.5	51.52
#1	-.0005	-.0004	-.0007
#2	-.0003	.0005	-.0002
#3	-.0003	.0005	-.0006

Analysis Report Thu 05-09-96 11:43:39 AM page 1

Method: ICP1A Sample Name: 96-2608 Operator: DRS
Run Time: 05/09/96 11:42:20
Comment: 118.2B.W2 (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0014	6.386	.0600	.0638	.0002	.0001	.3065
SDev	.0009	.126	.0059	.0029	.0002	.0000	.1918
%RSD	69.61	1.971	9.898	4.541	77.35	49.64	62.58
#1	-.0003	6.295	.0552	.0658	.0003	.0001	.2441
#2	-.0019	6.529	.0581	.0605	.0003	.0000	.5218
#3	-.0019	6.332	.0666	.0650	.0000	.0001	.1537

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.008	-.0004	-.0058	.0009	2.894	-.0026	-.0010
SDev	.081	.0009	.0063	.0003	.029	.0009	.0005
%RSD	8.048	197.1	107.9	32.58	.9899	34.25	48.01
#1	.9602	-.0014	.0003	.0011	2.861	-.0017	-.0006
#2	1.101	-.0002	-.0055	.0010	2.913	-.0035	-.0009
#3	.9612	.0003	-.0122	.0006	2.909	-.0027	-.0015

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0013	.0914	5.091	-.0001	.3878	.4233	.0009
SDev	.0001	.0637	.054	.0013	.0026	.0085	.0007
%RSD	8.764	69.66	1.051	1025.	.6572	2.003	75.40
#1	.0014	.0722	5.153	.0004	.3849	.4280	.0007
#2	.0012	.1625	5.060	.0008	.3893	.4284	.0017
#3	.0012	.0396	5.060	-.0016	.3893	.4135	.0004

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.2720	696.0	-.0023	-.0010	57.00	.0035	.0402
SDev	.0034	5.9	.0026	.0028	.52	.0038	.0092
%RSD	1.262	.8538	110.2	275.7	.9077	107.6	23.00
#1	.2681	689.2	-.0009	.0021	56.41	.0043	.0429
#2	.2733	698.6	-.0053	-.0019	57.37	.0068	.0479
#3	.2745	700.3	-.0008	-.0033	57.22	-.0006	.0299

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0264	.0371	.0115	.0575	.4413	-.0351	.0036
SDev	.0058	.0003	.0074	.0064	.0117	.0246	.0007
%RSD	22.05	.8627	64.29	11.18	2.652	70.24	20.10
#1	.0251	.0368	.0183	.0645	.4320	-.0184	.0033
#2	.0327	.0374	.0036	.0561	.4544	-.0633	.0044
#3	.0213	.0371	.0124	.0518	.4074	-.0234	.0030

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0183	.0032	-.0004	.0033	2.067	.0002	.0242
SDev	.0082	.0035	.0001	.0066	.052	.0006	.0105

%RSD	44.97	173.5	21.24	196.3	2.514	401.1	43.54
#1	.0090	.0074	-.0003	.0037	2.035	.0008	.0211
#2	.0247	-.0031	-.0004	-.0034	2.127	.0003	.0155
#3	.0211	.0052	-.0005	.0097	2.038	-.0005	.0359

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0005	-.0005	.0040
SDev	.0003	.0003	.0042
%RSD	71.29	68.30	104.9
#1	-.0004	-.0002	.0032
#2	-.0001	-.0008	.0086
#3	-.0008	-.0003	.0003

Analysis Report Thu 05-09-96 11:47:35 AM page 1

Method: ICP1A Sample Name: 96-2608-DUP Operator: DRS
Run Time: 05/09/96 11:46:16
Comment: 118.2B.W2 Duplicate (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0028	7.208	.0635	.0715	.0001	.0000	.5203
SDev	.0004	.025	.0017	.0014	.0001	.0000	.0649
%RSD	14.29	.3454	2.657	2.021	117.2	7.931	12.47
#1	-.0024	7.180	.0648	.0703	.0002	.0000	.4473
#2	-.0030	7.220	.0616	.0712	.0000	.0000	.5716
#3	-.0032	7.225	.0642	.0731	.0000	.0000	.5419

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.101	-.0005	-.0121	-.0012	2.999	-.0049	-.0021
SDev	.039	.0031	.0015	.0010	.009	.0005	.0002
%RSD	3.505	696.7	12.08	81.74	.2878	10.91	10.49
#1	1.056	-.0041	-.0104	-.0013	2.996	-.0043	-.0020
#2	1.121	.0014	-.0132	-.0002	2.992	-.0050	-.0023
#3	1.125	.0014	-.0126	-.0021	3.009	-.0054	-.0019

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.1600	4.898	-.0026	.3857	.4331	.0012
SDev	.0001	.0201	.061	.0008	.0019	.0069	.0002
%RSD	14.80	12.55	1.252	31.92	.4815	1.582	16.65
#1	.0008	.1373	4.921	-.0025	.3878	.4381	.0015
#2	.0010	.1755	4.945	-.0035	.3849	.4253	.0011
#3	.0008	.1673	4.829	-.0018	.3844	.4358	.0011

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.2814	716.3	-.0109	-.0015	58.19	-.0009	.0133
SDev	.0014	.7	.0020	.0019	.17	.0027	.0095
%RSD	.4823	.0984	18.38	127.9	.2835	293.9	71.36
#1	.2816	715.7	-.0089	-.0001	58.16	-.0008	.0227
#2	.2800	716.0	-.0129	-.0037	58.05	.0018	.0037
#3	.2827	717.1	-.0108	-.0008	58.37	-.0037	.0135

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0127	.0358	.0039	.0499	.4219	-.0656	.0040
SDev	.0027	.0011	.0084	.0205	.0018	.0315	.0001
%RSD	20.89	3.152	213.9	41.09	.4358	48.06	3.616
#1	.0157	.0346	.0100	.0428	.4200	-.0326	.0039
#2	.0106	.0368	-.0056	.0338	.4236	-.0688	.0041
#3	.0119	.0361	.0074	.0729	.4221	-.0954	.0041

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0087	.0020	-.0012	.0042	2.302	-.0006	.0293
SDev	.0029	.0010	.0003	.0142	.039	.0004	.0069

%RSD	32.98	52.53	25.04	340.3	1.677	71.12	23.64
#1	.0085	.0030	-.0010	-.0055	2.274	-.0001	.0323
#2	.0116	.0021	-.0015	-.0024	2.346	-.0010	.0343
#3	.0059	.0009	-.0010	.0204	2.286	-.0007	.0214

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0010	.0000	.0074
SDev	.0004	.0011	.0013
%RSD	40.15	15640.	17.60
#1	-.0006	-.0012	.0059
#2	-.0013	.0002	.0083
#3	-.0013	.0010	.0080

Analysis Report Thu 05-09-96 11:51:19 AM page 1

Method: ICP1A Sample Name: 96-2613 Operator: DRS
Run Time: 05/09/96 11:50:01
Comment: 119.2A.W2 (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0013	.6358	.0618	.0562	.0001	.0000	.0607
SDev	.0003	.0095	.0079	.0016	.0002	.0000	.0040
%RSD	21.75	1.488	12.77	2.786	310.0	28.44	6.566
#1	-.0010	.6268	.0532	.0578	.0003	.0000	.0574
#2	-.0014	.6349	.0637	.0562	.0000	.0000	.0597
#3	-.0016	.6456	.0687	.0547	-.0001	.0000	.0652

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.263	-.0025	-.0151	-.0004	2.564	-.0035	-.0019
SDev	.017	.0012	.0048	.0008	.002	.0002	.0003
%RSD	1.341	48.92	31.97	196.0	.0715	6.208	18.52
#1	1.245	-.0027	-.0104	.0004	2.562	-.0033	-.0016
#2	1.265	-.0037	-.0200	-.0003	2.566	-.0037	-.0023
#3	1.278	-.0012	-.0147	-.0013	2.565	-.0035	-.0017

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0260	3.747	-.0020	.3191	.4952	.0005
SDev	.0001	.0062	.097	.0019	.0017	.0066	.0001
%RSD	19.56	23.81	2.575	94.77	.5324	1.325	18.93
#1	.0006	.0198	3.855	-.0002	.3182	.5024	.0005
#2	.0004	.0261	3.670	-.0040	.3211	.4937	.0004
#3	.0004	.0322	3.716	-.0019	.3182	.4895	.0004

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.2730	720.2	-.0057	-.0021	56.11	-.0152	.0222
SDev	.0012	2.6	.0065	.0009	.12	.0087	.0141
%RSD	.4356	.3588	115.5	43.34	.2073	57.31	63.71
#1	.2741	717.5	.0019	-.0022	56.02	-.0187	.0317
#2	.2717	722.7	-.0097	-.0030	56.24	-.0217	.0288
#3	.2732	720.4	-.0092	-.0011	56.08	-.0053	.0059

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0191	.0383	.0003	.0258	.7677	-.0737	.0036
SDev	.0063	.0013	.0034	.0069	.0076	.0066	.0001
%RSD	32.84	3.273	1321.	26.59	.9886	8.913	4.007
#1	.0260	.0375	-.0036	.0290	.7590	-.0710	.0035
#2	.0176	.0376	.0029	.0304	.7710	-.0688	.0037
#3	.0138	.0397	.0015	.0179	.7731	-.0811	.0037

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0062	.0047	-.0009	.0062	.5602	-.0007	.0157
SDev	.0062	.0066	.0003	.0054	.0645	.0007	.0033

%RSD	99.42	140.7	31.77	87.91	11.51	110.1	20.74
#1	.0025	-.0007	-.0006	-.0000	.6112	.0000	.0138
#2	.0133	.0028	-.0012	.0085	.5917	-.0014	.0139
#3	.0028	.0120	-.0010	.0101	.4877	-.0006	.0195

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0009	-.0006	-.0014
SDev	.0002	.0006	.0006
%RSD	23.33	112.2	46.51
#1	-.0010	-.0011	-.0007
#2	-.0006	.0001	-.0016
#3	-.0010	-.0007	-.0020

Analysis Report Thu 05-09-96 11:54:25 AM page 1

Method: ICP1A Sample Name: 96-2613-DUP Operator: DRS
Run Time: 05/09/96 11:53:06
Comment: 119.2A.W2 Duplicate (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0021	.8725	.0589	.0668	-.0005	-.0000	.0355
SDev	.0005	.0060	.0057	.0020	.0001	.0000	.0119
%RSD	22.45	.6908	9.742	2.962	26.04	189.5	33.62
#1	-.0016	.8792	.0589	.0682	-.0004	-.0000	.0409
#2	-.0021	.8711	.0646	.0677	-.0007	-.0000	.0437
#3	-.0025	.8674	.0531	.0646	-.0005	.0000	.0218

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9886	-.0024	-.0229	-.0006	2.547	-.0042	-.0022
SDev	.0076	.0015	.0030	.0002	.015	.0009	.0009
%RSD	.7668	61.50	12.96	26.97	.5966	21.18	40.43
#1	.9816	-.0023	-.0199	-.0007	2.530	-.0036	-.0012
#2	.9876	-.0039	-.0231	-.0006	2.559	-.0052	-.0026
#3	.9967	-.0009	-.0258	-.0004	2.552	-.0038	-.0028

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0122	3.824	-.0025	.3157	.4808	.0002
SDev	.0003	.0031	.132	.0008	.0027	.0042	.0003
%RSD	138.4	25.50	3.446	33.30	.8650	.8703	150.5
#1	.0006	.0158	3.971	-.0016	.3128	.4790	.0005
#2	.0000	.0105	3.786	-.0032	.3162	.4856	.0004
#3	.0000	.0104	3.716	-.0029	.3182	.4778	-.0002

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.2729	714.0	-.0111	-.0027	55.84	-.0131	.0124
SDev	.0030	6.4	.0067	.0023	.56	.0091	.0107
%RSD	1.106	.8969	60.50	84.94	.9959	69.43	86.18
#1	.2695	706.6	-.0033	-.0001	55.21	-.0030	.0246
#2	.2738	716.8	-.0153	-.0041	56.03	-.0205	.0083
#3	.2753	718.5	-.0145	-.0041	56.27	-.0157	.0044

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0124	.0385	.0009	.0325	.7490	-.0664	.0024
SDev	.0076	.0022	.0061	.0174	.0016	.0251	.0001
%RSD	61.69	5.672	651.7	53.40	.2193	37.80	5.940
#1	.0210	.0409	-.0060	.0381	.7476	-.0377	.0026
#2	.0098	.0379	.0036	.0464	.7508	-.0773	.0023
#3	.0064	.0367	.0053	.0130	.7487	-.0842	.0023

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0059	-.0002	-.0011	.0060	.2373	-.0013	.0226
SDev	.0074	.0077	.0001	.0017	.0885	.0008	.0070

%RSD	126.5	3272.	8.086	29.02	37.28	66.45	31.02
#1	.0079	-.0039	-.0010	.0050	.3304	-.0003	.0175
#2	-.0024	.0086	-.0011	.0080	.1544	-.0017	.0306
#3	.0120	-.0054	-.0010	.0050	.2272	-.0018	.0196

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0009	-.0008	-.0021
SDev	.0004	.0010	.0007
%RSD	38.32	123.1	34.79
#1	-.0005	.0003	-.0013
#2	-.0011	-.0010	-.0027
#3	-.0011	-.0016	-.0022

Analysis Report Thu 05-09-96 11:58:32 AM page 1

Method: ICP1A Sample Name: 96-2614 Operator: DRS
Run Time: 05/09/96 11:57:14
Comment: 119.2B.W2 (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0019	3.002	.0583	.0647	-.0002	.0000	.0571
SDev	.0007	.040	.0115	.0024	.0002	.0000	.0133
%RSD	37.64	1.345	19.63	3.747	76.61	217.6	23.31
#1	-.0023	3.049	.0715	.0649	-.0001	-.0000	.0720
#2	-.0011	2.978	.0505	.0671	-.0004	.0000	.0465
#3	-.0023	2.980	.0531	.0622	-.0001	.0000	.0529

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.7765	-.0025	-.0141	-.0009	2.307	-.0045	-.0019
SDev	.0133	.0014	.0051	.0002	.012	.0007	.0006
%RSD	1.713	55.22	36.15	25.45	.5325	15.08	31.60
#1	.7913	-.0040	-.0119	-.0011	2.321	-.0044	-.0025
#2	.7656	-.0016	-.0200	-.0007	2.300	-.0040	-.0016
#3	.7726	-.0018	-.0105	-.0010	2.300	-.0053	-.0014

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0162	3.469	-.0027	.1166	.4183	.0001
SDev	.0002	.0076	.058	.0013	.0017	.0063	.0001
%RSD	71.86	47.05	1.681	47.90	1.458	1.514	71.67
#1	.0001	.0251	3.415	-.0028	.1175	.4255	.0003
#2	.0004	.0113	3.531	-.0013	.1175	.4137	.0001
#3	.0004	.0124	3.461	-.0039	.1146	.4157	.0001

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.2415	661.3	-.0126	-.0034	55.26	-.0159	.0174
SDev	.0014	2.5	.0037	.0020	.05	.0047	.0087
%RSD	.5814	.3828	29.57	58.13	.0816	29.42	50.20
#1	.2423	663.6	-.0165	-.0011	55.28	-.0211	.0078
#2	.2422	661.8	-.0123	-.0048	55.30	-.0143	.0250
#3	.2399	658.6	-.0091	-.0044	55.21	-.0122	.0194

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0102	.0303	.0032	.0356	.5318	-.0832	.0023
SDev	.0018	.0014	.0050	.0150	.0030	.0213	.0001
%RSD	17.50	4.782	155.9	42.18	.5639	25.62	6.321
#1	.0108	.0311	-.0006	.0529	.5285	-.0959	.0025
#2	.0082	.0286	.0013	.0284	.5342	-.0951	.0022
#3	.0117	.0311	.0088	.0256	.5328	-.0586	.0022

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0072	.0087	-.0012	.0066	.4890	-.0008	.0079
SDev	.0091	.0011	.0001	.0024	.0406	.0003	.0059

%RSD	126.3	12.35	10.20	36.47	8.301	38.03	74.57
#1	-.0024	.0095	-.0012	.0040	.4832	-.0005	.0012
#2	.0083	.0075	-.0011	.0070	.5321	-.0011	.0103
#3	.0157	.0090	-.0013	.0088	.4515	-.0008	.0122

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0010	-.0004	-.0019
SDev	.0000	.0003	.0006
%RSD	1.795	76.47	29.83
#1	-.0009	-.0000	-.0015
#2	-.0010	-.0006	-.0016
#3	-.0009	-.0006	-.0025

Analysis Report Thu 05-09-96 12:02:50 PM page 1

Method: ICP1A Sample Name: 96-2614-DUP Operator: DRS
Run Time: 05/09/96 12:01:31
Comment: 119.2B.W2 Duplicate (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0014	2.567	.0505	.0638	-.0002	.0000	.0548
SDev	.0006	.106	.0093	.0023	.0002	.0000	.0560
%RSD	43.49	4.140	18.31	3.621	130.1	84.82	102.2
#1	-.0021	2.690	.0447	.0661	.0000	.0000	.1195
#2	-.0009	2.507	.0612	.0614	-.0004	.0000	.0222
#3	-.0013	2.505	.0457	.0640	-.0001	.0001	.0227

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.8581	-.0029	-.0137	.0004	2.421	-.0035	-.0011
SDev	.0558	.0011	.0074	.0007	.018	.0008	.0004
%RSD	6.500	38.40	53.96	174.7	.7410	22.42	34.42
#1	.9224	-.0041	-.0196	.0005	2.437	-.0042	-.0015
#2	.8225	-.0018	-.0054	.0009	2.424	-.0027	-.0009
#3	.8295	-.0028	-.0161	-.0004	2.402	-.0035	-.0008

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0214	3.747	-.0014	.1213	.4717	.0004
SDev	.0001	.0220	.054	.0013	.0020	.0114	.0000
%RSD	22.77	102.5	1.429	87.62	1.634	2.424	4.721
#1	.0004	.0468	3.809	-.0029	.1225	.4839	.0004
#2	.0006	.0086	3.716	-.0004	.1190	.4699	.0004
#3	.0004	.0089	3.716	-.0010	.1225	.4612	.0004

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.2548	696.7	-.0060	-.0061	57.30	-.0144	.0302
SDev	.0047	2.5	.0016	.0004	.26	.0007	.0080
%RSD	1.850	.3579	26.20	6.851	.4576	4.683	26.56
#1	.2601	699.4	-.0073	-.0059	57.60	-.0137	.0335
#2	.2511	694.7	-.0043	-.0059	57.17	-.0147	.0211
#3	.2532	695.9	-.0066	-.0066	57.13	-.0149	.0361

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0207	.0357	.0063	.0297	.5636	-.0558	.0025
SDev	.0036	.0016	.0168	.0215	.0106	.0191	.0004
%RSD	17.43	4.354	264.7	72.33	1.873	34.34	17.64
#1	.0199	.0373	-.0121	.0053	.5747	-.0687	.0030
#2	.0247	.0342	.0103	.0458	.5622	-.0338	.0022
#3	.0176	.0358	.0208	.0382	.5537	-.0648	.0022

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0090	.0031	-.0007	.0051	.5860	-.0004	.0126
SDev	.0061	.0120	.0002	.0006	.0393	.0004	.0069

%RSD	67.34	384.9	27.03	10.93	6.713	96.95	54.85
#1	.0161	-.0045	-.0007	.0051	.6215	-.0009	.0176
#2	.0051	.0169	-.0006	.0056	.5929	-.0002	.0156
#3	.0060	-.0031	-.0010	.0045	.5437	-.0002	.0047

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0007	-.0008	-.0011
SDev	.0003	.0002	.0013
%RSD	50.22	22.84	123.3
#1	-.0007	-.0009	.0003
#2	-.0003	-.0006	-.0024
#3	-.0010	-.0009	-.0011

Analysis Report QC Standard Thu 05-09-96 12:08:34 PM page 1

Method: ICP1A Sample Name: QC_MCVA 9604151901 Operator: DRS
Run Time: 05/09/96 12:07:15
Comment: (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

PASS DRS 5/9/96

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4744	9.830	2.540	2.052	.4884	.0965	23.67
SDev	.0086	.192	.027	.037	.0105	.0018	.47
%RSD	1.817	1.951	1.058	1.800	2.151	1.847	1.955
#1	.4673	9.658	2.511	2.022	.4794	.0949	23.50
#2	.4718	9.795	2.543	2.042	.4859	.0961	23.71
#3	.4840	10.04	2.565	2.094	.4999	.0985	24.39
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.5000	10.00	2.500	2.000	.5000	.1000	25.00
Range	.0500	1.000	.2500	.2000	.0500	.0100	2.500

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.82	.4747	-.0517	.9692	.9607	.9184	-.0078
SDev	.43	.0125	.0085	.0167	.0137	.0161	.0013
%RSD	1.749	2.625	16.51	1.719	1.429	1.755	16.71
#1	24.47	.4641	-.0428	.9559	.9497	.9053	-.0069
#2	24.70	.4716	-.0524	.9639	.9562	.9136	-.0072
#3	25.31	.4885	-.0598	.9879	.9761	.9364	-.0093
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK
Value	25.00	.5000		1.000	1.000	1.000	
Range	2.500	.0500		.1000	.1000	.1000	

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0007	19.69	23.32	-.0110	1.949	31.36	.5082
SDev	.0004	.38	.19	.0019	.040	.56	.0105
%RSD	55.73	1.907	.8096	17.45	2.062	1.776	2.059
#1	-.0003	19.38	23.19	-.0091	1.914	30.88	.5000
#2	-.0007	19.59	23.23	-.0109	1.941	31.23	.5045
#3	-.0010	20.11	23.53	-.0129	1.993	31.97	.5200
Errors	NOCHECK	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass
Value		20.00	25.00		2.000	31.20	.5000
Range		2.000	2.500		.2000	3.120	.0500

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9785	36.25	-.0447	.9773	4.828	2.359	-.1546
SDev	.0194	.72	.0108	.0178	.073	.040	.0183
%RSD	1.984	1.991	24.22	1.819	1.517	1.697	11.87
#1	.9611	35.64	-.0358	.9583	4.768	2.320	-.1380
#2	.9750	36.05	-.0415	.9801	4.806	2.356	-.1514
#3	.9995	37.05	-.0568	.9935	4.910	2.400	-.1743
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	NOCHECK	QC Pass	NOCHECK
Value	1.000	36.70		1.000		2.500	

Range	.1000	3.670		.1000		.2500	
Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0668	-.0120	2.433	2.527	19.40	.0315	.4973
SDev	.0147	.0058	.046	.052	.34	.0392	.0104
%RSD	22.02	48.60	1.875	2.065	1.770	124.1	2.094
#1	-.0547	-.0061	2.388	2.492	19.10	.0735	.4881
#2	-.0625	-.0121	2.431	2.502	19.33	.0253	.4952
#3	-.0832	-.0178	2.479	2.587	19.78	-.0041	.5086
Errors	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass
Value			2.500	2.500	20.00		.5000
Range			.2500	.2500	2.000		.0500

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0118	.0462	.9691	2.470	-.7764	.9694	.0217
SDev	.0091	.0044	.0191	.022	.1477	.0178	.0056
%RSD	76.82	9.511	1.975	.8851	19.02	1.836	25.74
#1	.0199	.0510	.9527	2.448	-.6161	.9542	.0274
#2	.0134	.0425	.9644	2.471	-.8062	.9650	.0162
#3	.0020	.0450	.9901	2.492	-.9069	.9890	.0214
Errors	NOCHECK	NOCHECK	QC Pass	QC Pass	NOCHECK	QC Pass	NOCHECK
Value			1.000	2.500		1.000	
Range			.1000	.2500		.1000	

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0019	.9730	1.945
SDev	.0005	.0169	.041
%RSD	23.75	1.739	2.124
#1	-.0015	.9570	1.909
#2	-.0018	.9714	1.937
#3	-.0024	.9907	1.990
Errors	NOCHECK	QC Pass	QC Pass
Value		1.000	2.000
Range		.1000	.2000

Analysis Report Thu 05-09-96 12:14:00 PM page 1

Method: ICP1A Sample Name: ICP1.0 960318F100 Operator: DRS
Run Time: 05/09/96 12:12:41
Comment: 119.2B.W2 Duplicate (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0027	.0041	.0039	-.0003	-.0003	-.0000	.0173
SDev	.0009	.0027	.0062	.0018	.0003	.0000	.0037
%RSD	32.30	67.22	159.8	510.6	106.2	114.0	21.59
#1	-.0028	.0058	.0007	-.0023	-.0001	.0000	.0214
#2	-.0018	.0056	-.0000	.0000	-.0001	-.0001	.0164
#3	-.0035	.0009	.0111	.0012	-.0007	-.0000	.0141

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0138	-.0033	-.0279	-.0006	.0014	-.0021	-.0031
SDev	.0003	.0007	.0008	.0008	.0039	.0013	.0010
%RSD	2.047	21.35	3.007	122.3	288.1	59.69	32.04
#1	.0139	-.0031	-.0285	-.0009	-.0001	-.0009	-.0027
#2	.0141	-.0040	-.0282	-.0012	-.0016	-.0021	-.0024
#3	.0135	-.0027	-.0270	.0002	.0057	-.0035	-.0043

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0009	.0026	-.9735	-.0057	-.0011	-.0009	.0002
SDev	.0002	.0013	.1045	.0016	.0010	.0052	.0003
%RSD	25.15	49.64	10.74	27.35	85.71	586.6	118.7
#1	-.0007	.0035	-.9657	-.0052	-.0011	.0013	.0001
#2	-.0008	.0032	-.8730	-.0045	-.0002	.0029	.0006
#3	-.0011	.0011	-1.082	-.0075	-.0021	-.0068	.0001

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0057	-.0177	-.0042	.0345	-.0226	-.0378
SDev	.0002	.0129	.0066	.0021	.0178	.0017	.0063
%RSD	62.47	225.9	37.09	51.05	51.52	7.477	16.75
#1	.0005	-.0017	-.0212	-.0066	.0265	-.0207	-.0395
#2	.0004	.0207	-.0101	-.0026	.0549	-.0233	-.0307
#3	.0001	-.0017	-.0217	-.0033	.0221	-.0239	-.0430

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0206	-.0054	-.0064	.0153	.0141	-.0964	.0002
SDev	.0061	.0008	.0036	.0061	.0078	.0197	.0001
%RSD	29.62	14.28	55.83	39.78	55.41	20.46	43.38
#1	-.0225	-.0061	-.0029	.0086	.0196	-.0953	.0002
#2	-.0138	-.0045	-.0101	.0170	.0175	-.0773	.0002
#3	-.0255	-.0055	-.0062	.0204	.0052	-.1167	.0001

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0170	.0096	-.0010	-.0122	-.3466	-.0020	-.0075
SDev	.0065	.0045	.0002	.0023	.0232	.0010	.0067

%RSD	38.41	46.89	24.51	19.20	6.679	49.04	89.37
#1	-.0157	.0099	-.0007	-.0128	-.3679	-.0015	-.0057
#2	-.0112	.0140	-.0011	-.0141	-.3220	-.0014	-.0150
#3	-.0241	.0050	-.0012	-.0096	-.3501	-.0032	-.0019

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0012	-.0003	-.0034
SDev	.0000	.0006	.0005
%RSD	1.581	166.6	15.01
#1	-.0011	-.0009	-.0039
#2	-.0012	.0003	-.0034
#3	-.0012	-.0004	-.0029

Analysis Report QC Standard Thu 05-09-96 01:16:03 PM page 1

Method: ICP1A Sample Name: QC_MCVA 9604151901 Operator: DRS
Run Time: 05/09/96 13:14:44
Comment: (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

PASS 5/9/96

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4804	9.986	2.568	2.084	.4971	.0980	24.22
SDev	.0146	.337	.098	.069	.0187	.0033	.80
%RSD	3.044	3.373	3.806	3.325	3.756	3.370	3.320
#1	.4683	9.703	2.512	2.023	.4816	.0952	23.55
#2	.4763	9.897	2.511	2.071	.4920	.0971	23.99
#3	.4967	10.36	2.681	2.159	.5179	.1016	25.11
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.5000	10.00	2.500	2.000	.5000	.1000	25.00
Range	.0500	1.000	.2500	.2000	.0500	.0100	2.500

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	25.21	.4816	-.0686	.9845	.9767	.9268	-.0092
SDev	.78	.0101	.0148	.0332	.0306	.0332	.0019
%RSD	3.094	2.103	21.61	3.373	3.135	3.583	20.91
#1	24.55	.4737	-.0549	.9566	.9534	.9000	-.0074
#2	25.00	.4781	-.0665	.9758	.9654	.9165	-.0099
#3	26.07	.4930	-.0844	1.021	1.011	.9640	-.0112
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK
Value	25.00	.5000		1.000	1.000	1.000	
Range	2.500	.0500		.1000	.1000	.1000	

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0013	20.03	23.08	-.0128	1.986	31.80	.5164
SDev	.0006	.66	.42	.0026	.071	1.00	.0183
%RSD	42.75	3.279	1.809	20.65	3.571	3.139	3.549
#1	-.0008	19.47	22.79	-.0103	1.925	30.95	.5010
#2	-.0012	19.86	22.88	-.0125	1.969	31.54	.5117
#3	-.0019	20.75	23.56	-.0156	2.064	32.90	.5367
Errors	NOCHECK	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass
Value		20.00	25.00		2.000	31.20	.5000
Range		2.000	2.500		.2000	3.120	.0500

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9940	36.72	-.0642	.9894	4.849	2.378	-.1878
SDev	.0340	1.27	.0134	.0299	.077	.069	.0332
%RSD	3.422	3.454	20.89	3.020	1.595	2.910	17.68
#1	.9675	35.66	-.0529	.9656	4.795	2.323	-.1545
#2	.9823	36.37	-.0606	.9797	4.815	2.355	-.1881
#3	1.032	38.12	-.0790	1.023	4.938	2.456	-.2208
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	NOCHECK	QC Pass	NOCHECK
Value	1.000	36.70		1.000		2.500	

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Range	.1000	3.670		.1000		.2500	
Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0847	-.0148	2.474	2.598	19.65	-.0392	.5085
SDev	.0170	.0074	.081	.082	.62	.0586	.0187
%RSD	20.12	50.22	3.286	3.167	3.130	149.6	3.675
#1	-.0674	-.0075	2.416	2.539	19.12	-.0006	.4924
#2	-.0852	-.0144	2.440	2.563	19.50	-.0103	.5041
#3	-.1015	-.0224	2.567	2.692	20.33	-.1066	.5290
Errors	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass
Value			2.500	2.500	20.00		.5000
Range			.2500	.2500	2.000		.0500

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0068	.0451	.9861	2.496	-.9555	.9830	.0191
SDev	.0040	.0039	.0338	.072	.1802	.0334	.0070
%RSD	58.85	8.536	3.433	2.881	18.86	3.398	36.37
#1	-.0022	.0466	.9571	2.442	-.7880	.9556	.0183
#2	-.0085	.0479	.9779	2.469	-.9324	.9732	.0126
#3	-.0096	.0407	1.023	2.578	-1.146	1.020	.0265
Errors	NOCHECK	NOCHECK	QC Pass	QC Pass	NOCHECK	QC Pass	NOCHECK
Value			1.000	2.500		1.000	
Range			.1000	.2500		.1000	

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0025	.9928	1.989
SDev	.0006	.0233	.069
%RSD	25.35	2.344	3.482
#1	-.0018	.9739	1.929
#2	-.0027	.9856	1.973
#3	-.0030	1.019	2.064
Errors	NOCHECK	QC Pass	QC Pass
Value		1.000	2.000
Range		.1000	.2000

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Method: ICP1A Sample Name: QC_MCVB 9604181902 Operator: DRG
Run Time: 05/09/96 13:19:19
Comment: (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

PASS DB 5/9/96

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0125	1.741	.3355	6.127	.0026	.0006	.0733
SDev	.0010	.009	.0092	.026	.0001	.0001	.0051
%RSD	7.655	.4911	2.735	.4288	3.122	16.21	6.994
#1	-.0129	1.739	.3301	6.137	.0025	.0006	.0788
#2	-.0133	1.750	.3461	6.146	.0025	.0006	.0687
#3	-.0114	1.733	.3303	6.097	.0027	.0008	.0724
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0800	.0029	1.951	-.0038	.0073	.0163	1.895
SDev	.0023	.0009	.011	.0003	.0007	.0022	.011
%RSD	2.918	29.82	.5483	8.466	9.794	13.38	.5865
#1	.0827	.0035	1.948	-.0036	.0065	.0162	1.901
#2	.0786	.0032	1.964	-.0042	.0077	.0142	1.902
#3	.0788	.0019	1.943	-.0036	.0077	.0185	1.882
Errors	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	QC Pass
Value			2.000				2.000
Range			10.00				10.00

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.918	.0482	-2.851	.9466	-.0054	-.1547	.0015
SDev	.012	.0030	.227	.0027	.0010	.0068	.0002
%RSD	.6494	6.251	7.980	.2910	18.92	4.370	15.52
#1	1.925	.0515	-2.982	.9485	-.0065	-.1622	.0014
#2	1.925	.0476	-2.982	.9478	-.0051	-.1527	.0013
#3	1.904	.0456	-2.588	.9434	-.0046	-.1492	.0017
Errors	QC Pass	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK
Value	2.000			1.000			
Range	10.00			10.00			

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0069	4.488	1.859	.0265	.1078	.2048	2.170
SDev	.0006	.046	.005	.0015	.0126	.0061	.034
%RSD	8.945	1.023	.2486	5.491	11.71	2.972	1.558
#1	.0065	4.449	1.859	.0265	.1197	.2004	2.158
#2	.0076	4.538	1.863	.0280	.0945	.2022	2.208
#3	.0065	4.477	1.854	.0250	.1092	.2118	2.143
Errors	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value			2.000				

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Range 10.00

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.921	1.903	.0945	.0758	56.07	1.944	.0039
SDev	.007	.002	.0066	.0173	.14	.041	.0001
%RSD	.3722	.1183	6.987	22.83	.2442	2.099	1.840
#1	1.929	1.903	.0884	.0832	55.97	1.917	.0039
#2	1.919	1.905	.0935	.0881	56.22	1.925	.0040
#3	1.916	1.900	.1015	.0560	56.00	1.991	.0039
Errors	QC Pass	QC Pass	NOCHECK	NOCHECK	NOCHECK	QC Pass	NOCHECK
Value	2.000	2.000				2.000	
Range	10.00	10.00				10.00	

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.936	9.361	.0078	.0034	23.57	-.0042	1.937
SDev	.015	.054	.0004	.0026	.10	.0007	.026
%RSD	.7710	.5765	5.313	77.74	.4338	17.55	1.321
#1	1.920	9.404	.0073	.0007	23.62	-.0049	1.920
#2	1.948	9.380	.0079	.0035	23.64	-.0043	1.966
#3	1.941	9.301	.0081	.0059	23.45	-.0034	1.924
Errors	QC Pass	QC Pass	NOCHECK	NOCHECK	QC Pass	NOCHECK	QC Pass
Value	2.000	10.00			25.00		2.000
Range	10.00	10.00			10.00		10.00

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	.9483	.0057	.0171
SDev	.0054	.0012	.0019
%RSD	.5694	20.92	10.92
#1	.9511	.0070	.0150
#2	.9518	.0053	.0179
#3	.9421	.0047	.0185
Errors	QC Pass	NOCHECK	NOCHECK
Value	1.000		
Range	10.00		

Analysis Report QC Standard Thu 05-09-96 01:24:48 PM page 1

Method: ICP1A Sample Name: QC_SRM-1643d 108520 Operator: DRS
Run Time: 05/09/96 13:23:30
Comment: (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	Q-.0019	.1254	Q.0630	Q.1582	.5096	Q.0124	.0118
SDev	.0006	.0022	.0046	.0037	.0019	.0000	.0113
%RSD	31.69	1.728	7.230	2.352	.3729	.2987	96.20
#1	Q-.0016	.1246	Q.0661	Q.1562	.5116	Q.0124	.0057
#2	Q-.0026	.1237	Q.0651	Q.1625	.5093	Q.0124	.0048
#3	Q-.0015	.1278	Q.0577	Q.1559	.5078	Q.0124	.0249
Errors	QC Fail	QC Pass	QC Fail	QC Fail	QC Pass	QC Fail	NOCHECK
Value	.0013	.1276	.0560	.1448	.5065	.0125	
Range	.0570	3.500	.7300	5.200	8.900	.2800	

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	Q31.88	Q.0048	-.0266	.0249	Q.0201	Q.0116	-.0004
SDev	.09	.0012	.0021	.0001	.0013	.0010	.0005
%RSD	.2688	25.39	7.845	.3123	6.612	9.031	110.7
#1	Q31.97	Q.0049	-.0288	.0249	Q.0192	Q.0105	-.0005
#2	Q31.86	Q.0060	-.0247	Q.0248	Q.0216	Q.0115	-.0008
#3	Q31.80	Q.0036	-.0264	.0249	Q.0195	Q.0126	.0001
Errors	QC Fail	QC Fail	NOCHECK	QC Pass	QC Fail	QC Fail	NOCHECK
Value	31.04	.0065		.0250	.0185	.0205	
Range	.6400	.3700		.5900	.2000	3.800	

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0023	.0882	Q1.136	.0006	Q.0157	Q8.411	Q.0404
SDev	.0002	.0003	.071	.0013	.0006	.038	.0002
%RSD	10.12	.3900	6.235	218.6	3.608	.4556	.4847
#1	.0024	.0878	Q1.074	.0006	Q.0150	Q8.455	Q.0402
#2	.0024	.0884	Q1.120	.0019	Q.0160	Q8.396	Q.0405
#3	.0020	.0884	Q1.213	-.0007	Q.0160	Q8.383	Q.0405
Errors	NOCHECK	QC Pass	QC Fail	NOCHECK	QC Fail	QC Fail	QC Fail
Value		.0912	2.356		.0165	7.989	.0377
Range		3.900	.0350		.5500	.0350	.8300

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.1121	22.02	-.0088	Q.0517	.0275	Q-.0067	-.0292
SDev	.0015	.06	.0024	.0011	.0075	.0060	.0080
%RSD	1.375	.2839	27.15	2.150	27.08	88.77	27.41
#1	Q.1104	22.08	-.0114	Q.0519	.0330	Q-.0070	-.0347
#2	.1133	22.03	-.0066	Q.0526	.0191	Q-.0126	-.0329
#3	.1127	21.95	-.0084	Q.0505	.0306	Q-.0006	-.0200
Errors	QC Pass	QC Pass	NOCHECK	QC Fail	NOCHECK	QC Fail	NOCHECK
Value	.1129	22.07		.0581		.0181	

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Range	1.700	.6400		2.700		.6400	
Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0210	-.0039	0.0547	0.0239	2.988	-.0970	.2996
SDev	.0036	.0012	.0059	.0051	.016	.0060	.0008
%RSD	17.25	30.75	10.82	21.47	.5484	6.165	.2519
#1	-.0223	-.0031	0.0609	0.0258	3.000	-.1037	.3003
#2	-.0238	-.0052	.0540	0.0181	2.993	-.0955	.2996
#3	-.0169	-.0033	0.0492	0.0279	2.969	-.0920	.2988
Errors	NOCHECK	NOCHECK	QC Fail	QC Fail	NOCHECK	NOCHECK	QC Pass
Value			.0541	.0114			.2948
Range			1.100	.1700			3.400

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0132	.0132	-.0010	0-.0070	-.1357	0.0316	.0046
SDev	.0109	.0022	.0002	.0093	.0061	.0000	.0028
%RSD	82.28	16.67	23.11	133.5	4.508	.0553	61.58
#1	-.0023	.0149	-.0012	0-.0131	-.1338	0.0316	.0015
#2	-.0132	.0140	-.0011	0-.0117	-.1307	0.0316	.0071
#3	-.0241	.0107	-.0008	0.0038	-.1425	0.0316	.0051
Errors	NOCHECK	NOCHECK	NOCHECK	QC Fail	NOCHECK	QC Fail	NOCHECK
Value				.0073		.0351	
Range				.2500		1.400	

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	.0002	0.0784	-.0032
SDev	.0002	.0016	.0003
%RSD	89.47	2.091	8.182
#1	.0001	0.0776	-.0035
#2	.0001	0.0774	-.0032
#3	.0005	0.0803	-.0030
Errors	NOCHECK	QC Fail	NOCHECK
Value		.0725	
Range		.6500	

Analysis Report QC Standard Thu 05-09-96 01:29:46 PM page 1

Method: ICP1A Sample Name: QC_CCV1 9604031901 Operator: DRS
Run Time: 05/09/96 13:28:27
Comment: (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

PASS DRS 5/9/96

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.5861	5.960	2.068	1.055	.5825	.1979	.0254
SDev	.0006	.005	.010	.001	.0010	.0003	.0094
%RSD	.1005	.0772	.5030	.0866	.1688	.1478	37.05
#1	.5868	5.965	2.075	1.054	.5835	.1982	.0297
#2	.5858	5.961	2.073	1.055	.5824	.1978	.0320
#3	.5858	5.956	2.056	1.055	.5815	.1977	.0146
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	NOCHECK
Value	.6000	6.000	2.000	1.000	.6000	.2000	
Range	10.00	10.00	10.00	10.00	10.00	10.00	

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	30.09	.5937	-.0332	.5999	.5843	.5541	-.0024
SDev	.03	.0015	.0048	.0016	.0037	.0014	.0003
%RSD	.1115	.2454	14.48	.2696	.6384	.2623	12.46
#1	30.13	.5926	-.0294	.6001	.5809	.5527	-.0023
#2	30.08	.5953	-.0386	.5982	.5883	.5556	-.0022
#3	30.06	.5932	-.0315	.6014	.5837	.5541	-.0027
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK
Value	30.00	.6000		.6000	.6000	.6000	
Range	10.00	10.00		10.00	10.00	10.00	

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0016	25.03	37.62	.0002	-.0018	15.24	.4128
SDev	.0001	.03	.09	.0013	.0010	.02	.0004
%RSD	7.560	.1285	.2464	665.2	56.77	.1207	.0914
#1	.0014	25.06	37.53	-.0005	-.0021	15.25	.4132
#2	.0016	25.02	37.62	.0017	-.0026	15.22	.4125
#3	.0016	25.00	37.72	-.0006	-.0007	15.25	.4127
Errors	NOCHECK	QC Pass	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass
Value		25.00	40.00			15.00	.4000
Range		10.00	10.00			10.00	10.00

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.5902	5.082	-.0113	.6018	.0518	1.947	-.0447
SDev	.0006	.055	.0012	.0009	.0103	.013	.0126
%RSD	.1089	1.073	10.36	.1519	19.79	.6520	28.23
#1	.5901	5.129	-.0102	.6010	.0518	1.952	-.0592
#2	.5896	5.095	-.0125	.6017	.0416	1.933	-.0382
#3	.5908	5.022	-.0113	.6028	.0621	1.957	-.0366
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	NOCHECK	QC Pass	NOCHECK
Value	.6000	5.000		.6000		2.000	

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Range	10.00	10.00		10.00		10.00	
Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0208	.0062	2.010	1.068	.4965	.1749	.0006
SDev	.0033	.0024	.025	.018	.0030	.0041	.0000
%RSD	15.94	38.94	1.226	1.692	.6103	2.336	.0244
#1	-.0242	.0035	2.013	1.069	.4998	.1777	.0006
#2	-.0208	.0082	2.034	1.086	.4955	.1702	.0006
#3	-.0175	.0069	1.985	1.050	.4940	.1767	.0006
Errors	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK	NOCHECK
Value			2.000	1.000	.4600		
Range			10.00	10.00	10.00		

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0232	.0281	1.963	1.990	-.1604	.5863	.0348
SDev	.0055	.0091	.004	.003	.0584	.0015	.0104
%RSD	23.69	32.43	.1842	.1701	36.41	.2619	30.07
#1	.0280	.0383	1.967	1.994	-.2245	.5869	.0262
#2	.0172	.0251	1.960	1.988	-.1101	.5875	.0464
#3	.0243	.0209	1.963	1.989	-.1466	.5846	.0317
Errors	NOCHECK	NOCHECK	QC Pass	QC Pass	NOCHECK	QC Pass	NOCHECK
Value			2.000	2.000		.6000	
Range			10.00	10.00		10.00	

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	.0006	.6123	-.0043
SDev	.0002	.0006	.0007
%RSD	32.36	.1056	17.29
#1	.0005	.6117	-.0050
#2	.0005	.6123	-.0045
#3	.0008	.6129	-.0035
Errors	NOCHECK	QC Pass	NOCHECK
Value		.6000	
Range		10.00	

Analysis Report QC Standard Thu 05-09-96 01:34:08 PM page 1

Method: ICP1A Sample Name: QC_SSTMCV 9604031904 Operator: DRS

Run Time: 05/09/96 13:32:49

Comment: (BX112 Core 118/119)M.Urie

Mode: CONC Corr. Factor: 1

PASS
DB
5/9/96

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.5013	5.053	2.134	-.0007	.1005	.1012	1.546
SDev	.0019	.020	.011	.0018	.0005	.0004	.013
%RSD	.3752	.4033	.5017	262.0	.4892	.4299	.8544
#1	.4996	5.035	2.123	.0002	.1000	.1007	1.531
#2	.5010	5.049	2.133	-.0028	.1005	.1012	1.557
#3	.5033	5.075	2.145	.0005	.1009	.1016	1.550
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass
Value	.5000	5.000	2.000		.1000	.1000	1.500
Range	10.00	10.00	10.00		10.00	10.00	10.00

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.085	.1981	-.0322	-.0026	.3048	-.0065	-.0041
SDev	.002	.0009	.0050	.0005	.0045	.0006	.0008
%RSD	.2111	.4676	15.56	20.67	1.464	8.892	18.70
#1	1.083	.1971	-.0274	-.0029	.3012	-.0064	-.0033
#2	1.085	.1989	-.0316	-.0029	.3098	-.0060	-.0042
#3	1.087	.1981	-.0374	-.0020	.3035	-.0071	-.0048
Errors	QC Pass	QC Pass	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK
Value	1.000	.2000			.3000		
Range	10.00	10.00			10.00		

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0057	.5337	48.51	-.0063	-.0036	-.1086	.1060
SDev	.0001	.0013	.18	.0004	.0010	.0059	.0006
%RSD	2.185	.2468	.3711	6.985	27.27	5.438	.5490
#1	.0057	.5341	48.31	-.0059	-.0026	-.1040	.1059
#2	.0059	.5322	48.56	-.0068	-.0036	-.1064	.1054
#3	.0057	.5348	48.66	-.0061	-.0046	-.1152	.1066
Errors	NOCHECK	QC Pass	QC Pass	NOCHECK	NOCHECK	NOCHECK	QC Pass
Value		.5000	50.00				.1000
Range		10.00	10.00				10.00

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0055	5.069	-.0347	.5228	4.039	2.990	-.0441
SDev	.0007	.042	.0056	.0013	.011	.012	.0031
%RSD	12.49	.8316	16.11	.2442	.2821	.3869	7.112
#1	.0058	5.067	-.0283	.5230	4.027	2.992	-.0467
#2	.0060	5.028	-.0383	.5215	4.041	2.978	-.0406
#3	.0047	5.112	-.0375	.5240	4.050	3.000	-.0451
Errors	NOCHECK	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK
Value		5.000		.5000	4.000	3.000	

Range		10.00		10.00	10.00	10.00	
Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0329	-.0119	2.076	2.663	3.069	-.0372	.0013
SDev	.0042	.0015	.016	.044	.018	.0126	.0000
%RSD	12.80	12.83	.7817	1.651	.5833	33.76	.0508
#1	-.0334	-.0127	2.060	2.650	3.057	-.0268	.0013
#2	-.0285	-.0101	2.076	2.627	3.061	-.0336	.0013
#3	-.0368	-.0128	2.093	2.712	3.090	-.0512	.0013
Errors	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK	NOCHECK
Value			2.000	2.500	3.000		
Range			10.00	10.00	10.00		

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0064	-.0115	-.0011	-.0106	19.88	.5055	.0192
SDev	.0080	.0061	.0008	.0180	.06	.0014	.0169
%RSD	124.4	53.59	65.27	169.9	.2781	.2798	88.17
#1	.0021	-.0079	-.0003	-.0267	19.83	.5044	.0376
#2	-.0077	-.0080	-.0014	.0069	19.87	.5049	.0044
#3	-.0137	-.0186	-.0017	-.0140	19.94	.5071	.0155
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	NOCHECK
Value					20.00	.5000	
Range					10.00	10.00	

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0019	.0020	.5052
SDev	.0002	.0005	.0040
%RSD	10.39	26.58	.8002
#1	-.0018	.0020	.5007
#2	-.0021	.0026	.5063
#3	-.0018	.0015	.5085
Errors	NOCHECK	NOCHECK	QC Pass
Value			.5000
Range			10.00

Analysis Report QC Standard Thu 05-09-96 01:38:26 PM page 1

Method: ICP1A Sample Name: QC_SSTA 960403I903 Operator: DRS
Run Time: 05/09/96 13:37:06
Comment: (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

PASS DRS 5/9/96

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0350	248.8	.3366	.0383	.0080	-.0009	193.2
SDev	.0015	2.1	.0188	.0010	.0001	.0001	1.3
%RSD	4.311	.8394	5.577	2.639	1.004	6.124	.6984
#1	-.0342	246.6	.3289	.0387	.0081	-.0009	191.7
#2	-.0341	250.8	.3229	.0372	.0080	-.0010	194.3
#3	-.0367	249.1	.3580	.0391	.0080	-.0009	193.6
Errors	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	QC Pass
Value		250.0					200.0
Range		10.00					10.00

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	246.3	.0639	.0661	.0041	.2335	-.1434	.0083
SDev	1.6	.0024	.0047	.0007	.0034	.0006	.0008
%RSD	.6313	3.814	7.105	17.77	1.442	.4124	9.857
#1	244.6	.0666	.0714	.0041	.2351	-.1428	.0089
#2	247.7	.0618	.0624	.0034	.2296	-.1437	.0074
#3	246.6	.0634	.0646	.0049	.2358	-.1438	.0085
Errors	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value	250.0						
Range	10.00						

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0809	191.0	97.37	47.80	.0289	-1.020	.0182
SDev	.0005	1.3	.79	.38	.0010	.022	.0004
%RSD	.6711	.6793	.8094	.8028	3.528	2.179	2.061
#1	.0803	189.6	96.59	47.38	.0293	-.9956	.0186
#2	.0814	192.2	98.16	48.12	.0298	-1.039	.0178
#3	.0812	191.2	97.35	47.92	.0278	-1.024	.0183
Errors	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK	NOCHECK	NOCHECK
Value		200.0	100.0	50.00			
Range		10.00	10.00	10.00			

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0969	.7616	.0829	188.0	195.1	.8714	.9188
SDev	.0016	.0086	.0053	1.1	1.2	.0037	.0098
%RSD	1.611	1.125	6.380	.5935	.6043	.4260	1.062
#1	.0951	.7596	.0889	186.7	193.8	.8679	.9246
#2	.0976	.7541	.0792	188.9	196.0	.8753	.9075
#3	.0980	.7709	.0804	188.3	195.4	.8711	.9242
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	NOCHECK	NOCHECK
Value				200.0	200.0		

Range				10.00	10.00		
Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.1437	.1009	.3887	1.530	-.2417	2.957	.0188
SDev	.0080	.0026	.0052	.019	.0119	.028	.0001
%RSD	5.606	2.611	1.336	1.262	4.914	.9400	.6718
#1	.1518	.1038	.3865	1.520	-.2285	2.943	.0187
#2	.1357	.0986	.3850	1.552	-.2517	2.939	.0189
#3	.1435	.1003	.3947	1.517	-.2448	2.989	.0188
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.6345	-.2739	-.0040	.3067	200.3	.0352	.5243
SDev	.0071	.0168	.0001	.0228	1.7	.0007	.0096
%RSD	1.113	6.117	3.707	7.432	.8710	1.999	1.832
#1	.6265	-.2603	-.0040	.2810	198.5	.0360	.5186
#2	.6397	-.2687	-.0042	.3142	201.9	.0352	.5353
#3	.6375	-.2926	-.0039	.3247	200.6	.0346	.5188
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK
Value					200.0		
Range					10.00		

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	.0146	.0662	.0560
SDev	.0002	.0059	.0012
%RSD	1.197	8.960	2.118
#1	.0146	.0642	.0554
#2	.0148	.0729	.0552
#3	.0144	.0615	.0573
Errors	NOCHECK	NOCHECK	NOCHECK
Value			
Range			

Analysis Report Thu 05-09-96 01:44:30 PM page 1

Method: ICP1A Sample Name: ICP1.0 960318F100 Operator: DRS
Run Time: 05/09/96 13:43:11
Comment: 119.2B.W2 Duplicate (BX112 Core 118/119)M.Urie
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	B	Ba	Be	Bi
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0045	.0811	-.0047	-.0035	-.0009	-.0001	.0689
SDev	.0003	.0085	.0125	.0022	.0001	.0000	.0005
%RSD	6.583	10.51	268.6	63.51	8.872	48.97	.6709
#1	-.0048	.0905	-.0183	-.0019	-.0008	-.0001	.0689
#2	-.0044	.0786	-.0019	-.0026	-.0010	-.0000	.0694
#3	-.0042	.0741	.0063	-.0060	-.0010	-.0001	.0684

Elem	Ca	Cd	Ce	Co	Cr	Cu	Dy
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0875	.0014	-.0374	-.0023	-.0001	-.0054	-.0037
SDev	.0074	.0031	.0054	.0004	.0011	.0011	.0002
%RSD	8.479	224.5	14.44	15.63	2110.	20.43	6.262
#1	.0949	.0046	-.0339	-.0019	.0012	-.0054	-.0038
#2	.0876	.0013	-.0436	-.0025	-.0008	-.0064	-.0035
#3	.0800	-.0017	-.0346	-.0026	-.0006	-.0042	-.0039

Elem	Eu	Fe	K	La	Li	Mg	Mn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0011	.0653	-1.437	.0102	-.0033	-.0197	-.0005
SDev	.0000	.0059	.096	.0005	.0017	.0054	.0001
%RSD	1.260	8.955	6.715	4.848	52.68	27.38	17.42
#1	-.0011	.0712	-1.360	.0107	-.0031	-.0223	-.0004
#2	-.0011	.0653	-1.406	.0103	-.0016	-.0234	-.0004
#3	-.0011	.0595	-1.545	.0097	-.0051	-.0135	-.0006

Elem	Mo	Na	Nd	Ni	P	Pb	Pd
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	-.0522	-.0292	.1230	.0867	-.0318	-.0605
SDev	.0015	.0202	.0044	.0092	.0151	.0034	.0008
%RSD	228.6	38.75	15.11	7.435	17.44	10.69	1.376
#1	.0006	-.0578	-.0328	.1302	.0694	-.0338	-.0609
#2	-.0003	-.0298	-.0243	.1262	.0930	-.0336	-.0596
#3	-.0023	-.0690	-.0305	.1127	.0976	-.0278	-.0611

Elem	Rh	Ru	Sb	Se	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0296	-.0086	-.0030	.0151	-.0106	-.1041	-.0002
SDev	.0021	.0005	.0047	.0063	.0005	.0068	.0001
%RSD	7.247	5.950	155.2	41.64	4.233	6.555	34.60
#1	-.0285	-.0089	.0004	.0191	-.0106	-.0978	-.0002
#2	-.0282	-.0080	-.0083	.0079	-.0111	-.1030	-.0002
#3	-.0321	-.0089	-.0011	.0184	-.0102	-.1113	-.0003

Elem	Te	Th	Ti	Tl	U	V	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0193	.0095	-.0023	-.0163	-.4323	-.0036	-.0037
SDev	.0049	.0065	.0002	.0067	.0492	.0009	.0048

Analysis Report Thu 05-09-96 01:44:30 PM page 2

%RSD	25.41	68.28	8.806	40.97	11.37	25.09	132.1
#1	-.0234	.0093	-.0020	-.0231	-.3958	-.0026	-.0055
#2	-.0207	.0031	-.0023	-.0098	-.4130	-.0038	.0019
#3	-.0139	.0162	-.0024	-.0160	-.4882	-.0043	-.0073

Elem	Y	Zn	Zr
Units	ppm	ppm	ppm
Avge	-.0017	-.0010	-.0049
SDev	.0002	.0003	.0002
%RSD	11.76	27.43	4.482
#1	-.0018	-.0007	-.0047
#2	-.0015	-.0010	-.0048
#3	-.0018	-.0013	-.0051

E4 - TOC/TIC/TC ANALYSIS

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DATA PACKAGE ROUTING

The attached records have completed technical review and are being routed for further processing.

Identification of Records -

ACL Numbers: 96-02607, 96-02608, 96-02613, 96-02614

Tests: TOC/P

ASR Number: 2785.01

Project Number: 22762 or ED Work Order: _____

Sent By -

D L Baldwin — Name
5/28/96 — Date
_____ — MSIN

__ Return after DQ Review (if required)
__ Return after PM Review

Data Quality Review Complete (if required) Yes

DQ Signature — Date 5/31/96

PM - Check the Following if Data Package is to be Returned -

__ PM Review complete; return to sender

Return to D Baldwin

For LSO Use Only

X DQ Review required
__ ACL Waste

Completed QC Screen BN (Initial) 5-28-96 (Date)

Client Due Date 5-31-96

Battelle
Pacific Northwest Laboratories

Project Number _____

Internal Distribution

System File/LB

Date May 30, 1996

To Project Manager

From DL Baldwin

Subject TOC/TIC/TC Analysis (Hot Persulfate Method) of BX112 Cores 118/119

The analysis of these samples was done by the hot persulfate wet oxidation method, PNL-ALO-381, rev. 1. The work was performed according to ASR 2785.01 and TI96-PM-10. The work was performed at Impact Level I. The hot persulfate method uses hot acid decomposition for TIC and acidic persulfate oxidation at 92-95°C for TOC, all on the same sample. TC is the sum of the two.

The table below shows the results, rounded to 2 or 3 significant figures. The full results are located on the attached spreadsheet, with the supporting raw data located on data sheets and review report spreadsheets and on file in the LSO Records Office. The TIC standard is calcium carbonate and the TOC standard is glucose. The standard materials were used in solid form for system standards as well as matrix spikes. Percent recovery is determined for TIC and TOC using the respective standards, $CaCO_3$, or glucose, and all sample results are corrected for percent recovery of standards and are blank-corrected. The estimated precision is ±10% and the estimated accuracy is ±15%. All results are reported in ugC/g, based on the weight of sample.

QC Narrative: QC for this work involved system blanks, system standards, duplicates, and one matrix spike for the batch. The QC system standards for TIC and TOC ranged from 84.9% to 114.8% recovery. The low 84.9% result was the first TOC standard run and is on the very low edge of acceptibility. This was an unusually large spread in the TOC recoveries, though the method is still considered in control. The matrix spike, run on 96-02614, came in within required limits, measured at 102% recovery for TIC, and 104% recovery for TOC.

The RPD precision values, ranging from 2% to 68%, indicates some possible homogeneity problems. For TIC, the RPD is high on 96-02613 at 52%, while for TOC, the RPD is high on both 96-02608 and 96-02613, at 31% and 68%, respectively. But, the unusual large spread of TOC standard recoveries, amounting to a 30% spread, may explain the 31% RPD for 96-02608. Therefore, the homogeneity on 96-02613 only is suspect.

May 30, 1996
Page 2

The mdl is calculated based on pooled historical data, and is 60 ug/g for TIC and 110 ug/g for TOC, based on a nominal weight of 0.1500 g.

Table of Results

ALO No.	Sample ID	wt (g)	TIC (ugC/g)	RPD (%)	TOC (ugC/g)	RPD (%)	TC (ugC/g)	RPD (%)
96-02607	BX112, C118 seg 2	0.1502	2670		1070		3740	
96-02607	dup	0.1316	2210	19	880	19	3090	19
96-02608	BX112, C118 seg 2	0.1204	1650		830		2480	
96-02608	dup	0.1544	1930	16	1130	31	3070	21
96-02613	BX112, C119 seg 2	0.1247	1840		1060		2900	
96-02613	dup	0.1369	1080	52	520	68	1600	58
96-02614	BX112, C119 seg 2	0.1315	2760		1080		3840	
96-02614	dup	0.1373	2650	4	1100	2	3750	2
96-02614	matrix spike	0.1203	102% recov		104% recov			

Concur by: _____ Date: 5-30-96
File TOC-PER.61
System File No. TC051696

TOC/TIC/TC Calculations "Review" Report - Hot Persulfate Method PNL-ALO-381
Samples: BX112 Cores 118/119 Samples Analyzed 5/16/96

Preparer/date: D. Baldwin 5/30/96
Reviewer/date: [illegible] 5-30-96

Instrument: WC01713 in SAL Hot Cell / Fume Hood
TIC STD: CaCO3 (lot N261)
Project No.: 22762 ASR: 2785.01 WP#: K41990 IL I

Bal M&TE: 360-06-01-016
TOC STD: Glucose (lot Kodak B1F)

Procedure: PNL-ALO-381
Archive File: 201PER24.XLS

**** Standard Calculations ****

Blank Averages:

TIC Blk:		TOC Blk:	
10	Average: 14.0	99	Average: 97.3
9	SD: 7.8	99	SD: 2.9
23	Pooled SD: 3.0	94	Pooled SD: 5.3
	MDL: 9.0		MDL: 16.0

	measured TIC (ug)	Blk (ug)	Standard wt (g)	TIC % Recov	measured TOC (ug)	blk (ug)	Standard wt (g)	TOC % Recov
STD 1	3418	14.0	0.0290	97.9	1557	97.3	0.0043	84.9
STD 2	2297	14.0	0.0201	94.7	2298	97.3	0.0060	91.7
STD 3	1771	14.0	0.0169	86.7	2295	97.3	0.0048	114.5
			avg:	93.1			avg:	97.0

**** Sample Calculations ****

ACL Number	Client ID	display TIC (ug)	blk (ug)	sample wt. (g)	TIC (ugC/g)	TIC RPD (%)	display TOC (ug)	blk (ug)	sample wt. (g)	TOC (ugC/g)	TOC RPD (%)	TC (ugC/g)	TC RPD (%)
96-02607	BX112, C118 seg 2, sludge [118.2A.D]	387	14.0	0.1502	2667		253	97.3	0.1502	1068		3735	
96-02607	dup	285	14.0	0.1316	2212	19	210	97.3	0.1316	883	19	3094	19
96-02608	BX112, C118 seg 2, sludge [118.2A.D]	199	14.0	0.1204	1650		194	97.3	0.1204	828		2478	
96-02608	dup	292	14.0	0.1544	1934	16	267	97.3	0.1544	1133	31	3066	21
96-02613	BX112, C119 seg 2, sludge [119.2A.D]	228	14.0	0.1247	1843		225	97.3	0.1247	1055		2898	
96-02613	dup	152	14.0	0.1369	1083	52	166	97.3	0.1369	517	68	1600	58
96-02614	BX112, C119 seg 2, sludge [119.2A.D]	352	14.0	0.1315	2760		235	97.3	0.1315	1079		3840	
96-02614	dup	353	14.0	0.1373	2652	4	244	97.3	0.1373	1101	2	3753	2
96-02614	matrix spike	2346	14.0	0.1203	see below		3197	97.3	0.1203	see below		see below	

**** Matrix Spike Results ****

ACL Number	Client ID	MS (ug)	MS blk (ug)	Sa ug/g	MS Sa wt. (g)	spike (g)	Spike % Recovery
96-02614	matrix spike TIC	2346	14.0	2760	0.1203	0.0178	101.8
96-02614	matrix spike TOC	3197	97.3	1079	0.1203	0.0074	103.6

**** Equations ****

Carbon Fraction in TIC (CaCO3) Standard = 0.1199
Carbon Fraction in TOC (Glucose) Standard = 0.4000

% TIC (CaCO3) Recovery = [(S-B)/(Sample wt*e+6*0.1199)]*100
% TOC (Glucose) Recovery = [(S-B)/(Sample wt*e+6*0.400)]*100
TIC (ugC/g sample) = (TIC-Blk)/(Sample wt*Avg TIC Recov/100)
TOC (ugC/g sample) = (TOC-Blk)/(Sample wt*Avg TOC Recov/100)
TIC MS Recov (spike in g) = [(MS(ug)-B)*1e-6/(Avg TIC Recov/100)-S(ug/g)*Sample wt]*100/[spk wt*1e6*0.1199]
TOC MS Recov (spike in g) = [(MS(ug)-B)*1e-6/(Avg TOC Recov/100)-S(ug/g)*Sample wt]*100/[spk wt*1e6*0.400]
Due to the precision carried in the spreadsheet, some calculations may appear to be slightly off due to rounding errors.
The Pooled SD is the averaged SD for a recent list of 12 sample batches. MDL is based upon the Pooled SD. MDL = 3 x pooled SD.

2288

WHC-SD-WM-DP-170, REV. 1

DATA PACKAGE ROUTING

The attached records have **completed technical review** and are being routed for further processing.

Identification of Records -

ACL Numbers: 96-2607-2614

Tests: Gross β, GEA, ^{90}Sr, U/Laser

ASR Number: 2785.01

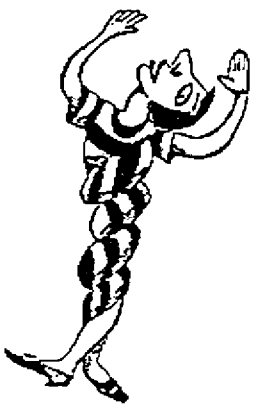
Project Number: 22762 or ED Work Order: K41987

Sent By -

[signature] 5/28/96

Name Date MSIN

__ Return after DQ Review (if required)
__ Return after PM Review



Data Quality Review Complete (if required) -

[signature] 5/30/96

DQ Signature Date

PM - Check the Following if Data Package is to be Returned -

__ PM Review complete; return to sender

For LSO Use Only

__ DQ Review required
__ ACL Waste

Completed QC Screen BN 5-28-96

Initial Date

Client Due Date 5-31-96

E5 - GEA

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Table 3.6: Gamma Energy Analysis, Core 118/119, Seg 2A/2B, Tank BX-112

ALO #	CORE ID	Co-60 uCi/g	Cs-134 uCi/g	Cs-137 uCi/g	+/-% Error	Eu-154 uCi/g	Eu-155 uCi/g	Am-241 uCi/g
96-2605-BLK	PROCESS BLANK	<9.8E-3	<6.5E-3	1.51E-01	5%	<1.4E-2	<2.6E-2	<2.4E-2
96-2607	118.2A.F	<1.5E-2	<3.3E-2	5.70E+01	2%	<2.4E-2	<1.2E-1	<1.4E-1
96-2607-DUP	118.2A.F DUP	<1.4E-2	<3.5E-2	5.72E+01	2%	<2.6E-2	<1.3E-1	<1.5E-1
	RPD			0.4%				
96-2606-BLK	PROCESS BLANK	<1.2E-2	<6.5E-3	7.80E-02	8%	<1.8E-2	<2.5E-2	<2.5E-2
96-2608	118.2B.F	<1.5E-2	<3.6E-2	6.24E+01	2%	<2.3E-2	<1.3E-1	<1.5E-1
96-2608-DUP	118.2B.F DUP	<1.4E-2	<3.4E-2	6.29E+01	2%	<1.8E-2	<1.2E-1	<1.5E-1
	RPD			0.8%				
96-2611-BLK	PROCESS BLANK	<1.4E-2	<6.6E-3	1.63E-01	5%	<1.7E-2	<2.8E-2	<2.6E-2
96-2613	119.2A.F	<1.6E-2	<3.3E-2	4.68E+01	2%	<2.7E-2	<1.2E-1	<1.4E-1
96-2613-DUP	119.2A.F DUP	<1.7E-2	<3.3E-2	4.77E+01	2%	<3.0E-2	<1.2E-1	<1.5E-1
	RPD			1.9%				
96-2612-BLK	PROCESS BLANK	<1.2E-2	<7.6E-3	1.39E-01	5%	<2.3E-2	<2.7E-2	<2.8E-2
96-2614	119.2B.F	<1.1E-2	<3.2E-2	4.32E+01	2%	<2.3E-2	<9.7E-2	<1.1E-1
96-2851DUP	119.2B.F DUP	<1.1E-2	<2.9E-2	4.42E+01	2%	<1.6E-2	<9.2E-2	<1.0E-1
	RPD			2.3%				

RT R 5/7/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

3-MAY-1996 08:57:52.69
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-02605 Blk BX112 Core118 seg2 Urie K41991

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_G0464.CNF;1
Analys. File: ND_SC_ASF:COMMON.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_G3GSV2MLW_N
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_G.CNF;21 - 19-APR-1996 17:07:09

Acquisition time : 3-MAY-1996 06:57:42. Sample quantity: 2.00000E+00 ml ✓
Sample (EOI) time: 3-MAY-1996 06:57:41. Sample geometry: P3-GSV-2ML-W ✓
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:00.97 0.0%

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 70.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/ml	Decay Corr uCi/ml	1-Sigma %Error	Status
CS-137	661.66	85.20*	5.575E-01	2.553E-04	2.553E-04	4.87	OK

Final Mean for 1 Valid Peaks = 2.553E-04+/- 1.244E-05 (4.87%)

Flag: "*" = Keyline

per 2 ml

$\times \frac{100\,ml}{.1687\,g} = 1.51E-1\ \frac{\mu Ci}{g}$

JRH 5-13-96

Post-NID Peak Search Report
Sample ID : 96-02605 Blk U

Acquisition date : 3-MAY-1996 06:57:42

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/ml
0	84.79*	37	1.40	219.94	216	8	79.1			
0	93.43	166	3.08	243.01	236	16	30.7			
0	661.53	646	1.73	1760.14	1749	22	4.6		CS-137	2.553E-04
0	829.98	24	3.32	2210.17	2200	17	39.8			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/ml)	µci/g
K-40	51.	1460.83	1.8575E-04	
CR-51	208.	320.08	1.3190E-04	
MN-54	21.	834.84	8.6251E-06	
FE-59	15.	1099.25	1.6172E-05	
CO-60	39.	1332.50	1.6614E-05	<9.8E-3
SR-85	119.	514.00	1.4648E-05	
NB-94	29.	871.09	1.0544E-05	
NB-95	41.	765.81	1.1306E-05	
TC-95M	326.	204.11	1.7696E-05	
ZR-95	36.	756.73	1.9060E-05	
RU-103	70.	497.05	1.1841E-05	
RURH-106	51.	621.92	1.0870E-04	
AG-108M	30.	722.90	1.0030E-05	
CD-109	286.	88.03	2.5594E-04	
SB-125	91.	427.88	3.6227E-05	
CS-134	55.	604.72	1.1047E-05	<6.5E-3
CE-139	362.	165.85	1.3555E-05	
CE-141	387.	145.44	2.1772E-05	
CE-144	379.	133.54	9.0634E-05	
EU-152	159.	344.28	4.5115E-05	
EU-154	10.	1274.44	2.3251E-05	<1.4E-2
EU-155	331.	105.31	4.3357E-05	< 2.6E-2
HG-203	331.	72.87	1.9580E-04	
BI-214	22.	1120.27	7.2944E-05	
TH-228	328.	238.58	3.0038E-05	
U-235	415.	185.71	2.1688E-05	
U-238	42.	1001.00	2.1482E-03	
AM-241	193.	59.54	4.0698E-05	< 2.4E-2

YRL
5-13-96

RTRS 5/7/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

7-MAY-1996 16:30:09.89
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-02607 BX112 Core118 seg2 Urie K41991

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_H0238.CNF;1
Analys. File: ND_SC_ASF:COMMON.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_H3GSV2MLW_T
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_H.CNF;20 - 8-APR-1996 16:57:56.

Acquisition time : 3-MAY-1996 09:41:43.
Sample (EOI) time: 3-MAY-1996 09:41:43.
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:04:18.66 3.5%

Sample quantity: 3.37600E-03 g
Sample geometry: P3-GSV-2ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	4.993E-01	5.699E+01	5.699E+01	1.53	OK

Final Mean for 1 Valid Peaks = 5.699E+01+/- 8.698E-01 (1.53%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-02607 BX112 Acquisition date : 3-MAY-1996 09:41:43

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	74.87*	207	1.22	197.19	195	7	49.8			
0	661.67*	218060	1.78	1761.71	1749	23	0.2		CS-137	57.0
0	1332.51*	10	1.78	3551.33	3542	17	111.5			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	59.	1460.83	1.4051E-01
CR-51	5026.	320.08	4.2546E-01
MN-54	44.	834.84	8.2325E-03
FE-59	29.	1099.25	1.4679E-02
CO-60	64.	1332.50	1.4459E-02
SR-85	3275.	514.00	5.0800E-02
NB-94	33.	871.09	7.3895E-03
NB-95	51.	765.81	8.2934E-03
TC-95M	8132.	204.11	5.8970E-02
ZR-95	25.	756.73	1.0491E-02
RU-103	3910.	497.05	5.8545E-02
RURH-106	1052.	621.92	3.2670E-01
AG-108M	47.	722.90	8.3492E-03
CD-109	3964.	88.03	7.5833E-01
SB-125	6644.	427.88	2.0479E-01
CS-134	1092.	604.72	3.2700E-02
CE-139	5496.	165.85	3.6239E-02
CE-141	5246.	145.44	5.6387E-02
CE-144	5292.	133.54	2.4254E-01
EU-152	4992.	344.28	1.6595E-01
EU-154	23.	1274.44	2.3778E-02
EU-155	4414.	105.31	1.2043E-01
HG-203	3706.	72.87	5.3958E-01
BI-214	33.	1120.27	5.9512E-02
TH-228	5923.	238.58	8.4282E-02
U-235	7543.	185.71	6.2391E-02
U-238	26.	1001.00	1.1149E+00
AM-241	3345.	59.54	1.3986E-01

RI RS 5/7/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

7-MAY-1996 16:31:01.60
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-02607Dup BX112 Core118 seg2 Urie K41991

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_H0239.CNF;1
Analys. File: ND_SC_ASF:COMMON.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_H3GSV2MLW_T
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_H.CNF;20 - 8-APR-1996 16:57:56.

Acquisition time : 3-MAY-1996 12:32:41.
Sample (EOI) time: 3-MAY-1996 12:32:40.
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:04:24.00 3.5%

Sample quantity: 3.14000E-03 g
Sample geometry: P3-GSV-2ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: Activation

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CO-60	1173.24	99.97	3.185E-01	1.311E-02	1.311E-02	37.03	OK
	1332.50	99.99*	2.872E-01	1.915E-03	1.915E-03	239.65	OK
	2505.74	-- Miscellaneous--		-----	Line Not Found	-----	Absent

Final Mean for 2 Valid Peaks = 7.197E-03+/- 3.335E-03 (46.33%)

< 1.4E-2 JRS 5-13-96

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	4.993E-01	5.720E+01	5.720E+01	1.53	OK

Final Mean for 1 Valid Peaks = 5.720E+01+/- 8.740E-01 (1.53%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-02607Dup BX

Acquisition date : 3-MAY-1996 12:32:41

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	75.03*	177	0.84	197.61	195	7	55.7			
0	661.72*	203562	1.77	1761.84	1749	24	0.2		CS-137	57.2
0	1174.36*	35	4.27	3129.33	3114	26	37.0		CO-60	1.311E-02
0	1332.77*	5	2.00	3552.01	3542	17	239.6		CO-60	1.915E-03

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	58.	1460.83	1.4875E-01
CR-51	4578.	320.08	4.3662E-01
MN-54	45.	834.84	8.9129E-03
FE-59	32.	1099.25	1.6745E-02
SR-85	2963.	514.00	5.1946E-02
NB-94	31.	871.09	7.7042E-03
NB-95	34.	765.81	7.3108E-03
TC-95M	7639.	204.11	6.1447E-02
ZR-95	47.	756.73	1.5604E-02
RU-103	3688.	497.05	6.1134E-02
RURH-106	1020.	621.92	3.4584E-01
AG-108M	42.	722.90	8.4989E-03
CD-109	3737.	88.03	7.9165E-01
SB-125	6046.	427.88	2.1005E-01
CS-134	1068.	604.72	3.4763E-02
CE-139	5168.	165.85	3.7783E-02
CE-141	4934.	145.44	5.8791E-02
CE-144	4878.	133.54	2.5037E-01
EU-152	4663.	344.28	1.7243E-01
EU-154	23.	1274.44	2.5375E-02
EU-155	3925.	105.31	1.2210E-01
HG-203	3458.	72.87	5.6035E-01
BI-214	37.	1120.27	6.8143E-02
TH-228	5616.	238.58	8.8237E-02
U-235	7032.	185.71	6.4768E-02
U-238	37.	1001.00	1.4348E+00
AM-241	3084.	59.54	1.4438E-01

RI RS 5/7/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

3-MAY-1996 11:46:10.11
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-02606 Blk BX112 Core118 seg2 Urie K41991

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_G0465.CNF;1
Analys. File: ND_SC_ASF:COMMON.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_G3GSV2MLW_N
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_G.CNF;21 - 19-APR-1996 17:07:09

Acquisition time : 3-MAY-1996 09:46:00. Sample quantity: 2.00000E+00 ml
Sample (EOI) time: 3-MAY-1996 09:45:59. Sample geometry: P3-GSV-2ML-W
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:00.95 0.0%

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 70.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: natural

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/ml	Decay Corr uCi/ml	1-Sigma %Error	Status
K-40	1460.83	10.67*	3.129E-01	1.085E-04	1.085E-04	43.56	OK

Final Mean for 1 Valid Peaks = 1.085E-04+/- 4.726E-05 (43.56%)

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/ml	Decay Corr uCi/ml	1-Sigma %Error	Status
CS-137	661.66	85.20*	5.575E-01	1.316E-04	1.316E-04	7.62	OK

Final Mean for 1 Valid Peaks = 1.316E-04+/- 1.003E-05 (7.62%)

Flag: "*" = Keyline

per 2ml

$\times \frac{100\,ml}{avg.\ .1687g} = 7.8E-2\ \frac{uCi}{g}$

JRS 5-13-96

Post-NID Peak Search Report
Sample ID : 96-02606 Blk B

Acquisition date : 3-MAY-1996 09:46:00

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/ml
0	661.64	333	1.57	1760.44	1749	22	7.5		CS-137	1.316E-04
0	1332.35*	9	3.27	3552.76	3542	20	103.5			
0	1460.93*	19	3.96	3896.52	3886	20	43.5		K-40	1.085E-04

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/ml)	µCi/g
CR-51	199.	320.08	1.2888E-04	
MN-54	39.	834.84	1.1706E-05	
FE-59	20.	1099.25	1.8577E-05	
CO-60	57.	1332.50	1.9955E-05	< 1.2E-2
SR-85	107.	514.00	1.3867E-05	
NB-94	31.	871.09	1.0800E-05	
NB-95	40.	765.81	1.1173E-05	
TC-95M	341.	204.11	1.8080E-05	
ZR-95	31.	756.73	1.7742E-05	
RU-103	67.	497.05	1.1613E-05	
RURH-106	38.	621.92	9.3359E-05	
AG-108M	31.	722.90	1.0253E-05	
CD-109	297.	88.03	2.6064E-04	
SB-125	70.	427.88	3.1802E-05	
CS-134	53.	604.72	1.0877E-05	< 6.5E-3
CE-139	374.	165.85	1.3775E-05	
CE-141	365.	145.44	2.1145E-05	
CE-144	371.	133.54	8.9611E-05	
EU-152	154.	344.28	4.4332E-05	
EU-154	16.	1274.44	2.9270E-05	< 1.8E-2
EU-155	301.	105.31	4.1366E-05	< 2.5E-2
HG-203	334.	72.87	1.9677E-04	
BI-214	23.	1120.27	7.5602E-05	
TH-228	320.	238.58	2.9682E-05	
U-235	402.	185.71	2.1354E-05	
U-238	27.	1001.00	1.7310E-03	
AM-241	202.	59.54	4.1639E-05	< 2.5E-2

RTR 5/7/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

7-MAY-1996 16:31:13.53
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-02608 BX112 Core118 seg2 Urie K41991

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_H0241.CNF;1
Analys. File: ND_SC_ASF:COMMON.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_H3GSV2MLW_T
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_H.CNF;21 - 4-MAY-1996 12:30:48.

Acquisition time : 6-MAY-1996 07:35:37. Sample quantity: 3.30200E-03 g
Sample (EOI) time: 6-MAY-1996 07:35:36. Sample geometry: P3-GSV-2ML-W
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:04:28.56 3.6%

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 70.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: natural

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
K-40	1460.83	10.67*	2.659E-01	1.496E-02	1.496E-02	257.21	OK

Final Mean for 1 Valid Peaks = 1.496E-02+/- 3.849E-02 (257.21%)

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	4.993E-01	6.240E+01	6.240E+01	1.53	OK

Final Mean for 1 Valid Peaks = 6.240E+01+/- 9.526E-01 (1.53%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-02608 BX112

Acquisition date : 6-MAY-1996 07:35:37

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.79	233497	1.77	1762.05	1749	24	0.2		CS-137	62.4
0	1461.32*	4	1.52	3895.07	3885	18	257.2		K-40	1.496E-02

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
CR-51	5493.	320.08	4.5478E-01
MN-54	36.	834.84	7.5954E-03
FE-59	28.	1099.25	1.4807E-02
CO-60	59.	1332.50	1.4127E-02
SR-85	3579.	514.00	5.4296E-02
NB-94	33.	871.09	7.5376E-03
NB-95	39.	765.81	7.4098E-03
TC-95M	8860.	204.11	6.2929E-02
ZR-95	39.	756.73	1.3516E-02
RU-103	4239.	497.05	6.2330E-02
RURH-106	1094.	621.92	3.4063E-01
AG-108M	42.	722.90	8.0488E-03
CD-109	4291.	88.03	8.0672E-01
SB-125	6861.	427.88	2.1277E-01
CS-134	1209.	604.72	3.5184E-02
CE-139	5893.	165.85	3.8368E-02
CE-141	5751.	145.44	6.0358E-02
CE-144	5529.	133.54	2.5347E-01
EU-152	5317.	344.28	1.7511E-01
EU-154	20.	1274.44	2.2520E-02
EU-155	4666.	105.31	1.2660E-01
HG-203	4106.	72.87	5.8065E-01
BI-214	25.	1120.27	5.2762E-02
TH-228	6267.	238.58	8.8640E-02
U-235	8060.	185.71	6.5941E-02
U-238	31.	1001.00	1.2575E+00
AM-241	3589.	59.54	1.4812E-01

RJR 5/7/9

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

7-MAY-1996 16:31:19.91
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-02608Dup BX112 Core118 seg2 Urie K41991

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_H0242.CNF;1
Analys. File: ND_SC_ASF:COMMON.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_H3GSV2MLW_T
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_H.CNF;21 - 4-MAY-1996 12:30:48.

Acquisition time : 6-MAY-1996 09:45:12. Sample quantity: 3.67400E-03 g
Sample (EOI) time: 6-MAY-1996 09:45:11. Sample geometry: P3-GSV-2ML-W
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:04:27.75 3.6%

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 70.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: natural

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
K-40	1460.83	10.67*	2.660E-01	5.672E-02	5.672E-02	71.62	OK

Final Mean for 1 Valid Peaks = 5.672E-02+/- 4.062E-02 (71.62%)

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	4.993E-01	6.288E+01	6.288E+01	1.52	OK

Final Mean for 1 Valid Peaks = 6.288E+01+/- 9.588E-01 (1.52%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-02608Dup BX Acquisition date : 6-MAY-1996 09:45:12

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.78	261793	1.77	1762.02	1749	24	0.2		CS-137	62.9
0	821.88	18	3.56	2189.02	2175	21	79.3			
0	1460.95*	16	3.55	3894.07	3883	21	71.5		K-40	5.672E-02

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
CR-51	6000.	320.08	4.2719E-01
MN-54	43.	834.84	7.4706E-03
FE-59	35.	1099.25	1.4773E-02
CO-60	65.	1332.50	1.3357E-02
SR-85	3801.	514.00	5.0283E-02
NB-94	49.	871.09	8.2351E-03
NB-95	44.	765.81	7.1220E-03
TC-95M	9878.	204.11	5.9720E-02
ZR-95	35.	756.73	1.1423E-02
RU-103	4783.	497.05	5.9503E-02
RURH-106	1270.	621.92	3.2989E-01
AG-108M	48.	722.90	7.7469E-03
CD-109	4872.	88.03	7.7252E-01
SB-125	7589.	427.88	2.0112E-01
CS-134	1391.	604.72	3.3915E-02
CE-139	6658.	165.85	3.6653E-02
CE-141	6406.	145.44	5.7255E-02
CE-144	6183.	133.54	2.4090E-01
EU-152	5887.	344.28	1.6559E-01
EU-154	15.	1274.44	1.7443E-02
EU-155	5206.	105.31	1.2018E-01
HG-203	4532.	72.87	5.4826E-01
BI-214	31.	1120.27	5.3314E-02
TH-228	6983.	238.58	8.4092E-02
U-235	8872.	185.71	6.2178E-02
U-238	25.	1001.00	1.0117E+00
AM-241	4087.	59.54	1.4205E-01

BT 5/7/

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

6-MAY-1996 12:37:27.84
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-02611 Blk BX112 Core119 seg2 Urie K41991

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_G0470.CNF;1
Analys. File: ND_SC_ASF:COMMON.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_G3GSV2MLW_N
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_G.CNF;22 - 4-MAY-1996 12:29:22.

Acquisition time : 6-MAY-1996 10:37:19. Sample quantity: 2.00000E+00 ml
Sample (EOI) time: 6-MAY-1996 10:37:18. Sample geometry: P3-GSV-2ML-W
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:00.97 0.0%

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 70.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: natural

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/ml	Decay Corr uCi/ml	1-Sigma %Error	Status
K-40	1460.83	10.67*	3.129E-01	2.628E-05	2.628E-05	187.14	OK

Final Mean for 1 Valid Peaks = 2.628E-05+/- 4.919E-05 (187.14%)

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/ml	Decay Corr uCi/ml	1-Sigma %Error	Status
CS-137	661.66	85.20*	5.574E-01	2.530E-04	2.530E-04	4.72	OK

Final Mean for 1 Valid Peaks = 2.530E-04+/- 1.195E-05 (4.72%)

Flag: "*" = Keyline

per 2ml

$X \frac{100\,ml}{0.1555\,g} = 1.63E-1\ uCi/g$

5.13-96

Post-NID Peak Search Report
Sample ID : 96-02611 Blk B

Acquisition date : 6-MAY-1996 10:37:19

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/ml
0	92.44*	35	1.42	240.35	238	13	130.4			
0	661.69	640	1.36	1760.58	1751	17	4.5		CS-137	2.530E-04
0	1332.57*	13	1.54	3553.35	3542	19	76.9			
0	1460.93*	5	1.08	3896.53	3885	20	187.1		K-40	2.628E-05

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/ml)	uCi/g
CR-51	196.	320.08	1.2799E-04	
MN-54	18.	834.84	8.0610E-06	
FE-59	38.	1099.25	2.5381E-05	
CO-60	61.	1332.50	2.0631E-05	< 1.4E-2
SR-85	107.	514.00	1.3862E-05	
NB-94	26.	871.09	9.9150E-06	
NB-95	32.	765.81	9.9848E-06	
TC-95M	337.	204.11	1.7976E-05	
ZR-95	33.	756.73	1.8408E-05	
RU-103	69.	497.05	1.1769E-05	
RURH-106	43.	621.92	1.0018E-04	
AG-108M	35.	722.90	1.0824E-05	
CD-109	285.	88.03	2.5565E-04	
SB-125	105.	427.88	3.8961E-05	
CS-134	47.	604.72	1.0242E-05	< 6.6E-3
CE-139	367.	165.85	1.3652E-05	
CE-141	405.	145.44	2.2289E-05	
CE-144	345.	133.54	8.6459E-05	
EU-152	155.	344.28	4.4566E-05	
EU-154	14.	1274.44	2.7046E-05	< 1.7E-2
EU-155	316.	105.31	4.2379E-05	< 2.8E-2
HG-203	303.	72.87	1.8735E-04	
BI-214	28.	1120.27	8.3353E-05	
TH-228	330.	238.58	3.0133E-05	
U-235	407.	185.71	2.1489E-05	
U-238	22.	1001.00	1.5724E-03	
AM-241	182.	59.54	3.9496E-05	< 2.6E-2

RT 2 5/7/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

7-MAY-1995 16:31:32.55
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-02613 BX112 Core119 seg2 Urie K41991

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_H0243.CNF;1
Analys. File: ND_SC_ASF:COMMON.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_H3GSV2MLW_T
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_H.CNF;21 - 4-MAY-1996 12:30:48.

Acquisition time : 6-MAY-1996 11:56:16. Sample quantity: 3.08800E-03 g
Sample (EOI) time: 6-MAY-1996 11:56:16. Sample geometry: P3-GSV-2ML-W
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:04:06.05 3.3%

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 70.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: natural

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
K-40	1460.83	10.67*	2.659E-01	8.445E-02	8.445E-02	58.17	OK

Final Mean for 1 Valid Peaks = 8.445E-02+/- 4.912E-02 (58.17%)

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	4.993E-01	4.677E+01	4.677E+01	1.53	OK

Final Mean for 1 Valid Peaks = 4.677E+01+/- 7.168E-01 (1.53%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-02613 BX112

Acquisition date : 6-MAY-1996 11:56:16

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	75.26*	81	0.72	198.24	195	7	112.5			
0	661.77	163682	1.76	1761.99	1749	23	0.3		CS-137	46.8
0	911.39*	11	3.59	2427.79	2415	18	123.8			
0	1461.27*	20	2.56	3894.92	3884	21	58.1	1.87E+00	K-40	8.445E-02

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
CR-51	3864.	320.08	4.0785E-01
MN-54	40.	834.84	8.5617E-03
FE-59	35.	1099.25	1.7638E-02
CO-60	66.	1332.50	1.5979E-02
SR-85	2427.	514.00	4.7812E-02
NB-94	39.	871.09	8.7583E-03
NB-95	42.	765.81	8.1953E-03
TC-95M	6100.	204.11	5.5837E-02
ZR-95	42.	756.73	1.4873E-02
RU-103	3027.	497.05	5.6323E-02
RURH-106	827.	621.92	3.1668E-01
AG-108M	52.	722.90	9.5852E-03
CD-109	3180.	88.03	7.4255E-01
SB-125	4951.	427.88	1.9328E-01
CS-134	907.	604.72	3.2572E-02
CE-139	4217.	165.85	3.4707E-02
CE-141	4171.	145.44	5.4954E-02
CE-144	3944.	133.54	2.2891E-01
EU-152	3662.	344.28	1.5539E-01
EU-154	24.	1274.44	2.6379E-02
EU-155	3344.	105.31	1.1459E-01
HG-203	2958.	72.87	5.2703E-01
BI-214	40.	1120.27	7.1680E-02
TH-228	4653.	238.58	8.1666E-02
U-235	5810.	185.71	5.9867E-02
U-238	36.	1001.00	1.4506E+00
AM-241	2671.	59.54	1.3664E-01

RTR 5/2/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

7-MAY-1996 16:31:43.37
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-02613Dup BX112 Core119 seg2 Urie K41991

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_H0245.CNF;1
Analys. File: ND_SC_ASF:COMMON.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_H3GSV2MLW_T
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_H.CNF;21 - 4-MAY-1996 12:30:48.

Acquisition time : 7-MAY-1996 09:28:56.
Sample (EOI) time: 7-MAY-1996 09:28:56.
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:04:10.42 3.4%

Sample quantity: 2.81600E-03 g
Sample geometry: P3-GSV-2ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	4.993E-01	4.766E+01	4.766E+01	1.53	OK

Final Mean for 1 Valid Peaks = 4.766E+01+/- 7.313E-01 (1.53%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-02613Dup BX

Acquisition date : 7-MAY-1996 09:28:56

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.79	152095	1.76	1762.03	1749	24	0.3		CS-137	47.7

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	62.	1460.83	1.7170E-01
CR-51	3528.	320.08	4.2735E-01
MN-54	44.	834.84	9.9065E-03
FE-59	30.	1099.25	1.8017E-02
CO-60	60.	1332.50	1.6788E-02
SR-85	2274.	514.00	5.0745E-02
NB-94	36.	871.09	9.1717E-03
NB-95	33.	765.81	8.0383E-03
TC-95M	5861.	204.11	6.0016E-02
ZR-95	28.	756.73	1.3480E-02
RU-103	2780.	497.05	5.9180E-02
RURH-106	745.	621.92	3.2956E-01
AG-108M	35.	722.90	8.5695E-03
CD-109	2825.	88.03	7.6743E-01
SB-125	4454.	427.88	2.0103E-01
CS-134	765.	604.72	3.2816E-02
CE-139	3871.	165.85	3.6464E-02
CE-141	3876.	145.44	5.8105E-02
CE-144	3685.	133.54	2.4265E-01
EU-152	3516.	344.28	1.6696E-01
EU-154	25.	1274.44	2.9563E-02
EU-155	3066.	105.31	1.2032E-01
HG-203	2644.	72.87	5.4640E-01
BI-214	30.	1120.27	6.8525E-02
TH-228	4357.	238.58	8.6668E-02
U-235	5417.	185.71	6.3390E-02
U-238	25.	1001.00	1.3104E+00
AM-241	2536.	59.54	1.4600E-01

RTR 5/7/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

6-MAY-1996 15:06:57.16
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-02612 Blk BX112 Core119 seg2 Urie K41991

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_G0471.CNF;1
Analys. File: ND_SC_ASF:COMMON.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_G3GSV2MLW_N
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_G.CNF;22 - 4-MAY-1996 12:29:22.

Acquisition time : 6-MAY-1996 13:06:46. Sample quantity: 2.00000E+00 ml
Sample (EOI) time: 6-MAY-1996 13:06:46. Sample geometry: P3-GSV-2ML-W
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:00.96 0.0%

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 70.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/ml	Decay Corr uCi/ml	1-Sigma %Error	Status
CS-137	661.66	85.20*	5.575E-01	2.160E-04	2.160E-04	4.85	OK

Final Mean for 1 Valid Peaks = 2.160E-04+/- 1.048E-05 (4.85%)

Flag: "*" = Keyline

per 2ml

$\times \frac{100ml}{.1555g} = 1.39E-1 \frac{mCi}{g}$

JRD 5-13-96

Post-NID Peak Search Report
Sample ID : 96-02612 Blk B

Acquisition date : 6-MAY-1996 13:06:46

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/ml
0	661.64	546	1.90	1760.44	1753	15	4.6		CS-137	2.160E-04

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/ml)	uCi/g
K-40	58.	1460.83	1.9991E-04	
CR-51	168.	320.08	1.1863E-04	
MN-54	28.	834.84	9.8793E-06	
FE-59	18.	1099.25	1.7682E-05	
CO-60	49.	1332.50	1.8530E-05	<1.2E-2
SR-85	120.	514.00	1.4705E-05	
NB-94	42.	871.09	1.2650E-05	
NB-95	39.	765.81	1.1009E-05	
TC-95M	348.	204.11	1.8276E-05	
ZR-95	41.	756.73	2.0529E-05	
RU-103	60.	497.05	1.0966E-05	
RURH-106	45.	621.92	1.0237E-04	
AG-108M	27.	722.90	9.5780E-06	
CD-109	277.	88.03	2.5178E-04	
SB-125	90.	427.88	3.6047E-05	
CS-134	63.	604.72	1.1857E-05	<7.6E-3
CE-139	387.	165.85	1.4016E-05	
CE-141	398.	145.44	2.2093E-05	
CE-144	370.	133.54	8.9441E-05	
EU-152	138.	344.28	4.2070E-05	
EU-154	23.	1274.44	3.5440E-05	< 2.3E-2
EU-155	299.	105.31	4.1172E-05	<2.7E-2
HG-203	284.	72.87	1.8143E-04	
BI-214	29.	1120.27	8.4225E-05	
TH-228	376.	238.58	3.2161E-05	
U-235	389.	185.71	2.0995E-05	
U-238	34.	1001.00	1.9552E-03	
AM-241	212.	59.54	4.2709E-05	<2.8E-2

RJ RS 5/7/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

7-MAY-1996 09:16:28.26
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-02614 BX112 Core119 seg2 Urie K41991

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_G0472.CNF;1
Analys. File: ND_SC_ASF:COMMON.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_G3GSV2MLW_N
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_G.CNF;22 - 4-MAY-1996 12:29:22.

Acquisition time : 7-MAY-1996 07:16:08.
Sample (EOI) time: 7-MAY-1996 07:16:07.
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:13.43 0.2%

Sample quantity: 2.99000E-03 g
Sample geometry: P3-GSV-2ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	5.575E-01	4.320E+01	4.320E+01	1.53	OK

Final Mean for 1 Valid Peaks = 4.320E+01+/- 6.626E-01 (1.53%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-02614 BX112

Acquisition date : 7-MAY-1996 07:16:08

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.58	163430	1.84	1760.29	1748	25	0.3		CS-137	43.2

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	51.	1460.83	1.2547E-01
CR-51	4059.	320.08	3.8957E-01
MN-54	31.	834.84	7.0463E-03
FE-59	34.	1099.25	1.6077E-02
CO-60	38.	1332.50	1.0943E-02
SR-85	2591.	514.00	4.5679E-02
NB-94	29.	871.09	6.9802E-03
NB-95	32.	765.81	6.6714E-03
TC-95M	6280.	204.11	5.1927E-02
ZR-95	27.	756.73	1.1001E-02
RU-103	3098.	497.05	5.2703E-02
RURH-106	890.	621.92	3.0377E-01
AG-108M	47.	722.90	8.4394E-03
CD-109	3468.	88.03	5.9619E-01
SB-125	5087.	427.88	1.8167E-01
CS-134	994.	604.72	3.1533E-02
CE-139	4627.	165.85	3.2420E-02
CE-141	4569.	145.44	5.0048E-02
CE-144	4580.	133.54	2.1061E-01
EU-152	3923.	344.28	1.4977E-01
EU-154	21.	1274.44	2.2742E-02
EU-155	3690.	105.31	9.6810E-02
HG-203	3186.	72.87	4.0623E-01
BI-214	28.	1120.27	5.5951E-02
TH-228	4918.	238.58	7.7848E-02
U-235	6224.	185.71	5.6188E-02
U-238	33.	1001.00	1.2806E+00
AM-241	2981.	59.54	1.0703E-01

RT R 5/7/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

7-MAY-1996 11:27:19.24
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-02614Dup BX112 Core119 seg2 Urie K41991

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_G0473.CNF;1
Analys. File: ND_SC_ASF:COMMON.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_G3GSV2MLW_N
Library File: nd_sc_lib:common.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_G.CNF;22 - 4-MAY-1996 12:29:22.

Acquisition time : 7-MAY-1996 09:26:50.
Sample (EOI) time: 7-MAY-1996 09:26:49.
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:15.95 0.2%

Sample quantity: 3.54600E-03 g
Sample geometry: P3-GSV-2ML-W

Peak Search Sens.: 5.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 70.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/g	Decay Corr uCi/g	1-Sigma %Error	Status
CS-137	661.66	85.20*	5.574E-01	4.421E+01	4.422E+01	1.53	OK

Final Mean for 1 Valid Peaks = 4.422E+01+/- 6.757E-01 (1.53%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-02614Dup BX

Acquisition date : 7-MAY-1996 09:26:50

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/g
0	661.68	198368	1.76	1760.54	1748	24	0.2		CS-137	44.2
0	1332.95*	1	1.79	3554.37	3543	18703.7				

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/g)
K-40	52.	1460.83	1.0630E-01
CR-51	4820.	320.08	3.5797E-01
MN-54	28.	834.84	5.6238E-03
FE-59	22.	1099.25	1.0845E-02
CO-60	48.	1332.50	1.0365E-02
SR-85	3066.	514.00	4.1901E-02
NB-94	35.	871.09	6.5293E-03
NB-95	33.	765.81	5.7245E-03
TC-95M	7449.	204.11	4.7686E-02
ZR-95	35.	756.73	1.0621E-02
RU-103	3816.	497.05	4.9319E-02
RURH-106	1050.	621.92	2.7818E-01
AG-108M	38.	722.90	6.4318E-03
CD-109	4207.	88.03	5.5367E-01
SB-125	6078.	427.88	1.6745E-01
CS-134	1137.	604.72	2.8433E-02
CE-139	5465.	165.85	2.9708E-02
CE-141	5483.	145.44	4.6230E-02
CE-144	5502.	133.54	1.9464E-01
EU-152	4663.	344.28	1.3768E-01
EU-154	14.	1274.44	1.5727E-02
EU-155	4658.	105.31	9.1719E-02
HG-203	3905.	72.87	3.7922E-01
BI-214	20.	1120.27	3.9788E-02
TH-228	5860.	238.58	7.1650E-02
U-235	7549.	185.71	5.2177E-02
U-238	34.	1001.00	1.1005E+00
AM-241	3636.	59.54	9.9670E-02

RT R 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

20-MAY-1996 14:29:37.53
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: Dir#2 Sr BX112 Acie T41937

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_E0095.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_E0GSV10MLW_T
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_E.CNF;3 - 3-MAY-1996 16:10:45.

Acquisition time : 20-MAY-1996 12:29:17 Sample quantity: 1.00000E+00 sample OK
Sample (EOI) time: 16-MAY-1996 13:00:00 Sample geometry: P0-GSV-10ML-W OK
Elapsed live time: 0 02:00:00.00 compar.
Elapsed real time: 0 02:00:07.91 0.1%

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 45.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/sample	Decay Corr uCi/sample	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.793E+00	8.344E-03	8.711E-03	4.60	OK
	868.60	0.01	3.259E+00	-----	Line Not Found	-----	Absent

Final Mean for 1 Valid Peaks = 8.711E-03+/- 4.004E-04 (4.60%)

Flag: "*" = Keyline

Compar.

Post-NID Peak Search Report
Sample ID : Dir#2 Sr BX112

Acquisition date : 20-MAY-1996 12:29:17

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/sample
0	513.65	102289	1.22	1351.51	1344	17	0.3		SR-85	8.711E-03
0	557.99*	12	1.15	1467.90	1463	12	113.8			
0	1354.71	6	0.66	3560.22	3552	10	100.4			
0	1387.11	8	0.95	3645.32	3637	11	79.6			
0	1459.63*	16	1.46	3835.84	3828	15	74.3			
0	2611.67*	20	2.80	6864.06	6854	19	40.2			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/sample)
TC-95M	1607.	204.12	1.4433E-05
I-131	1047.	364.49	1.6494E-05
TH-227	1422.	235.97	9.0462E-05
NP-239	1558.	277.60	2.2542E-04

RT R 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

21-MAY-1996 08:39:17.53
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2607 Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_E0096.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_E0GSV10MLW_T
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_E.CNF;3 ✓ - 3-MAY-1996 16:10:45.

Acquisition time : 21-MAY-1996 06:39:02
Sample (EOI) time: 16-MAY-1996 13:00:00 ✓
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:07.47 0.1%

Sample quantity: 1.00000E+00 samp
Sample geometry: P0-GSV-10ML-W OK

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 45.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.794E+00	7.725E-03	8.130E-03	4.60	OK
	868.60	0.01	3.259E+00	----- Line Not Found		-----	Absent

Final Mean for 1 Valid Peaks = 8.130E-03+/- 3.738E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2607 Sr BX-

Acquisition date : 21-MAY-1996 06:39:02

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	488.58	82	0.77	1285.69	1282	10	50.3			
0	513.62	94703	1.22	1351.43	1344	16	0.3		SR-85	8.130E-03
0	558.08*	10	1.09	1468.15	1462	14	203.1			
0	726.98	11	2.52	1911.57	1904	11	119.1			
0	805.46*	15	0.61	2117.64	2114	7	50.7			
0	910.57*	11	1.05	2393.64	2389	12	100.7			
0	1078.94	12	1.39	2835.83	2831	8	50.0			
0	1173.07	39	0.65	3083.07	3074	19	28.3			
0	1292.12	20	3.22	3395.80	3390	13	22.4			
0	1763.90*	6	0.58	4635.37	4629	14	138.0			
0	2611.77*	5	2.38	6864.34	6855	16	169.6			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1453.	204.12	1.3840E-05
I-131	1067.	364.49	1.7773E-05
TH-227	1413.	235.97	9.2718E-05
NP-239	1498.	277.60	2.7621E-04

RI RS 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

21-MAY-1996 11:09:44.02
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2607Dup Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_E0098.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_E0GSV10MLW_T
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_E.CNF;3 - 3-MAY-1996 16:10:45.

Acquisition time : 21-MAY-1996 09:09:27
Sample (EOI) time: 16-MAY-1996 13:00:00
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:07.46 0.1%

Sample quantity: 1.00000E+00 samp
Sample geometry: P0-GSV-10ML-W OK

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 45.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.794E+00	7.717E-03	8.131E-03	4.60	OK
	868.60	0.01	3.259E+00	-----	Line Not Found	-----	Absent

Final Mean for 1 Valid Peaks = 8.131E-03+/- 3.738E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2607Dup Sr Acquisition date : 21-MAY-1996 09:09:27

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	513.59	94611	1.20	1351.35	1344	16	0.3		SR-85	8.131E-03
0	558.21*	41	1.49	1468.47	1459	18	54.4			
0	609.18*	16	1.56	1602.31	1596	12	116.1			
0	967.73*	19	2.79	2543.77	2534	16	50.1			
0	1122.02	5	1.02	2948.99	2937	13	224.3			
0	1126.80	22	4.16	2961.55	2950	24	86.4			
0	1459.57*	4	0.92	3835.70	3826	16	316.8			
0	1659.59	14	2.37	4361.26	4353	13	36.9			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1516.	204.12	1.4153E-05
I-131	951.	364.49	1.6936E-05
TH-227	1391.	235.97	9.2352E-05
NP-239	1448.	277.60	2.8000E-04

RT R 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

21-MAY-1996 14:02:02.86
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2614 Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_E0099.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_E0GSV10MLW_T
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_E.CNF;3 - 3-MAY-1996 16:10:45.

Acquisition time : 21-MAY-1996 12:01:47 Sample quantity: 1.00000E+00 samp
Sample (EOI) time: 16-MAY-1996 13:00:00 Sample geometry: P0-GSV-10ML-W OK
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:07.35 0.1%

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 45.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.794E+00	7.590E-03	8.007E-03	4.60	OK
	868.60	0.01	3.259E+00	-----	Line Not Found	-----	Absent

Final Mean for 1 Valid Peaks = 8.007E-03+/- 3.681E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2614 Sr BX-

Acquisition date : 21-MAY-1996 12:01:47

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	66.62*	93	1.13	178.20	175	7	56.3			
0	341.73	105	0.55	900.22	897	9	73.2			
0	513.61	93046	1.23	1351.39	1344	16	0.3		SR-85	8.007E-03
0	583.05*	14	0.94	1533.69	1529	10	93.8			
0	608.98*	30	1.63	1601.76	1594	17	76.5			
0	911.37*	48	5.16	2395.77	2386	23	28.3			
0	1459.53*	6	1.41	3835.59	3828	16	266.6			
0	2611.53*	1	1.51	6863.69	6854	17	573.5			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1449.	204.12	1.3857E-05
I-131	1023.	364.49	1.7748E-05
TH-227	1375.	235.97	9.2236E-05
NP-239	1510.	277.60	2.9621E-04

RTR 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

21-MAY-1996 16:16:02.11
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2614Dup Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_E0100.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_E0GSV10MLW_T
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_E.CNF;3 - 3-MAY-1996 16:10:45.

Acquisition time : 21-MAY-1996 14:15:42 Sample quantity: 1.00000E+00 samp
Sample (EOI) time: 16-MAY-1996 13:00:00 Sample geometry: P0-GSV-10ML-W OK
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:07.32 0.1%

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 45.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.794E+00	7.572E-03	7.996E-03	4.60	OK
	868.60	0.01	3.259E+00	----- Line Not Found		-----	Absent

Final Mean for 1 Valid Peaks = 7.996E-03+/- 3.677E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2614Dup Sr

Acquisition date : 21-MAY-1996 14:15:42

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	89.87	80	1.07	239.21	238	5	48.1			
0	513.62	92833	1.21	1351.43	1343	17	0.3		SR-85	7.996E-03
0	583.39*	23	0.94	1534.59	1530	11	58.3			
0	866.25	12	0.47	2277.27	2272	8	74.7			
0	1028.17	15	3.00	2702.50	2691	16	83.6			
0	1118.88*	9	1.48	2940.74	2934	12	98.1			
0	1269.55	22	3.07	3336.50	3329	15	34.7			
0	1332.13*	7	0.45	3500.88	3496	10	116.5			
0	1459.66*	9	1.90	3835.93	3826	19	150.2			
0	2611.44*	16	1.80	6863.47	6853	19	48.6			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1347.	204.12	1.3373E-05
I-131	1035.	364.49	1.7991E-05
TH-227	1348.	235.97	9.1642E-05
NP-239	1435.	277.60	2.9669E-04

RTR 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

22-MAY-1996 09:02:44.96
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2614Dup Duplicate Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_E0101.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_E0GSV10MLW_T
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_E.CNF;3 - 3-MAY-1996 16:10:45.

Acquisition time : 22-MAY-1996 07:02:24 Sample quantity: 1.00000E+00 samp
Sample (EOI) time: 16-MAY-1996 13:00:00 Sample geometry: P0-GSV-10ML-W 0F
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:07.34 0.1%

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 45.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.794E+00	7.532E-03	8.014E-03	4.60	OK
	868.60	0.01	3.259E+00	-----	Line Not Found	-----	Absent

Final Mean for 1 Valid Peaks = 8.014E-03+/- 3.685E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2614Dup Dup

Acquisition date : 22-MAY-1996 07:02:24

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	139.42*	106	1.73	369.23	366	8	56.3			
0	240.76	16	0.35	635.21	635	8	417.8			
0	439.19	47	0.99	1156.04	1155	8	73.7			
0	513.62	92342	1.24	1351.42	1344	15	0.3		SR-85	8.014E-03
0	558.26*	22	0.79	1468.61	1462	17	96.4			
0	1292.84	27	1.02	3397.67	3391	13	19.2			
0	1459.40*	19	1.88	3835.24	3828	20	74.8			
0	1515.10	10	0.46	3981.60	3977	8	31.6			
0	1762.88*	5	1.81	4632.68	4627	12	98.5			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1449.	204.12	1.3983E-05
I-131	1001.	364.49	1.8794E-05
TH-227	1327.	235.97	9.3317E-05
NP-239	1475.	277.60	3.6949E-04

RJ R 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

22-MAY-1996 12:47:49.15
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2605Blk Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_E0102.CNF;2
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_E0GSV10MLW_T
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_E.CNF;3 - 3-MAY-1996 16:10:45.

Acquisition time : 22-MAY-1996 10:47:30
Sample (EOI) time: 16-MAY-1996 13:00:00
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:07.37 0.1%

Sample quantity: 1.00000E+00 samp
Sample geometry: P0-GSV-10ML-W DF

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 45.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.794E+00	7.633E-03	8.134E-03	4.60	OK
	868.60	0.01	3.259E+00	-----	Line Not Found	-----	Absent

Final Mean for 1 Valid Peaks = 8.134E-03+/- 3.740E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2605Blk Sr

Acquisition date : 22-MAY-1996 10:47:30

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	513.63	93576	1.21	1351.45	1344	16	0.3		SR-85	8.134E-03
0	558.43*	5	0.95	1469.07	1464	11	333.2			
0	582.52*	16	1.11	1532.31	1528	9	69.7			
0	1121.26	24	0.43	2946.99	2937	17	48.2			
0	1172.94	27	1.41	3082.74	3073	15	47.6			
0	1385.39	11	0.47	3640.80	3634	11	51.6			
0	2611.92*	2	2.12	6864.73	6855	16	361.1			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1461.	204.12	1.4064E-05
I-131	997.	364.49	1.9015E-05
TH-227	1402.	235.97	9.6464E-05
NP-239	1441.	277.60	3.8246E-04

RF RS 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

22-MAY-1996 15:19:51.78
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2606Blk Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_E0103.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_E0GSV10MLW_T
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_E.CNF;3 - 3-MAY-1996 16:10:45.

Acquisition time : 22-MAY-1996 13:19:34 Sample quantity: 1.00000E+00 samp
Sample (EOI) time: 16-MAY-1996 13:00:00 Sample geometry: P0-GSV-10ML-W OK
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:07.31 0.1%

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 45.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.794E+00	7.564E-03	8.070E-03	4.60	OK
	868.60	0.01	3.259E+00	-----	Line Not Found	-----	Absent

Final Mean for 1 Valid Peaks = 8.070E-03+/- 3.711E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2606Blk Sr

Acquisition date : 22-MAY-1996 13:19:34

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	513.63	92734	1.24	1351.44	1345	15	0.3		SR-85	8.070E-03
0	558.23*	3	1.20	1468.53	1463	15	589.5			
0	893.75	19	2.07	2349.47	2343	13	56.9			
0	1000.60	38	1.58	2630.10	2621	16	28.6			
0	1363.26	17	1.74	3582.67	3576	11	30.8			
0	1459.45*	22	1.06	3835.39	3827	18	52.9			
0	1763.09*	16	4.28	4633.23	4624	16	47.4			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1434.	204.12	1.3951E-05
I-131	1025.	364.49	1.9454E-05
TH-227	1393.	235.97	9.6530E-05
NP-239	1479.	277.60	3.9964E-04

RT R 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

23-MAY-1996 08:45:11.62
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2612Blk Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_E0105.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_E0GSV10MLW_T
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_E.CNF;3 - 3-MAY-1996 16:10:45.

Acquisition time : 23-MAY-1996 06:44:54
Sample (EOI) time: 16-MAY-1996 13:00:00
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:07.38 0.1%

Sample quantity: 1.00000E+00 samp
Sample geometry: P0-GSV-10ML-W OK

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 45.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.794E+00	7.663E-03	8.239E-03	4.60	OK
	868.60	0.01	3.259E+00	-----	Line Not Found	-----	Absent

Final Mean for 1 Valid Peaks = 8.239E-03+/- 3.788E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2612Blk Sr

Acquisition date : 23-MAY-1996 06:44:54

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	513.63	93937	1.23	1351.44	1343	17	0.3		SR-85	8.239E-03
0	802.39*	16	0.53	2109.58	2105	9	63.8			
0	1098.68	12	2.58	2887.68	2873	18	107.8			
0	1244.58	4	0.85	3270.90	3264	9	141.3			
0	1654.05	14	1.06	4346.68	4337	16	41.9			
0	1705.87	10	0.80	4482.85	4474	13	50.9			
0	2611.73*	5	1.51	6864.23	6856	16	168.6			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1413.	204.12	1.3965E-05
I-131	1073.	364.49	2.1194E-05
TH-227	1388.	235.97	9.8980E-05
NP-239	1483.	277.60	4.9548E-04

RT RS 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

20-MAY-1996 14:26:43.42
GAMMA ENERGY ANALYSIS (GEA)

#2" dish wrap w/ plastic face counted on st Det.

Sample Title: Dir#1 Sr Bx112 Urie 541987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_D0402.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_D0GSV10MLW_M
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_D.CNF;48 ✓ - 14-MAY-1996 17:57:33

Acquisition time : 20-MAY-1996 12:26:27
Sample (EOI) time: 16-MAY-1996 13:00:00 ✓
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:05.66 0.1%

Sample quantity: 1.00000E+00 sample ✓
Sample geometry: P0-GSV-10ML-W OK

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 45.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/sample	Decay Corr uCi/sample	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.023E+00	9.520E-03	9.938E-03	4.59	OK
	868.60	0.01	2.668E+00	-----	Line Not Found	-----	Absent

Final Mean for 1 Valid Peaks = 9.938E-03+/- 4.565E-04 (4.59%)

Flag: "*" = Keyline

compar. only

Post-NID Peak Search Report
Sample ID : Dir#1 Sr Bx112

Acquisition date : 20-MAY-1996 12:26:27

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/sample
0	445.12	48	0.99	1187.98	1185	8	66.1			
0	514.06	97954	1.46	1371.94	1363	19	0.3		SR-85	9.938E-03
0	559.84	28	0.88	1494.13	1484	19	79.7			
0	802.20*	52	0.59	2141.02	2132	18	19.4			
0	882.09	14	0.95	2354.30	2349	10	64.9			
0	1053.13	29	1.75	2810.97	2803	18	35.1			
0	1254.94	13	0.44	3349.91	3341	17	57.7			
0	1461.26*	22	2.89	3901.00	3892	18	60.4			
0	2614.69*	9	0.80	6983.95	6973	19	87.7			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/sample)
TC-95M	1804.	204.12	1.6975E-05
I-131	1266.	364.49	2.1158E-05
TH-227	1803.	235.97	1.1500E-04
NP-239	1785.	277.60	2.7622E-04

RT RS 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

21-MAY-1996 08:37:40.88
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2608 Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_D0406.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_D0GSV10MLW_M
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_D.CNF;48 - 14-MAY-1996 17:57:33

Acquisition time : 21-MAY-1996 06:37:27 Sample quantity: 1.00000E+00 samp
Sample (EOI) time: 16-MAY-1996 13:00:00 Sample geometry: P0-GSV-10ML-W OK
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:05.25 0.1%

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 45.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.024E+00	8.486E-03	8.930E-03	4.60	OK
	868.60	0.01	2.668E+00	-----	Line Not Found	-----	Absent

Final Mean for 1 Valid Peaks = 8.930E-03+/- 4.104E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2608 Sr BX-

Acquisition date : 21-MAY-1996 06:37:27

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	513.98	87319	1.46	1371.73	1363	19	0.3		SR-85	8.930E-03
0	558.80*	7	1.21	1491.36	1486	14247.9				
0	1461.01*	12	2.09	3900.33	3888	21123.5				

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1729.	204.12	1.6762E-05
I-131	1153.	364.49	2.1555E-05
TH-227	1616.	235.97	1.1196E-04
NP-239	1624.	277.60	3.2919E-04

RTR 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

21-MAY-1996 11:06:31.10
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2608Dup Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_D0407.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_D0GSV10MLW_M
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_D.CNF;48 - 14-MAY-1996 17:57:33

Acquisition time : 21-MAY-1996 09:06:15 Sample quantity: 1.00000E+00 samp
Sample (EOI) time: 16-MAY-1996 13:00:00 Sample geometry: P0-GSV-10ML-W OK
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:05.14 0.1%

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 45.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.024E+00	8.431E-03	8.882E-03	4.60	OK
	868.60	0.01	2.668E+00	-----	Line Not Found	-----	Absent

Final Mean for 1 Valid Peaks = 8.882E-03+/- 4.082E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2608Dup Sr

Acquisition date : 21-MAY-1996 09:06:15

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	92.59*	89	1.18	247.39	243	10	80.4			
0	513.94	86755	1.46	1371.62	1362	20	0.3		SR-85	8.882E-03
0	597.95	33	3.62	1595.84	1588	19	67.6			
0	968.04	22	3.79	2583.77	2576	14	33.2			
0	1129.09	11	2.69	3013.80	3001	18	85.3			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1609.	204.12	1.6190E-05
I-131	1049.	364.49	2.0746E-05
TH-227	1468.	235.97	1.0714E-04
NP-239	1627.	277.60	3.3965E-04

RT R 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

21-MAY-1996 13:59:06.50
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2613 Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_D0408.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_D0GSV10MLW_M
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_D.CNF;48 - 14-MAY-1996 17:57:33

Acquisition time : 21-MAY-1996 11:58:52 Sample quantity: 1.00000E+00 samp
Sample (EOI) time: 16-MAY-1996 13:00:00 Sample geometry: P0-GSV-10ML-W OK
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:05.25 0.1%

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 45.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.024E+00	8.598E-03	9.070E-03	4.60	OK
	868.60	0.01	2.668E+00	-----	Line Not Found	-----	Absent

Final Mean for 1 Valid Peaks = 9.070E-03+/- 4.168E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Page : 2
Sample ID : 96-2613 Sr BX-
Acquisition date : 21-MAY-1996 11:58:52

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	513.86	88490	1.48	1371.43	1363	19	0.3		SR-85	9.070E-03
0	558.24*	12	1.46	1489.86	1481	16	137.5			
0	584.28*	4	0.80	1559.36	1548	16	472.4			
0	911.38*	4	3.28	2432.51	2422	23	360.7			
0	1120.16	26	7.04	2989.98	2977	23	51.5			
0	1327.41	7	0.46	3543.46	3536	11	80.1			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1726.	204.12	1.6790E-05
I-131	1096.	364.49	2.1422E-05
TH-227	1626.	235.97	1.1324E-04
NP-239	1669.	277.60	3.5640E-04

RJR 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

21-MAY-1996 16:14:06.06
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2613Dup Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_D0409.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_D0GSV10MLW_M
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_D.CNF;48 - 14-MAY-1996 17:57:33

Acquisition time : 21-MAY-1996 14:13:53 Sample quantity: 1.00000E+00 samp
Sample (EOI) time: 16-MAY-1996 13:00:00 Sample geometry: P0-GSV-10ML-W OK
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:04.58 0.1%

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 45.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.024E+00	7.211E-03	7.614E-03	4.60	OK
	868.60	0.01	2.668E+00	----- Line Not Found		-----	Absent

Final Mean for 1 Valid Peaks = 7.614E-03+/- 3.501E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2613Dup Sr

Acquisition date : 21-MAY-1996 14:13:53

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	366.75	171	4.14	978.85	970	20	55.3			
0	513.90	74205	1.49	1371.52	1361	21	0.4		SR-85	7.614E-03
0	570.02*	3	1.01	1521.29	1513	12	550.0			
0	828.82	33	3.31	2212.09	2205	15	25.2			
0	965.45	13	2.11	2576.87	2570	12	64.1			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1452.	204.12	1.5416E-05
I-131	942.	364.49	2.0022E-05
TH-227	1408.	235.97	1.0577E-04
NP-239	1411.	277.60	3.3689E-04

RT R 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

23-MAY-1996 08:43:21.05
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2611Blk Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_D0414.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_D0GSV10MLW_M
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_D.CNF;48 - 14-MAY-1996 17:57:33

Acquisition time : 23-MAY-1996 06:43:08
Sample (EOI) time: 16-MAY-1996 13:00:00
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:04.52 0.1%

Sample quantity: 1.00000E+00 samp
Sample geometry: P0-GSV-10ML-W OK

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 45.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.023E+00	7.329E-03	7.880E-03	4.60	OK
	868.60	0.01	2.668E+00	----- Line Not Found		-----	Absent

Final Mean for 1 Valid Peaks = 7.880E-03+/- 3.623E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2611Blk Sr

Acquisition date : 23-MAY-1996 06:43:08

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	124.69	152	1.39	333.02	330	8	35.7			
0	514.00	75413	1.48	1371.80	1362	21	0.4		SR-85	7.880E-03
0	971.02	8	0.47	2591.73	2582	15	142.6			
0	1460.76*	12	2.47	3899.65	3890	18	103.3			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1401.	204.12	1.5436E-05
I-131	976.	364.49	2.3581E-05
TH-227	1317.	235.97	1.0886E-04
NP-239	1455.	277.60	5.6181E-04

RT R 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

22-MAY-1996 08:56:06.63
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: Std Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_D0410.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_D0GSV10MLW_M
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_D.CNF;48 - 14-MAY-1996 17:57:33

Acquisition time : 22-MAY-1996 06:55:54
Sample (EOI) time: 16-MAY-1996 13:00:00
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:05.07 0.1%

Sample quantity: 1.00000E+00 samp
Sample geometry: P0-GSV-10ML-W DK

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 45.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.024E+00	8.226E-03	8.751E-03	4.60	OK
	868.60	0.01	2.668E+00	----- Line Not Found		-----	Absent

Final Mean for 1 Valid Peaks = 8.751E-03+/- 4.022E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : Std Sr BX-112

Acquisition date : 22-MAY-1996 06:55:54

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	439.15	52	0.63	1172.05	1170	8	56.1			
0	513.95	84651	1.47	1371.65	1361	22	0.4		SR-85	8.751E-03
0	1116.23	20	1.53	2979.48	2972	14	36.2			
0	1214.13	16	4.40	3240.92	3228	18	58.2			
0	2613.63*	16	4.36	6981.11	6969	22	51.3			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1689.	204.12	1.6760E-05
I-131	1119.	364.49	2.3172E-05
TH-227	1606.	235.97	1.1589E-04
NP-239	1645.	277.60	4.4625E-04

RJ R 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

22-MAY-1996 12:45:02.51
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: Blk Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_D0411.CNF;2
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_D0GSV10MLW_M
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_D.CNF;48 - 14-MAY-1996 17:57:33

Acquisition time : 22-MAY-1996 10:44:45
Sample (EOI) time: 16-MAY-1996 13:00:00
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:05.11 0.1%

Sample quantity: 1.00000E+00 samp
Sample geometry: P0-GSV-10ML-W OK

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75
Errors propagated: Yes
Abundance limit : 45.00

Half life ratio: 8.00
Systematic Erro: 1.30
WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.024E+00	8.410E-03	8.963E-03	4.60	OK
	868.60	0.01	2.668E+00	-----	Line Not Found	-----	Absent

Final Mean for 1 Valid Peaks = 8.963E-03+/- 4.119E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : Blk Sr BX-112

Acquisition date : 22-MAY-1996 10:44:45

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	513.98	86542	1.47	1371.73	1362	21	0.4		SR-85	8.963E-03
0	558.08*	5	2.50	1489.43	1482	13	297.4			
0	709.33	20	2.19	1893.13	1880	17	81.5			
0	1225.12	34	1.71	3270.25	3259	23	25.0			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1690.	204.12	1.6798E-05
I-131	1131.	364.49	2.3627E-05
TH-227	1536.	235.97	1.1399E-04
NP-239	1694.	277.60	4.7452E-04

RJ R 5/24/96

BATTELLE / PACIFIC NORTHWEST NATIONAL LAB
ANALYTICAL CHEMISTRY LABORATORY

22-MAY-1996 15:15:30.97
GAMMA ENERGY ANALYSIS (GEA)

Sample Title: 96-2605Blk+Std Sr BX-112 Urie K41987

Config. File: DKA200:[USER.SCUSR.ARCHIVE]SMP_D0412.CNF;1
Analys. File: ND_SC_ASF:SPECIAL.ASF

Effic. File : DKA200:[USER.SCUSR.EFF]EFF_D0GSV10MLW_M
Library File: nd_sc_lib:special.nlb

Backgnd File: DKA200:[USER.SCUSR.ARCHIVE]BKG_D.CNF;48 - 14-MAY-1996 17:57:33

Acquisition time : 22-MAY-1996 13:15:14 Sample quantity: 1.00000E+00 samp
Sample (EOI) time: 16-MAY-1996 13:00:00 Sample geometry: P0-GSV-10ML-W OK
Elapsed live time: 0 02:00:00.00
Elapsed real time: 0 02:00:05.06 0.1%

Peak Search Sens.: 4.00000
Eng. Tol. (FWHM) : 0.75 Half life ratio: 8.00
Errors propagated: Yes Systematic Erro: 1.30
Abundance limit : 45.00 WTM error limit: 3.00

Analyses by : PEAK V16.6 PEAKEFF V2.2 ENBACK V1.5 NID V3.2
WTMEAN V1.8 MINACT V2.5

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected uCi/samp	Decay Corr uCi/samp	1-Sigma %Error	Status
SR-85	514.00	96.00*	4.023E+00	8.246E-03	8.798E-03	4.60	OK
	868.60	0.01	2.668E+00	-----	Line Not Found	-----	Absent

Final Mean for 1 Valid Peaks = 8.798E-03+/- 4.043E-04 (4.60%)

Flag: "*" = Keyline

Post-NID Peak Search Report
Sample ID : 96-2605Blk+Std Acquisition date : 22-MAY-1996 13:15:14

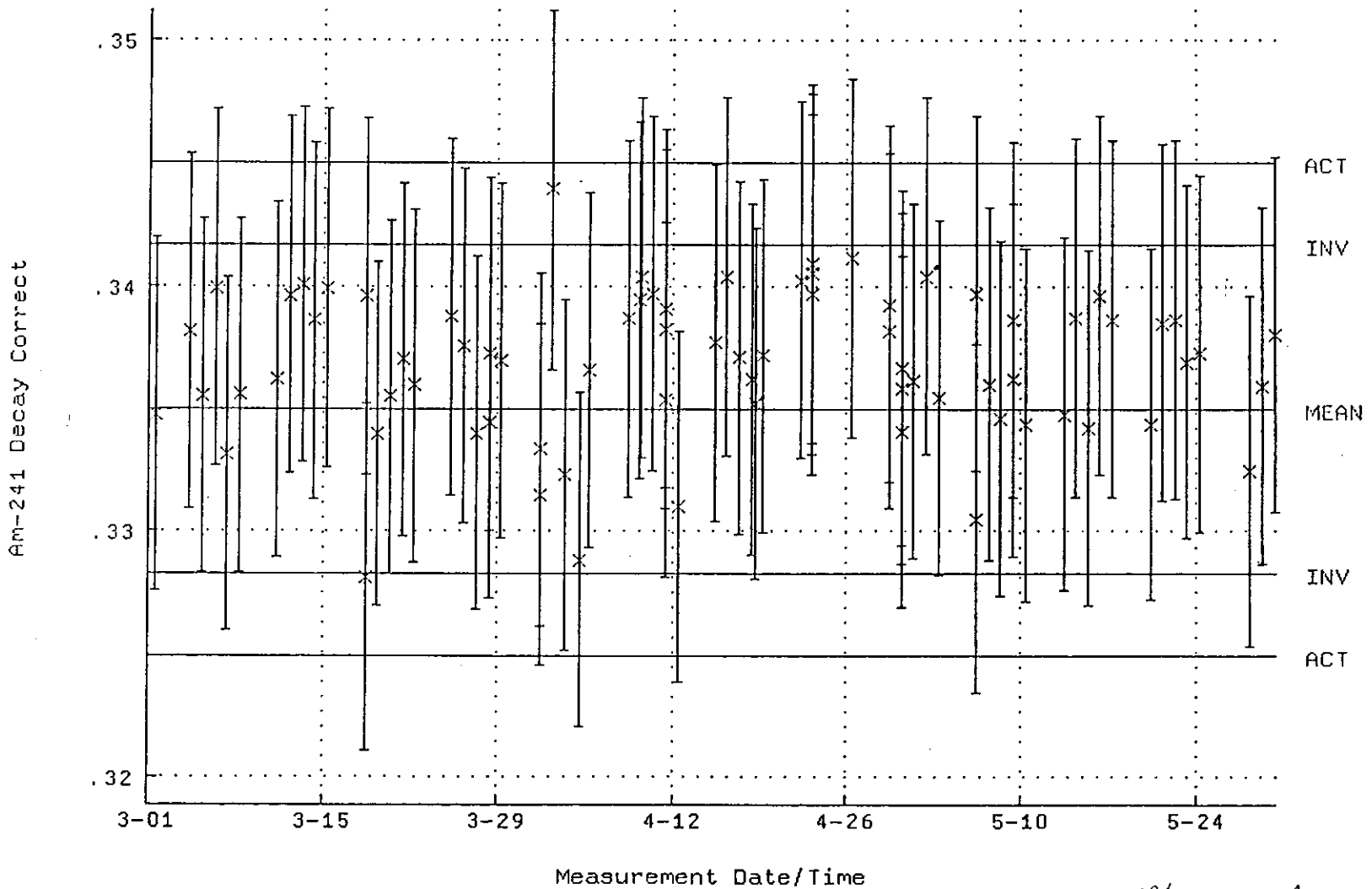
It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/samp
0	370.31*	48	1.06	988.35	985	8	94.9			
0	435.55	28	0.92	1162.44	1159	6	86.7			
0	514.03	84848	1.46	1371.87	1363	20	0.4		SR-85	8.798E-03
0	631.32	11	0.90	1684.91	1673	13	120.2			
0	636.23	24	2.19	1698.00	1691	13	43.1			
0	767.50	8	0.94	2048.39	2041	12	114.7			
0	1333.67	14	1.03	3560.19	3553	13	54.4			
0	1358.59	12	1.06	3626.74	3618	14	43.3			

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/samp)
TC-95M	1649.	204.12	1.6608E-05
I-131	1018.	364.49	2.2615E-05
TH-227	1504.	235.97	1.1326E-04
NP-239	1633.	277.60	4.8044E-04

QA filename : DKA200:[GAMMA.QA]DET_G.QAF;1
Parameter Name : NLACTVTY-AM (Am-241 Decay Corrected Activity)
Start/End Dates : 1-MAR-1996 14:08:14 through 30-MAY-1996 07:35:39
Mean +- Std Dev : 0.335000 +- 3.350000E-03 (1.00 %) <USER>

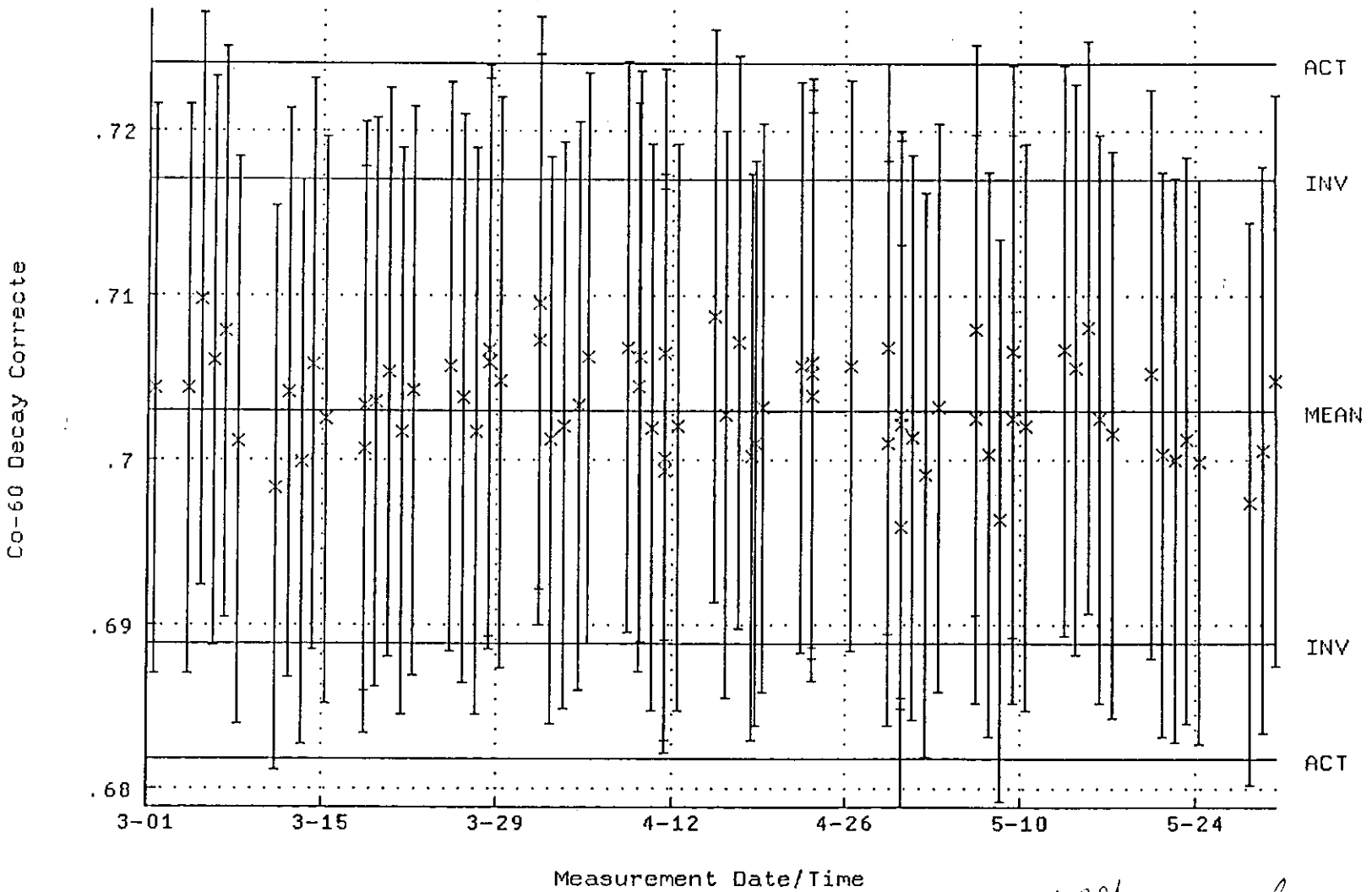
Gamma Detector G
241Am



J R Greenwood
5-30-96

Gamma Detector G
^{60}Co

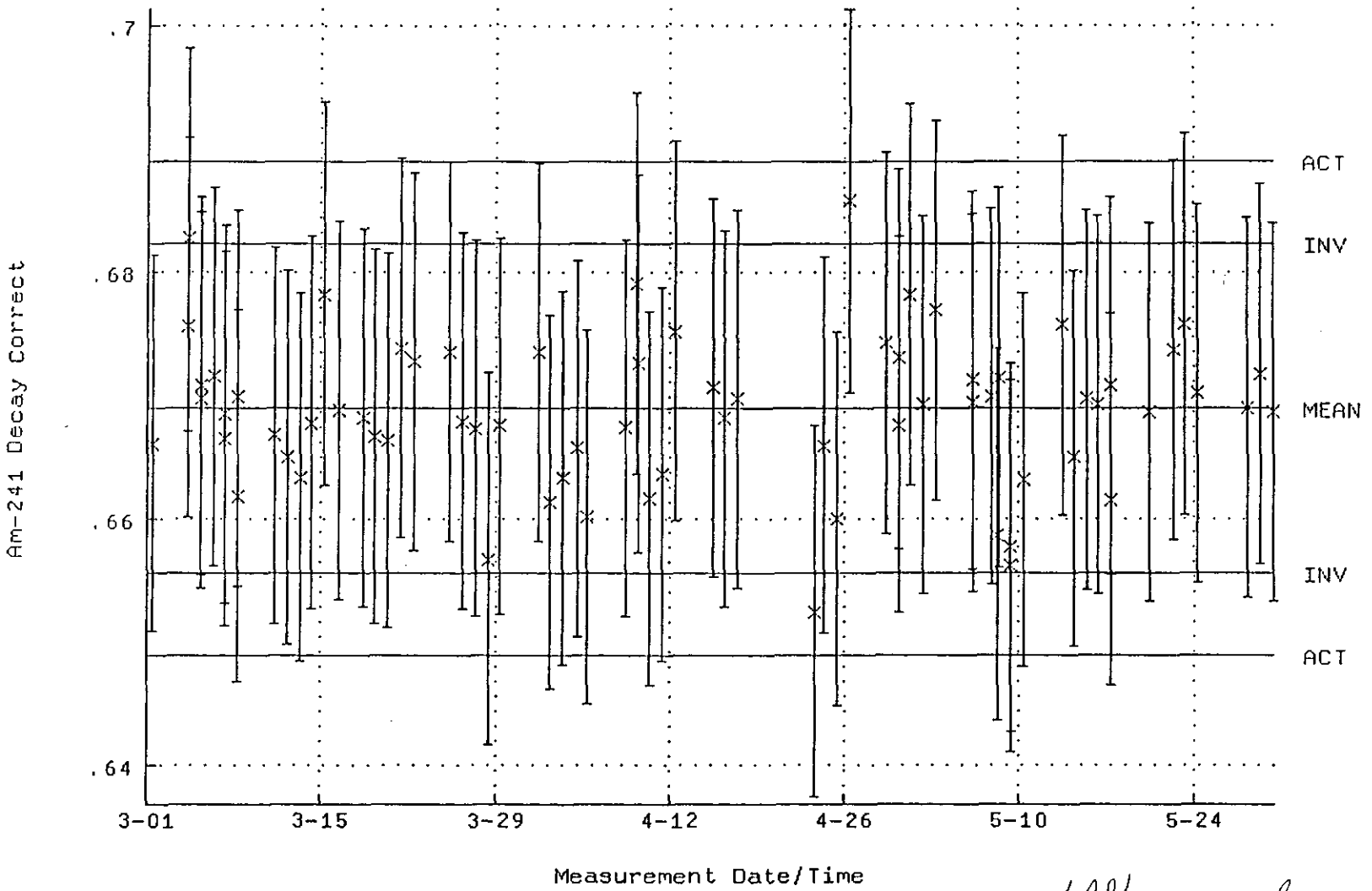
QA filename : DKA200:[GAMMA.QA]DET_G.QAF;1
Parameter Name : NLACTVTY-CO (Co-60 Decay Corrected Activity)
Start/End Dates : 1-MAR-1996 14:08:14 through 30-MAY-1996 07:35:39
Mean +- Std Dev : 0.703000 +- 7.030000E-03 (1.00 %) <USER>



J R Greenwood
5-30-96

QA filename : DKA200:[GAMMA.QA]DET_H.QAF;1
Parameter Name : NLACTVTY-AM (Am-241 Decay Corrected Activity)
Start/End Dates : 1-MAR-1996 10:09:25 through 30-MAY-1996 07:35:44
Mean +- Std Dev : 0.669000 +- 6.690000E-03 (1.00 %) <USER>

Gamma Detector H
241Am



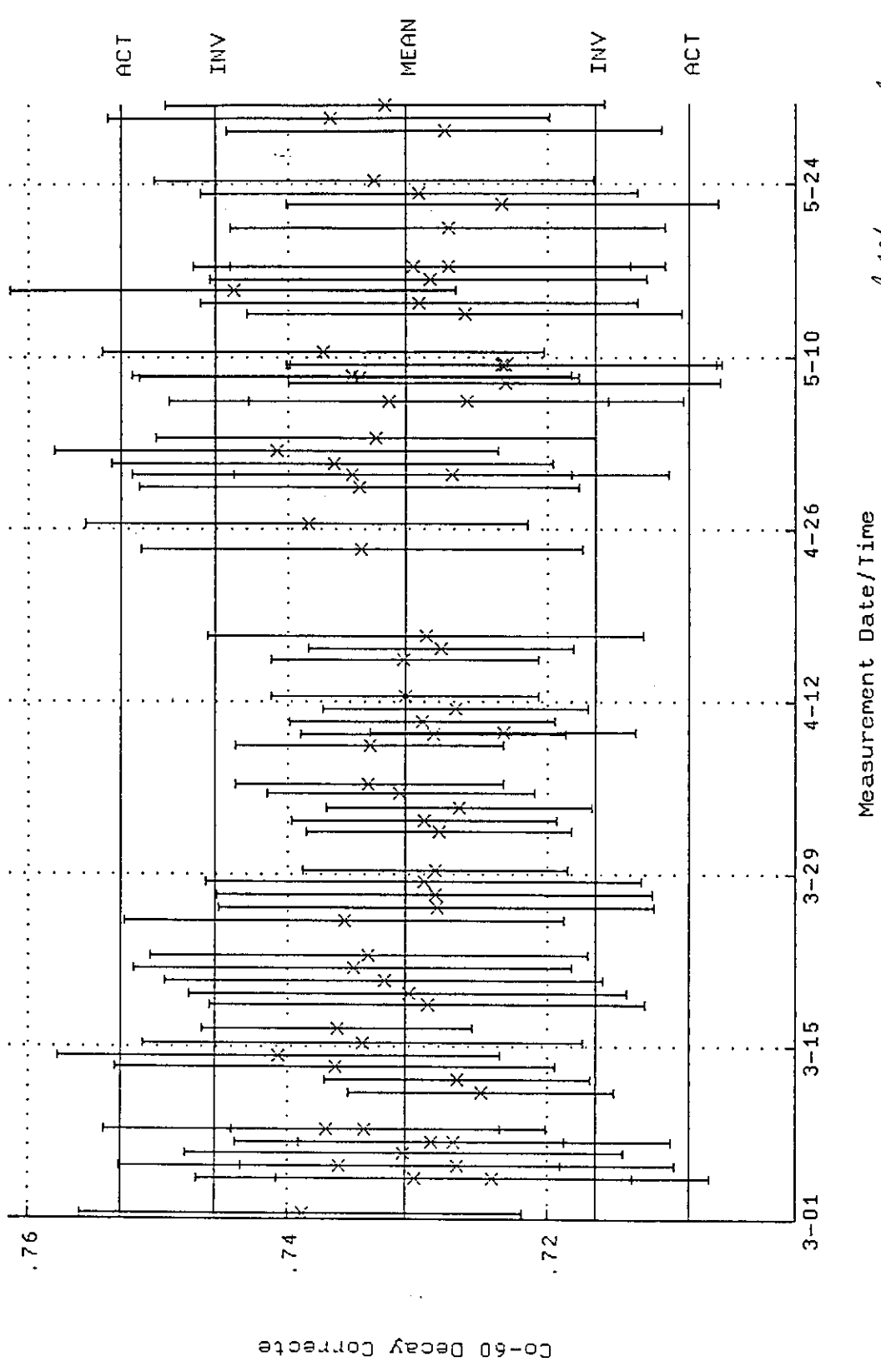
J R Hammond
5-20-96

2355

WHC-SD-WM-DP-170, REV. 1

Gamma Detector H
60Co

QA filename : DKA200:[GAMMA.QA]DET_H.QAF;1
Parameter Name : NLACTVTY-CO (Co-60 Decay Corrected Activity)
Start/End Dates : 1-MAR-1996 10:09:25 through 30-MAY-1996 07:35:44
Mean +- Std Dev : 0.731000 +- 7.310000E-03 (1.00 %) <USER>



5-30-96

P.B.C.-1 Control Chart Counts and Backgrounds

Date	100 min. Bkg.	SrY-90	Decay-Corrected cpm	Tc-99	ccpm	
1/02/96	27.11	133811	14639.69	54144	5387.29	
1/03/96	27.89	133774	14635.75	54094	5381.51	
1/04/96	26.68	133012	14554.49	54011	5374.42	
1/05/96	27.94	133156	14569.86	54545	5426.56	
1/08/96	26.03	133605	14624.08	54145	5388.47	
1/09/96	26.01	133589	14623.31	54202	5394.19	
1/10/96	26.42	133271	14588.95	54527	5426.28	
1/11/96	27.44	133158	14576.39	54076	5380.16	
1/12/96	25.14	133131	14576.92	54268	5401.66	
1/15/96	26.47	133937	14666.78	53999	5373.43	
1/16/96	26.78	133184	14584.78	54034	5376.62	
1/17/96	28.32	133733	14644.29	54326	5404.28	
1/18/96	27.42	133442	14614.31	54189	5391.48	
1/19/96	27.58	133489	14620.26	54224	5394.82	
1/22/96	26.09	133449	14620.40	54199	5393.81	
1/23/96	25.47	133406	14617.32	53729	5347.43	
1/24/96	25.35	133428	14620.83	54003	5374.95	1/25/96Low gas
1/26/96	25.37	133569	14638.22	54176	5392.23	1/26/96new gas
1/29/96	24.36	132581	14533.72	53029	5278.54	
1/30/96	26.81	133107	14589.76	54157	5388.89	
1/31/96	26.73	132150	14485.69	53520	5325.27	
2/01/96	26.77	132368	14510.55	53670	5340.23	
2/02/96	26.19	132907	14571.35	53598	5333.61	
2/05/96	26.75	132438	14522.09	53225	5295.75	replaced gas
2/05/96	26.75	133043	14588.56	53452	5318.45	regulator2/5/96
2/06/96	28.27	133367	14623.46	54044	5376.13	
2/07/96	27.44	133701	14662.04	54065	5379.06	
2/08/96	28.79	133256	14612.62	54036	5374.81	
2/09/96	29.61	132789	14561.35	53810	5351.39	
2/12/96	28.48	133576	14651.99	53667	5338.22	
2/13/96	27.17	133488	14644.72	54101	5382.93	
2/14/96	28.18	133510	14646.99	53983	5370.12	
2/15/96	26.15	133535	14652.94	54096	5383.45	
2/16/96	26.50	133591	14659.68	53236	5297.10	
2/20/96	29.38	133091	14605.39	53540	5324.62	
2/21/96	29.38	133002	14596.56	53757	5346.32	
2/22/96	28.45	133403	14642.66	53811	5352.65	
2/23/96	27.46	132424	14537.02	53534	5325.94	
2/26/96	29.17	133188	14622.07	53343	5305.13	
2/27/96	27.85	133211	14627.02	54109	5383.05	
2/28/96	27.94	133178	14624.25	53629	5334.96	
2/29/96	28.55	133223	14629.50	54376	5409.05	
3/01/96	28.21	133519	14663.41	54021	5373.89	
3/04/96	28.16	133327	14645.24	54061	5377.94	
3/05/96	29.85	133402	14652.60	54233	5393.45	clean dish 3/5/96
3/06/96	27.88	132177	14520.87	53964	5368.52	
3/07/96	25.56	133189	14635.80	54189	5393.34	

P.B.C.-1 Control Chart Counts and Backgrounds

Date	100 min. Bkg.	SrY-90	Decay-Corrected cpm	Tc-99	ccpm	
3/08/96	28.82	133334	14649.14	54210	5392.18	
3/11/96	27.33	132140	14522.19	54125	5385.17	
3/12/96	28.08	132072	14514.83	53810	5352.92	
3/13/96	29.11	132446	14555.85	54039	5374.79	
3/14/96	30.47	132302	14539.45	53798	5349.33	
3/15/96	30.05	132329	14543.84	53607	5330.65	dean dish 3/28/96
3/18/96	30.04	132084	14519.74	53271	5297.06	
3/19/96	29.67	133136	14637.02	53773	5347.63	
3/20/96	30.29	132887	14609.86	53165	5286.21	
3/21/96	31.03	132870	14608.14	53739	5342.87	
3/22/96	31.10	132755	14596.35	53922	5361.10	
3/25/96	31.06	133344	14664.21	53702	5339.14	
3/26/96	30.92	133345	14665.44	53324	5301.48	
3/27/96	30.90	132770	14603.04	53851	5354.20	
3/28/96	31.38	132748	14601.04	53584	5327.02	cleaned 3/28
3/29/96	30.80	132429	14567.47	53785	5347.70	
4/01/96	29.83	133277	14664.94	53029	5273.07	
4/02/96	31.89	132638	14593.17	54023	5370.41	
4/03/96	32.50	132550	14583.75	53469	5314.40	
4/04/96	31.65	132662	14598.00	54002	5368.55	
4/05/96	31.33	133022	14639.03	53908	5359.47	
4/08/96	29.60	132649	14602.68	53296	5300.00	
4/09/96	30.50	132394	14574.51	53651	5334.60	
4/10/96	31.83	132159	14548.08	53600	5328.17	
4/11/96	31.43	132535	14590.97	53893	5357.87	
4/12/96	32.56	133650	14713.74	54052	5372.64	
4/15/96	31.24	132284	14567.32	53676	5336.36	
4/16/96	31.47	133149	14663.52	53977	5366.23	
4/17/96	32.37	132565	14599.02	53901	5357.73	
4/18/96	30.40	132308	14573.78	53817	5351.30	
4/19/96	32.01	132552	14599.91	54256	5393.59	
4/22/96	31.21	132124	14556.41	53981	5366.89	
4/23/96	31.17	132374	14585.03	53913	5360.13	
4/24/96	32.24	132207	14566.36	53723	5340.06	
4/25/96	29.86	132779	14633.13	53653	5335.44	
4/26/96	30.38	132597	14613.42	53630	5332.62	
4/29/96	30.68	132249	14577.53	53754	5344.72	
4/30/96	29.11	133212	14686.63	53540	5324.89	
5/01/96	31.61	132965	14657.54	53585	5326.89	
5/02/96	32.61	132975	14658.51	53888	5356.19	
5/03/96	30.47	132498	14609.12	54043	5373.83	
5/06/96	30.99	132532	14615.20	53715	5340.51	
5/07/96	31.87	132542	14616.29	54077	5375.83	
5/08/96	30.43	132345	14597.07	54059	5375.47	
5/09/96	31.25	132319	14594.25	54087	5377.45	
5/10/96	31.43	132462	14610.83	53775	5346.07	
5/13/96	28.87	132025	14568.22	53837	5354.83	

P.B.C.-1 Control Chart Counts and Backgrounds

Date	100 min. Bkg.	SrY-90	Decay-Corrected cpm	Tc-99	ccpm	
5/14/96	30.24	132458	14615.56	54077	5377.46	
5/15/96	33.72	132687	14638.00	54116	5377.88	
5/16/96	34.10	132892	14661.22	54006	5366.50	
5/17/96	34.26	132779	14649.51	54317	5397.44	
5/20/96	32.21	132698	14645.71	54109	5378.69	replace new dish
5/21/96	31.66	132163	14588.09	53711	5339.44	
5/22/96	30.43	132498	14627.48	54113	5380.87	
5/23/96	31.88	132642	14642.78	53967	5364.82	
5/24/96	35.87	132519	14625.72	53574	5321.53	
5/28/96	35.97	132611	14639.65	54081	5372.13	

L R Gremmel
5-29-96

P.B.C.-2 Control Chart Counts and Backgrounds

Date	100 min. Bkg.	SrY-90	Decay-Corrected cpm	Tc-99	ccpm	
1/02/96	27.14	128262	13470.15	46268	4599.66	
1/03/96	26.15	128248	13470.60	46210	4594.85	
1/04/96	28.39	128144	13458.19	46224	4594.01	
1/05/96	29.21	128266	13471.05	46410	4611.79	
1/08/96	27.78	128254	13473.96	46289	4601.12	
1/09/96	27.29	128209	13470.63	46344	4607.11	
1/10/96	29.08	126648	13305.26	46170	4587.92	
1/11/96	26.17	127397	13388.07	46281	4601.93	
1/12/96	26.79	127956	13447.17	46342	4607.41	
1/15/96	26.78	127997	13454.16	46252	4598.42	
1/16/96	28.14	127345	13384.94	46269	4598.76	
1/17/96	28.91	127530	13404.50	46099	4580.99	
1/18/96	28.65	127780	13431.99	46062	4577.55	
1/19/96	27.73	128154	13473.25	46192	4591.47	
1/22/96	27.37	128219	13483.15	46143	4586.93	
1/23/96	28.08	127071	13362.30	46158	4587.72	
1/24/96	27.47	128032	13465.11	46166	4589.13	1/25/96low gas
1/26/96	28.15	128244	13488.52	46198	4591.65	1/26/96new gas
1/29/96	27.84	127006	13360.99	46047	4576.86	
1/30/96	28.37	127192	13380.92	46263	4597.93	
1/31/96	28.15	127543	13419.05	46148	4586.65	
2/01/96	28.06	127589	13424.88	46261	4598.04	
2/02/96	28.03	127914	13460.07	46194	4591.37	
2/05/96	27.66	127003	13367.03	46426	4614.94	replaced gas
2/06/96	29.46	127085	13374.66	46128	4583.34	regulator
2/07/96	28.02	127030	13371.26	46344	4606.38	
2/08/96	27.95	127547	13426.76	46143	4586.35	
2/09/96	29.27	127308	13401.04	46252	4595.93	
2/12/96	27.71	127035	13376.53	46232	4595.49	
2/13/96	27.50	127119	13386.50	46193	4591.80	
2/14/96	28.25	127318	13407.59	46220	4593.75	
2/15/96	27.52	127284	13405.66	46187	4591.18	
2/16/96	27.55	127506	13429.94	46042	4576.65	
2/20/96	27.41	127272	13408.93	46093	4581.89	
2/21/96	28.74	127772	13461.20	46487	4619.96	
2/22/96	29.93	127619	13444.68	46368	4606.87	
2/23/96	29.25	127509	13434.66	45843	4555.05	
2/26/96	29.35	127309	13416.09	46059	4576.55	
2/27/96	27.75	127391	13427.33	46065	4578.75	
2/28/96	28.57	127326	13420.48	46025	4573.93	
2/29/96	28.87	127014	13388.09	46414	4612.53	
3/01/96	27.52	126870	13375.18	45766	4549.08	
3/04/96	27.91	127300	13422.86	45783	4550.39	
3/05/96	30.61	127324	13423.42	45894	4558.79	clean dish 3/5/96
3/06/96	28.21	126897	13381.72	46081	4579.89	
3/07/96	27.58	127334	13429.45	45977	4570.12	
3/08/96	27.81	127300	13426.50	45996	4571.79	

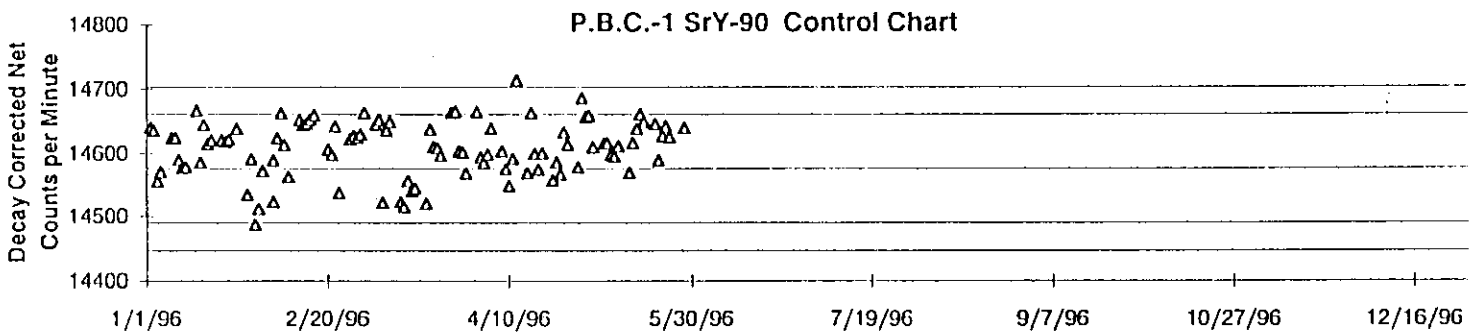
P.B.C.-2 Control Chart Counts and Backgrounds

Date	100 min. Bkg.	SrY-90	Decay-Corrected cpm	Tc-99	ccpm	
3/11/96	28.42	126557	13349.96	45973	4568.88	
3/12/96	29.42	126677	13362.47	45479	4518.48	
3/13/96	28.24	126934	13391.78	45781	4549.86	
3/14/96	27.59	126919	13391.76	46282	4600.61	
3/15/96	28.12	126663	13365.01	45833	4555.18	
3/18/96	28.16	126693	13370.79	45948	4566.64	
3/19/96	28.92	127434	13449.25	45603	4531.38	
3/20/96	27.45	127116	13418.05	45743	4546.85	
3/21/96	29.32	126552	13357.29	45854	4556.08	
3/22/96	29.56	126593	13362.25	45624	4532.84	
3/25/96	28.96	126375	13342.46	45722	4543.24	
3/26/96	28.58	126617	13369.35	45959	4567.32	
3/27/96	28.71	126296	13336.12	46022	4573.49	
3/28/96	29.41	126471	13354.79	45618	4532.39	clean dish 3/28/96
3/29/96	29.11	126755	13386.04	45940	4564.89	
4/01/96	28.54	126774	13391.31	46080	4579.46	
4/02/96	28.82	126080	13318.42	46014	4572.58	
4/03/96	29.45	126807	13395.60	46187	4589.25	
4/04/96	29.04	126369	13350.54	46249	4595.86	
4/05/96	29.21	126695	13385.76	45580	4528.79	
4/08/96	27.20	126780	13399.55	46230	4595.80	
4/09/96	28.64	126569	13376.55	46082	4579.56	
4/10/96	28.01	127141	13438.70	46218	4593.79	
4/11/96	28.56	126239	13343.44	46188	4590.24	
4/12/96	29.39	126940	13417.71	46087	4579.31	
4/15/96	29.14	126640	13388.84	45585	4529.36	
4/16/96	28.72	126804	13407.55	45761	4547.38	
4/17/96	29.48	126411	13365.98	45752	4545.72	
4/18/96	28.60	126213	13346.80	46054	4576.80	
4/19/96	29.20	126546	13382.35	45806	4551.40	
4/22/96	29.10	126635	13394.53	45646	4535.50	
4/23/96	28.87	126050	13333.64	45823	4553.43	
4/24/96	28.87	126050	13334.52	45823	4553.43	
4/25/96	27.60	126748	13410.76	45521	4524.50	
4/26/96	27.63	126073	13340.03	45712	4543.57	
4/29/96	28.48	126804	13419.30	45838	4555.32	
4/30/96	27.88	126677	13407.35	45639	4536.02	
5/01/96	29.48	126103	13345.65	45991	4569.62	
5/02/96	28.74	125688	13303.29	45768	4548.06	
5/03/96	29.10	126431	13382.61	45804	4551.30	
5/06/96	28.50	125837	13322.86	45787	4550.20	
5/07/96	28.51	126406	13384.11	46084	4579.89	
5/08/96	28.75	126120	13354.39	46034	4574.65	
5/09/96	28.00	126234	13368.17	45984	4570.40	
5/10/96	28.01	126474	13394.51	45979	4569.89	
5/13/96	28.50	125648	13415.11	45715	4543.00	
5/14/96	29.10	126540	13403.89	45993	4570.20	

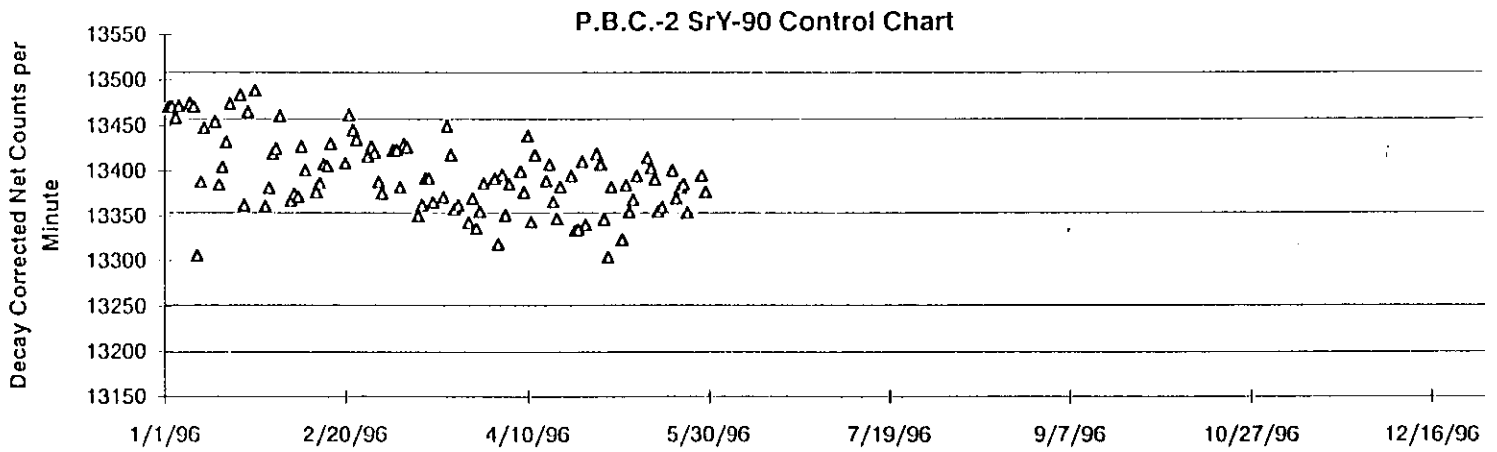
P.B.C.-2 Control Chart Counts and Backgrounds

Date	100 min. Bkg.	SrY-90	Decay-Corrected cpm	Tc-99	ccpm	
5/15/96	28.98	126411	13391.21	45792	4550.22	
5/16/96	29.33	126063	13354.77	45910	4561.67	clean dish
5/17/96	28.81	126098	13359.92	45996	4570.79	
5/20/96	29.71	126467	13400.80	45845	4554.79	replace new dish
5/21/96	28.73	126157	13369.79	46015	4572.77	
5/22/96	29.49	126262	13381.02	45262	4496.71	
5/23/96	29.65	126300	13385.77	46074	4577.75	
5/24/96	28.86	125980	13353.50	45591	4530.24	
5/28/96	28.74	126338	13395.19	45591	4530.36	
5/29/96	29.34	126161	13376.62	46216	4592.26	

L R Hemond
5-29-96



LR Greenwood
5-29-96



L R Greenwood
5-29-96

E6 - TOTAL BETA ANALYSIS

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Table 3.4 Total Beta, U, Sr-90 Results, Core 118/119, Seg 2A/2B, Tank BX-112

ALO #	CORE ID	Analysis Batch	Total Beta uCi/g	+/-% Error	Sr-90 uCi/g	+/-% Error	Uranium ug/g	+/-% Error
96-2605	PROCESS BLANK	2	1.81E-01	15%	<2.2E-1		<7.4E+0	
96-2607	118.2A.F	2	6.16E+01	3%	4.39E+00	9%	9.34E+02	10%
96-2607-DUP	118.2A.F DUP	2	5.99E+01	3%	3.60E+00	10%	9.33E+02	10%
	RPD		2.8%		19.8%		0.1%	
96-2606	PROCESS BLANK	2	6.46E-02	33%	<2.3E-1		<7.4E+0	
96-2608	118.2B.F	2	6.30E+01	4%	4.10E+00	10%	1.21E+03	8%
96-2608-DUP	118.2B.F DUP	2	6.37E+01	4%	4.17E+00	9%	1.15E+03	8%
	RPD		1.1%		1.7%		5.1%	
96-2611	PROCESS BLANK	2	1.88E-01	15%	<2.7E-1		<7.8E+0	
96-2613	119.2A.F	2	5.74E+01	3%	8.02E+00	9%	9.69E+02	10%
96-2613-DUP	119.2A.F DUP	2	5.80E+01	3%	9.87E+00	9%	9.74E+02	11%
	RPD		1.0%		20.7%		0.5%	
96-2612	PROCESS BLANK	2	1.94E-01	15%	<2.4E-1		<8.0E+0	
96-2614	119.2B.F	2	5.24E+01	3%	5.87E+00	9%	1.08E+03	10%
96-2614-DUP	119.2B.F DUP	2	5.35E+01	3%	6.13E+00	9%	1.06E+03	9%
	RPD		2.1%		4.3%		1.9%	
	LAB BLANK	2	<3.2E-3		<2.4E-1		<8.0E+1	
	LAB STANDARD	2	101%		101%		105%	
	SAMPLE SPIKE	2	114%		105%		N/A	

Silvers / Bx 112

P.B.C #1 1.81

BKG: ~~28.75~~ / 100 min.
30.43 5/8/96

96-2605 BLK 676 / 10 min.
96-2607 64006 / 10 min.
96-2607 Dup 58019 / 10 min.
96-2611 BLK 660 / 10 min.
96-2613 54664 / 10 min.
96-2613 Dup 50423 / 10 min.
STD 20397 / 10 min.
Spike -2614 Dup 81403 / 10 min.

P.B.C #2 1.89

BKG: ~~30.43~~ / 100 min.
28.75 TTL 5/8/96

BLK 287 / 10 min.
96-2606 BLK 415 / 10 mi
96-2608 61437 / 10 m
96-2608 Dup 68971 / 10
96-2612 BLK 639 / 10
96-2614 46319 / 10 m
96-2614 D 55973 / 10

T Trangle 5/8/96

Review: J R Greenwood 5/9/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : Silvers Date Received 0/ 0/ 0 Work order : K4199 ARF(SOW) :

A.L.O. No. 96-2605BLK Description :

DF .... .09944

Dilution Factor = 1.0056E+01 +/- 1.00%

Instrument	P.B.C. - 1	d/c SrY90 1.8100

Date	5 / 8 / 96
Total counts	676
Count time	10
Bkg C/M	30.430
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Beta	dpm/ml	6.77E+02	14.3	1.10E+02
	uCi/ml	3.05E-04		4.97E-05

$3.05E-04 \times \frac{100ml}{.1687g} = 1.81E-1\ uCi/g$ TLC 5/9/96

Data Entry by T Brangle Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/8/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : SILVERS/BX112 Date Received 5/ 7/ 96 Work order : K41991 ARF(SOW) : ASR 2785.01

A.L.O. No. 96-2607 Description : 118.2A.F

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	P.B.C. - 1	d/c SrY90 1.8100

Date	5 / 8 / 96
Total counts	64006
Count time	10
Bkg C/M	30.430
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Beta	dpm/ml	2.31E+05	2.8	2.20E+02
	uCi/ml	1.04E-01		9.89E-05

$\times \frac{100\,ml}{.1688\,g} = 6.16E1 \frac{uCi}{g}$ TTL 5/9/96

Data Entry by T Trang-le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/8/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : Silvers | 8x11² Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2607Dup Description :

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	P.B.C. - 1	d/c SrY90 1.8100

Date	5 / 8 / 96
Total counts	58019
Count time	10
Bkg C/M	30.430
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Beta	dpm/ml	2.09E+05	2.8	2.20E+02
	uCi/ml	9.41E-02 ✓		

$9.41E\text{-}02 \times \frac{100\ ml}{.1570\ g} = 5.99E\text{-}1\ uCi/g$ 9.89E-05 TTL 5/9/96

Data Entry by T Trang-le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L D Greenwood Date 5/8/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : Silvers | Bx 112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2606BLK Description :

DF .... .09944

Dilution Factor = 1.0056E+01 +/- 1.00%

Instrument	P.B.C. - 2	d/c SrY90 1.8900

Date	5 / 8 / 96
Total counts	415
Count time	10
Bkg C/M	28.750
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Beta	dpm/ml	2.42E+02	32.5	1.12E+02
	uCi/ml	1.09E-04 ✓		5.05E-05

$\frac{\times 100 ml}{.1687 g} = 6.46E-2$ uCi/g TTL 5/9/96

Data Entry by T Trang-Le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/9/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : SILVERS/BX112 Date Received 5/ 7/ 96 Work order : K41991 ARF(SOW) : ASR 2785.01

A.L.O. No. 96-2608 Description : 118.2B.F

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	P.B.C. - 2	d/c SrY90 1.8900

Date	5 / 8 / 96
Total counts	61437
Count time	10
Bkg C/M	28.750
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Beta	dpm/ml	2.31E+05	2.8	2.23E+02
	uCi/ml	1.04E-01		1.00E-04

$\times \frac{100\,ml}{.1651\,g} = 6.30\,E1\ uCi/g$ TTL 5/9/96

Data Entry by T Trang-Le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/9/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : Silvers | Bx 112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2608DUP Description :

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	P.B.C. - 2	d/c SrY90 1.8900

Date	5 / 8 / 96
Total counts	68971
Count time	10
Bkg C/M	28.750
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Beta	dpm/ml	2.60E+05	2.8	2.23E+02
	uCi/ml	1.17E-01 ✓		1.00E-04

$\times \frac{100\ ml}{.1837g} = 6.37E1$ uCi/g TTL 5/9/96

Data Entry by T Trang-le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by LR Greenwood Date 5/9/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : Silvers | Bx 11 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2611 BLK Description :

DF .... .09944

Dilution Factor = 1.0056E+01 +/- 1.00%

Instrument	P.B.C. - 1	d/c SrY90 1.8100

Date	5 / 8 / 96
Total counts	660
Count time	10
Bkg C/M	30.430
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Beta	dpm/ml	6.47E+02	14.7	1.10E+02
	uCi/ml	2.92E-04		4.97E-05

$\frac{\times 100\ ml}{.1555\ g}$ = 1.88E-1 uCi/g TTL 5/9/96

Data Entry by T Trang-le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L L Greenwood Date 5/9/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : SILVERS/BX112 Date Received 5/ 7/ 96 Work order : K41991 ARF(SOW) : ASR 2785.01

A.L.O. No. 96-2613 Description : 119.2A.F

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	P.B.C. - 1	d/c SrY90 1.8100

Date	5 / 8 / 96
Total counts	54664
Count time	10
Bkg C/M	30.430
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Beta	dpm/ml	1.97E+05	2.8	2.20E+02
	uCi/ml	8.86E-02		9.89E-05

$\checkmark \times \frac{100\,ml}{.1544\,g} = 5.74^{E1}\,uCi/g$ TTL 5/9/96

Data Entry by T Trang-le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/9/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : Silvers | Bx112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2613DUP Description :

DF ---- .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	P.B.C. - 1	d/c SrY90 1.8100

Date	5 / 8 / 96
Total counts	50423
Count time	10
Bkg C/M	30.430
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Beta	dpm/ml	1.81E+05	2.8	2.20E+02
	uCi/ml	8.17E-02		9.89E-05

$$8.17E-02 \times \frac{100 ml}{.1408 g} = 5.80E-\cancel{5}\ 1\ uCi/g$$ TTL 5/9/96 TTL 5/9/96

Data Entry by T Trang-le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/9/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : Silvers | Bx 112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2612BLK Description :

DF .... .09944

Dilution Factor = 1.0056E+01 +/- 1.00%

Instrument	P.B.C. - 2	d/c SrY90 1.8900

Date	5 / 8 / 96
Total counts	639
Count time	10
Bkg C/M	28.750
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Beta	dpm/ml	6.68E+02	14.7	1.12E+02
	uCi/ml	3.01E-04 ✓ $\times \frac{100 ml}{.1555 g}$ = 1.94E-1 uCi/g TTL 5/9/96		5.05E-05

Data Entry by T Trang-le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/9/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : SILVERS/BX112 Date Received 5/ 7/ 96 Work order : K41991 ARF(SOW) : ASR 2785.01

A.L.O. No. 96-2614 Description : 119.2B.F

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	P.B.C. - 2 | d/c SrY90 1.8900
Date	5 / 8 / 96
Total counts	46319
Count time	10
Bkg C/M	28.750
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Beta	dpm/ml	1.74E+05	2.8	2.23E+02
	uCi/ml	7.84E-02		1.00E-04

$\times \frac{100\,ml}{.1495\,g} = 5.24\,uCi/g$ TTL 5/9/96

Data Entry by T Trang-le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/9/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : Silvers / Bx 112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2614D Description :

DF .... .05001

Dilution Factor = 1.9996E+01 +/- 1.00%

Instrument	P.B.C. - 2	d/c SrY90 1.8900

Date	5 / 8 / 96
Total counts	55973
Count time	10
Bkg C/M	28.750
Bkg cnt time	100

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Beta	dpm/ml	2.10E+05	2.8	2.23E+02
	uCi/ml	9.48E-02		1.00E-04

$\frac{9.48E-02 \times 100 ml}{.1773 g} = 5.35 uCi/g$ EI TTL 5/9/96

Data Entry by T Trang-le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/9/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : Silvers/Bx 112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. BLK Description :

DF .... .99492

Dilution Factor = 1.0051E+00 +/- 1.00%

Instrument	P.B.C. - 2	d/c SrY90 1.8900

Date	5 / 8 / 96
Total counts	287
Count time	10
Bkg C/M	28.750
Bkg cnt time	100

Calculation and Results

TTL 5/9/96

Average: $\frac{.1555 + .1687}{2} = .1621$

		Activity	Uncertainty.%	MDA
Total Beta	dpm/ml	-9.50E-02	6965.6	1.12E+01
	uCi/ml	-4.28E-08		5.05E-06 ✓ $\times \frac{100\ ml}{.1621\ g} = 3.12E-3\ uCi/g$

TTL 5/9/96

Data Entry by T Trang-le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L D Greenwood Date 5/9/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : Silvers/8x11a Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. STD Description : 3.65 E6 dpm/ml

DF .... .09944 ---> 10.00000 .... .09944

Dilution Factor = 1.0113E+03 +/- 1.73%

Instrument	P.B.C. - 1	d/c SrY90 1.8100

Date	5 / 8 / 96
Total counts	20397
Count time	10
Bkg C/M	30.430
Bkg cnt time	100

101%

Calculation and Results

		Activity	Uncertainty.%	MDA
Total Beta	dpm/ml	3.68E+06	3.3	1.11E+04
	uCi/ml	1.66E+00		5.00E-03

Data Entry by T Trang-le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/9/96

Pacific Northwest Laboratory 96149

Total Beta.....PNL-ALO-430 & 431

Customer : Silvers | Bx112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. Spike 96-2614 Dup Description : 3.65 E6 dpm/ml

DF .... .09944 ---> 10.00000 .... .09944

Dilution Factor = 1.0113E+03 +/- 1.73%

Instrument	P.B.C. - 1	d/c SrY90 1.8100
Date	5 / 8 / 96	
Total counts	81403	
Count time	10	
Bkg C/M	30.430	
Bkg cnt time	100	

1.48 E7 / 1.0113E3 = 1.46E4
-2.10 E5 / 1.9996 E1 = 1.05 E4
4.10 E3 *
1.0113 E3
4.15 E6

Calculation and Results

		Activity	Uncertainty,%	MDA
Total Beta	dpm/ml	1.48E+07	3.1	1.11E+04
	uCi/ml	6.69E+00		5.00E-03

114%

Data Entry by T Trang-le Date 5/8/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/9/96

E7 - SR-90 ANALYSIS

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Table 3.4 Total Beta, U, Sr-90 Results, Core 118/119, Seg 2A/2B, Tank BX-112

ALO #	CORE ID	Analysis Batch	Total Beta uCi/g	+/-% Error	Sr-90 uCi/g	+/-% Error	Uranium ug/g	+/-% Error
96-2605	PROCESS BLANK	2	1.81E-01	15%	<2.2E-1		<7.4E+0	
96-2607	118.2A.F	2	6.16E+01	3%	4.39E+00	9%	9.34E+02	10%
96-2607-DUP	118.2A.F DUP	2	5.99E+01	3%	3.60E+00	10%	9.33E+02	10%
	RPD		2.8%		19.8%		0.1%	
96-2606	PROCESS BLANK	2	6.46E-02	33%	<2.3E-1		<7.4E+0	
96-2608	118.2B.F	2	6.30E+01	4%	4.10E+00	10%	1.21E+03	8%
96-2608-DUP	118.2B.F DUP	2	6.37E+01	4%	4.17E+00	9%	1.15E+03	8%
	RPD		1.1%		1.7%		5.1%	
96-2611	PROCESS BLANK	2	1.88E-01	15%	<2.7E-1		<7.8E+0	
96-2613	119.2A.F	2	5.74E+01	3%	8.02E+00	9%	9.69E+02	10%
96-2613-DUP	119.2A.F DUP	2	5.80E+01	3%	9.87E+00	9%	9.74E+02	11%
	RPD		1.0%		20.7%		0.5%	
96-2612	PROCESS BLANK	2	1.94E-01	15%	<2.4E-1		<8.0E+0	
96-2614	119.2B.F	2	5.24E+01	3%	5.87E+00	9%	1.08E+03	10%
96-2614-DUP	119.2B.F DUP	2	5.35E+01	3%	6.13E+00	9%	1.06E+03	9%
	RPD		2.1%		4.3%		1.9%	
	LAB BLANK	2	<3.2E-3		<2.4E-1		<8.0E+1	
	LAB STANDARD	2	101%		101%		105%	
	SAMPLE SPIKE	2	114%		105%		N/A	

Battelle, Pacific Northwest Laboratories
Analytical Chemistry Laboratory
File Location: Rad. 329 Building

Attachment 1
PNL-ALO-476, REV. 1
Page 1 of 2

Sr-90 Analysis Data Sheet

Check if used: PNL-ALO-476 ✓ PNL-ALO-463 ___ PNL-ALO-474 ___ Other ___

Date Sample Prep Started 5/16/96 Date Completed 5/16/96

^{90}Sr-^{90}Y Spike Volume
Matrix Spike 0.09944 → 10 - 0.05001
Pipet No. 8, 15 Volume ___ ± ___ Date Pipetted 5/16/96

Spike ID RS-11-13 Spike Activity 2.216SE6 dpm/mL 4/26/88

Blank Spike .09944 → 10 - .05001
Pipet No. 8, 15 Volume ___ ± ___ Date Pipetted 5/16/96

Spike ID RS-11-13 Spike Activity 2.216SE6 d/m/ml Ref 4-26-88 S.T.

Tracer: Sr carrier ___ or ^{85}Sr ✓

Pipet No. 15 Volume .05001 ± ___ Date Pipetted 5/16/96

Concentration or activity ~ 100 cpm β Spike ID ___
SEE TRACER COMPARITORS 1 & 2

Sample Volumes (if a pipet was used for small aqueous samples)
Used For 96-2605BIK; 2606BIK; 2611BIK; 2612BIK; 2605BIK+std; BIK.

Pipet No. 8 Volume .09944 ± ___ Date Pipetted 5/16/96

Used For 96-2607; 2607Dup; 2608; 2608Dup; 2613; 2613Dup; 2614; 2614Dup; 2614Dup Dup.

Pipet No. 15 Volume .05001 ± ___ Date Pipetted 5/16/96

Sr Separation Date & Time 5/16/96 1020 A.

Precipitate composition $Sr(NO_3)_2$ ___ $Sr(C_2O_4)$ ___ $SrCO_3$ ___

[signature] 5/16/96
Analyst Date

D.K. Fadyll 5/24/96
Reviewer Date

Use of this specific form is not required, but the information requested must appear on any form used as an alternative.

page 1 of 2

Pacific Northwest National Laboratory
Radiochemistry Group - 325 Building

Batch Counting Log SR-90

Client: Silvers

Work Package: #

Sample ID	Detector ID	Background Count Rate (cpm)*	Detector Efficiency (cpm/dpm)	Sample Counts	Count Time (min)	Date	
SR-85 Direct	PBC 1	34.10	1.81	1628	10	5/16/96	13:40
SR-85 Direct	PBC 1	34.10	1.81	1750	10	5/16/96	13:50
96-2605 BLK	PBC 2	29.33	1.89	1361	10	5/16/96	13:45
96-2606 BLK	2	29.33	1.89	1257	10	5/16/96	14:00
96-2605 BLK + STD	1	34.10	1.81	6332	10	5/16/96	14:07
96-2607	2	29.33	1.89	5739	10	5/16/96	14:10
STD	1	34.10	1.81	6114	10	5/16/96	14:25
96-2607 Dup	2	29.33	1.89	4754	10	5/16/96	14:22
96-2608	2	29.33	1.89	5206	10	5/16/96	14:32
96-2608 Dup	2	29.33	1.89	5668	10	5/16/96	14:45
96-2611 BLK	2	29.33	1.89	1251	10	5/16/96	14:55
96-2612 BLK	2	29.33	1.89	1242	10	5/16/96	15:05
96-2613	1	34.10	1.81	8756	10	5/16/96	14:52
96-2613 Dup	1	34.10	1.81	8157	10	5/16/96	15:03
96-2614	2	29.33	1.89	6481	10	5/16/96	15:20
96-2614 Dup	2	29.33	1.89	7664	10	5/16/96	15:30

PBC 1 Sr-90 d/c = 1.83 Y-90 d/c = 1.79 Sr/Y-90 = 1.81 ; PBC 2 Y90 d/c = 1.84 Sr Y-90 d/c ~~Y~~ = 1.89

*Background Count Time: 100 min.

Analyst: T Trang-le Date: 5/16/96

Reviewer: D.K. Fadeff Date: 5/24/96

estimate Sr90 d/c

$(1.89) \times \left(\frac{1.83}{1.81}\right) = 1.91$

based on similar characteristics between PBC1 and PBC2

2388

Pacific Northwest National Laboratory
Radiochemistry Group - 325 Building

Batch Counting Log Sr-90

Client: Silvers

Work Package: #

	Sample ID	Detector ID	Background Count Rate (cpm)*	Detector Efficiency (cpm/dpm)	Sample Counts	Count Time (min)	Date	
Duplicate	96-2614 Dup	PBC 2	29.33	1.89	7887	10	5/16/96	15:45
	BLK	PBC 2	29.33	1.89	1275	10	5/16/96	15:55

*Background Count Time: 100

Analyst: T Trang-Lo Date: 5/16/96

Reviewer: D.K. Shelley Date: 5/21/96

2389

2390

ANALYSES DATA

Client Silvers / BX112
Work Order # K4199
ASR 2785.01

Procedure PNL-ALO-430 ; 431

Sample	Dilution SEE PREP SHEETS
96-2605 BLK	.09944
96-2606 BLK	.09944
96-2607	.05001
96-2607 Dup	.05001
96-2608	.05001
96-2608 Dup	.05001
96-2611 BLK	.09944
96-2612 BLK	.09944
96-2613	.05001
96-2613 Dup	.05001
96-2614	.05001
96-2614 Dup	.05001
Std + 96-2614 Dup	.05001 ml sample + .09944 → 10 - .09944 ml std
Std	.09944 → 10 - .09944
Blk	.99492

Standard Information RS-11-13 Sr 90 2.2165E6 dlm/ml Ref 4-26-88 1.8233E6 x2

Pipets Used #8 .09944, #15 .05001, #14 .99492
BALANCE 132064-90

Analyst / Date [signature] 5/8/96 Reviewer / Date [signature] 5/8/96

SPREADSHEET FOR CALCULATION OF Sr-90 ACTIVITY BASED ON THE USE OF Sr-85 FOR YIELD DETERMINATION
Spreadsheet filename: SRCALC85

Revision: 10/30/95

ALO Sample ID(s): 96-2605 through 96-2614 BX112
Data File Name: SrBX112
Date Calculated: 05/24/96
Separation Time: 10:20

I. Calculation of Sr-85 Yields

Detector (M&TE)	Standard I	pCi/sample Sr-85	% Error	Average	Error
D	Sr-85 100	9938	4.59	9938	456
E	Sr-85 100	8711	4.60	8711	401

Detector (M&TE)	Sample ID	pCi/sample Sr-85	% Error	Yield	Error
E	96-2605 P	8134	4.6	0.934	0.061
E	96-2607	8130	3.4	0.933	0.053
E	96-2607D	8131	4.6	0.933	0.061
E	96-2606 P	8070	4.6	0.926	0.060
D	96-2608	8930	4.6	0.899	0.058
D	96-2608D	8882	4.6	0.894	0.058
D	96-2611 P	7880	4.6	0.793	0.052
D	96-2613	9070	4.6	0.913	0.059
D	96-2613D	7614	4.6	0.766	0.050
E	96-2612 P	8239	4.6	0.946	0.062
E	96-2614	8007	4.6	0.919	0.060
E	96-2614D	7996	4.6	0.918	0.060
E	96-2614D	8014	4.6	0.920	0.060
D	Blank	8963	4.6	0.902	0.059
D	Blank Spik	8751	4.6	0.881	0.057
D	MS-2605	8798	4.6	0.885	0.058

II. Sr-85 Contribution to Beta Counting

Detector (M&TE)	Sample Counted	Background Count Rate (cpm)	Std Count time	Total Sr-85 Counts	1s Error	Net cpm of Sr-85	1s Error
PBC1	100% yield	34.1	10	1628	40.35	128.70	4.0
PBC1	100% yield	34.1	10	1750	41.83	140.90	4.2

Average net beta count rate of Sr-85 100% chemical yield and standard deviation: 134.8 6.1

III. Beta Counting Data, Adjusted for Corrected Background & Sr-85 Recovery

Detector (M&TE)	Sample ID	Time of Count	Total Counts Observed	Error	Count Time	Background due to Sr-85	Detector Background	Total Background Counts	Net cpm Sample	Error
PBC2	96-2605 P	13:45	1361	37	10	125.87	29.33	155.20	-19.10	13.7
PBC2	96-2607	14:10	5739	76	10	125.81	29.33	155.14	418.76	16.8
PBC2	96-2607D	14:22	4754	69	10	125.82	29.33	155.15	320.25	16.9
PBC2	96-2606 P	14:00	1257	35	10	124.88	29.33	154.21	-28.51	13.4
PBC2	96-2608	14:32	5206	72	10	121.13	29.33	150.46	370.14	16.8
PBC2	96-2608D	14:45	5668	75	10	120.48	29.33	149.81	416.99	17.1
PBC2	96-2611 P	14:55	1251	35	10	106.89	29.33	136.22	-11.12	12.0
PBC1	96-2613	14:52	8756	94	10	123.03	34.10	157.13	718.47	19.1
PBC1	96-2613D	15:03	8157	90	10	103.28	34.10	137.38	678.32	17.2
PBC2	96-2612 P	15:05	1242	35	10	127.50	29.33	156.83	-32.63	13.6
PBC2	96-2614	15:20	6481	81	10	123.91	29.33	153.24	494.86	17.9
PBC2	96-2614D	15:30	7664	88	10	123.74	29.33	153.07	613.33	18.6
PBC2	96-2614D	15:45	7887	89	10	124.01	29.33	153.34	635.36	18.7
PBC2	Blank	15:55	1275	36	10	121.58	29.33	150.91	-23.41	13.2
PBC1	Blank Spik	14:25	6114	78	10	118.70	34.10	152.80	458.60	17.2
PBC1	MS-2605	14:07	6332	80	10	119.34	34.10	153.44	479.76	17.4

IV. Calculation of Sr-90 activity

Sample ID	Sample Quantity g	Overall Dilution Error (%)	Dilution Vol. (mL)	Lab Aliquot (mL)	Sr-90 Activity dpm/g	Error	uCi/g	Error	% error	Sample Specific Detection Limit uCi/g	
96-2605 PB	0.1687	0.02	100	0.09944	-2.244E+05	-1.6E+05	-1.01E-01	-7.3E-02	72	2.2E-01	<MDA
96-2607	0.1688	0.02	100	0.05001	9.739E+06	8.6E+05	4.39E+00	3.9E-01	9	4.5E-01	
96-2607D	0.1570	0.02	100	0.05001	7.989E+06	8.0E+05	3.60E+00	3.6E-01	10	4.8E-01	
96-2606 PB	0.1687	0.02	100	0.09944	-3.367E+05	-1.6E+05	-1.52E-01	-7.3E-02	48	2.3E-01	<MDA
96-2608	0.1651	0.02	100	0.05001	9.106E+06	8.7E+05	4.10E+00	3.9E-01	10	4.7E-01	
96-2608D	0.1837	0.02	100	0.05001	9.248E+06	8.7E+05	4.17E+00	3.9E-01	9	4.2E-01	
96-2611 PB	0.1555	0.02	100	0.09944	-1.648E+05	-1.8E+05	-7.42E-02	-8.0E-02	108	2.7E-01	<MDA
96-2613	0.1544	0.02	100	0.05001	1.780E+07	1.6E+06	8.02E+00	7.1E-01	9	4.9E-01	
96-2613D	0.1408	0.02	100	0.05001	2.191E+07	1.9E+06	9.87E+00	8.7E-01	9	6.0E-01	
96-2612 PB	0.1555	0.02	100	0.09944	-4.048E+05	-1.7E+05	-1.82E-01	-7.8E-02	43	2.4E-01	<MDA
96-2614	0.1495	0.02	100	0.05001	1.303E+07	1.2E+06	5.87E+00	5.4E-01	9	5.1E-01	
96-2614D	0.1773	0.02	100	0.05001	1.362E+07	1.2E+06	6.13E+00	5.5E-01	9	4.3E-01	
96-2614D du	0.1773	0.02	100	0.05001	1.404E+07	1.3E+06	6.32E+00	5.7E-01	9	4.3E-01	
Blank	1	0	1	0.09944	-4.695E+02	-2.7E+02	-2.11E-04	-1.2E-04	57	3.9E-04	<MDA
Blank Spike	0.09944	0.0005	10	0.05001	1.837E+06	1.7E+05	8.27E-01	7.5E-02	9	7.7E-02	
MS-2605	0.1687	0.02	100	0.09944	5.683E+06	5.2E+05	2.56E+00	2.4E-01	9	2.3E-01	

Blank spike recovery: 1.822e6 dpm Sr-90/mL / 2.22e6dpm/pCi 8.207E-1 uCi
101% recovery

Matrix spike recovery: 0.05001ml *1.822e6 dpmSr-90/mL*0.09944mL/10mL*100mL/0.09944mL/0.1687g 2.43E+0 uCi/g
105% recovery

Lab Blank
$\times \frac{100mL}{.16g} = < 2.4E-1 \frac{uCi}{g}$

D.K. Fadeg 5/24/96
Entered by Date

L R Greenwood 5/24/96
Reviewed by Date

$$\text{Yield} = \frac{\text{cps Sr-85 in sample}}{\text{cps Sr-85 in 100\% yield standard}}$$

Corrected background cpm = ((total counts Sr-85 100% yield)/count time - bkgd cpm)*yield + bkgd cpm

$$\text{Sr-90 Activity} = \frac{\text{Sr-90 net cpm}}{E(Sr) + [1 - \exp(-\ln 2 * \text{delta t/Y-90 half life})] * E(Y)} * \frac{1}{\text{Yield} * \text{Sample mass/vol}}$$

(Y-90 half life equals 64.08 hours)
E(Sr) = Sr-90 counting efficiency 0.523 PBC2, 0.546 PBC1 +/- 5% (weightless plates)
E(Y) = Y-90 counting efficiency 0.56073 (weightless plates)

$$\text{Sample Specific Detection Limit} = \frac{3 + 4.65 * \text{square root(background cpm * sample count time)}}{\text{sample count time} * E(Sr) * \text{Yield} * \text{Sample mass/vol}}$$

E8 - URANIUM ANALYSIS

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Table 3.4 Total Beta, U, Sr-90 Results, Core 118/119, Seg 2A/2B, Tank BX-112

ALO #	CORE ID	Analysis Batch	Total Beta uCi/g	+/-% Error	Sr-90 uCi/g	+/-% Error	Uranium ug/g	+/-% Error
96-2605	PROCESS BLANK	2	1.81E-01	15%	<2.2E-1		<7.4E+0	
96-2607	118.2A.F	2	6.16E+01	3%	4.39E+00	9%	9.34E+02	10%
96-2607-DUP	118.2A.F DUP	2	5.99E+01	3%	3.60E+00	10%	9.33E+02	10%
	RPD		2.8%		19.8%		0.1%	
96-2606	PROCESS BLANK	2	6.46E-02	33%	<2.3E-1		<7.4E+0	
96-2608	118.2B.F	2	6.30E+01	4%	4.10E+00	10%	1.21E+03	8%
96-2608-DUP	118.2B.F DUP	2	6.37E+01	4%	4.17E+00	9%	1.15E+03	8%
	RPD		1.1%		1.7%		5.1%	
96-2611	PROCESS BLANK	2	1.88E-01	15%	<2.7E-1		<7.8E+0	
96-2613	119.2A.F	2	5.74E+01	3%	8.02E+00	9%	9.69E+02	10%
96-2613-DUP	119.2A.F DUP	2	5.80E+01	3%	9.87E+00	9%	9.74E+02	11%
	RPD		1.0%		20.7%		0.5%	
96-2612	PROCESS BLANK	2	1.94E-01	15%	<2.4E-1		<8.0E+0	
96-2614	119.2B.F	2	5.24E+01	3%	5.87E+00	9%	1.08E+03	10%
96-2614-DUP	119.2B.F DUP	2	5.35E+01	3%	6.13E+00	9%	1.06E+03	9%
	RPD		2.1%		4.3%		1.9%	
	LAB BLANK	2	<3.2E-3		<2.4E-1		<8.0E+1	
	LAB STANDARD	2	101%		101%		105%	
	SAMPLE SPIKE	2	114%		105%		N/A	

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : Silvers/Bx112 Date Received 0/ 0/ 0 Work order : K41991 ARF(SOW) :

A.L.O. No. 96-2605BLK Description :

DF .... .16870 ---> 100.00000 .... .01976

Dilution Factor = 2.9998E+04 +/- 2.07%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml	U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.00500	U-236 (Mass f)	.00000000
Reading 2	.18000	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	1.69E-03	101.	7.38E-03 ✓

Data Entry by T Trang-le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L P Greenwood Date 5/10/96

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : SILVERS/BX112 Date Received 5/ 7/ 96 Work order : K41991 ARF(SOW) : ASR 2785.01

A.L.O. No. 96-2607 Description : 118.2A.F

DF .... .16880 ---> 100.00000 .... .01976

Dilution Factor = 2.9981E+04 +/- 2.07%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.99700 ug/ml	U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.24500	U-236 (Mass f)	.00000000
Reading 2	.40000	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	9.34E-01 ✓	10.	3.11E-02

Data Entry by T Trang-le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L A Greenwood Date 5/10/96

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : Silvers | Bx112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2607D Description :

DF .... .15700 ---> 100.00000 .... .01976

Dilution Factor = 3.2234E+04 +/- 2.07%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.99700 ug/ml	U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.23500	U-236 (Mass f)	.00000000
Reading 2	.39500	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	9.33E-01 ✓	10.	3.39E-02

Data Entry by T Trang-le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/10/96

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : Silvers | Bx 112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2606BLK Description :

DF .... .16870 ---> 100.00000 .... .01976

Dilution Factor = 2.9998E+04 +/- 2.07%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml	U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.01000	U-236 (Mass f)	.00000000
Reading 2	.18000	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	3.47E-03	101.	7.38E-03 ✓

Data Entry by T Trang-le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L D Hammond Date 5/10/96

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : SILVERS/BX112 Date Received 5/ 7/ 96 Work order : K41991 ARF(SOW) : ASR 2785.01

A.L.O. No. 96-2608 Description : 118.2B.F

DF .... .16510 ---> 100.00000 .... .01976

Dilution Factor = 3.0653E+04 +/- 2.07%

Instrument	U Laser
Working Std. Conc.	.99700 ug/ml
Vol. of Working Std.	.01976
Reading 1	.32000
Reading 2	.48000

	Mass Spec.
U-234 (Mass f)	.00000000
U-235 (Mass f)	.00000000
U-236 (Mass f)	.00000000
U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	1.21E+00 ✓	8.	2.63E-02

Data Entry by T Trang-le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/10/96

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : Silvers | Bx112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2608D Description :

DF ---- .18370 ---> 100.00000 ---- .01976

Dilution Factor = 2.7549E+04 +/- 2.07%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.99700 ug/ml	U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.34000	U-236 (Mass f)	.00000000
Reading 2	.50000	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	1.15E+00	8.	2.26E-02

Data Entry by T Trang-le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L A Greenwood Date 5/10/96

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : Silvers/Bx 112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2611BLK Description :

DF .... .15550 ---> 100.00000 .... .01976

Dilution Factor = 3.2545E+04 +/- 2.07%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml		
		U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.01000	U-236 (Mass f)	.00000000
Reading 2	.18500	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	3.66E-03	101.	7.76E-03 ✓

Data Entry by T. Trang-le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/10/96

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : SILVERS/BX112 Date Received 5/ 7/ 96 Work order : K41991 ARF(SOW) : ASR 2785.01

A.L.O. No. 96-2613 Description : 119.2A.F

DF .... .15440 ---> 100.00000 .... .01976

Dilution Factor = 3.2777E+04 +/- 2.07%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.99700 ug/ml	U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.24000	U-236 (Mass f)	.00000000
Reading 2	.40000	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	9.69E-01 ✓	10.	3.40E-02

Data Entry by T Trang-le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/10/96

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : Silvers/Bx11 2 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2613D Description :

DF .... .14080 ---> 100.00000 .... .01976

Dilution Factor = 3.5943E+04 +/- 2.07%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.99700 ug/ml		
		U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.22000	U-236 (Mass f)	.00000000
Reading 2	.38000	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	9.74E-01 ✓	11.	3.93E-02

Data Entry by T Trang-le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/10/96

Pacific Northwest Laboratory 96151

Uranium Laser.....PNL-ALO-445

Customer : Silvers B X112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2612BLK Description :

DF ---- .15550 ---> 100.00000 ---- .01976

Dilution Factor = 3.2545E+04 +/- 2.07%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml		
		U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.02750	U-236 (Mass f)	.00000000
Reading 2	.18000	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	1.16E-02	74.	8.01E-03

Data Entry by_____ Date_____

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/14/96

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : SILVERS/BX112 Date Received 5/ 7/ 96 Work order : K41991 ARF(SOW) : ASR 2785.01

A.L.O. No. 96-2614 Description : 119.2B.F

DF ---- .14950 ---> 100.00000 ---- .01976

Dilution Factor = 3.3851E+04 +/- 2.07%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.99700 ug/ml	U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.26000	U-236 (Mass f)	.00000000
Reading 2	.42000	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	1.08E+00	10.	3.33E-02

Data Entry by T Trang-Le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/10/96

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : Silvers | Bx112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. 96-2614D Description :

DF .... .17730 ---> 100.00000 .... .01976

Dilution Factor = 2.8543E+04 +/- 2.07%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.99700 ug/ml		
		U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.30300	U-236 (Mass f)	.00000000
Reading 2	.46300	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	1.06E+00 ✓	9.	2.54E-02

Data Entry by T Rang-le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L A Greenwood Date 5/10/96

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : Silvers / BX 11 2 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. BLK Description :

DF ---- .16210 ---> 100.00000 ---- .01976

Dilution Factor = 3.1220E+04 +/- 2.07%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.99700 ug/ml		
		U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.00000	U-236 (Mass f)	.00000000
Reading 2	.17300	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	0.00E+00	101.	8.04E-02

Data Entry by T Trang-le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L A Greenwood Date 5/10/96

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : Silvers/Bx112 Date Received 0/ 0/ 0 Work order : K41991 ARF(SOW) :

A.L.O. No. STD Description : 1.001 ug U/ml

DF .... .01976

Dilution Factor = 5.0607E+01 +/- 2.00%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.99700 ug/ml		
Vol. of Working Std.	.01976	U-234 (Mass f)	.00000000
Reading 1	.17300	U-235 (Mass f)	.00000000
Reading 2	.33800	U-236 (Mass f)	.00000000
		U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/ml	Uncertainties %	Less than mg/ml
Total uranium	1.05E-03	13.	6.27E-05

105%

Data Entry by T Trang-le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L P Greenwood Date 5/10/96

URANIUM LASER

Client: Silvers / BX112
Work Order #: K41991

Procedure: ANL-ACO-445

Sample	Dilution SEE Prep Sheets	R1	R2	R1	R2
96-2607	.01976 ml	.245	.40	.245	.40
96-2607 D		.235	.395		
96-2608		.32	.48		
96-2608 D		.34	.50		
96-2613		.24	.40		
96-2613 D		.22	.38		
96-2614		.26	.42		
96-2614 D		.305	.465	.30	.46
Std		.175	.34	.17	.335
Blk	5 ml	.00	.175	.00	.17
		[illegible] 5/10/96			

Standard Information: W-156 1.001 ug U/ml ACL-0029 p4-7 volume .01976 ml

Working Standard Information: Med .9970 ug U/ml ACL-0029 p10 volume .01976 ml

Pipets Used: #3 .01976 ml
BALANCE 130064-90

Analyst / Date: [illegible] 5/10/96 Reviewer / Date: [illegible] 5/13/96

2410

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : Silvers | Bx112 Date Received 0/ 0/ 0 Work order : ARF(SOW) :

A.L.O. No. BLK Description :

DF .... .16210 ---> 100.00000 .... .01976

Dilution Factor = 3.1220E+04 +/- 2.07%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml	U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.00000	U-236 (Mass f)	.00000000
Reading 2	.17800	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/g	Uncertainties %	Less than mg/g
Total uranium	0.00E+00	101.	7.78E-03 ✓

Data Entry by T Trang-le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L D Greenwood Date 5/10/96

Pacific Northwest Laboratory 96149

Uranium Laser.....PNL-ALO-445

Customer : Silvers/Bx112 Date Received 0/ 0/ 0 Work order : K4199/ ARF(SOW) :

A.L.O. No. STD Description : .1001 ug U/ml

DF ---- .01976

Dilution Factor = 5.0607E+01 +/- 2.00%

Instrument	U Laser		Mass Spec.
Working Std. Conc.	.09960 ug/ml		
		U-234 (Mass f)	.00000000
Vol. of Working Std.	.01976	U-235 (Mass f)	.00000000
Reading 1	.17300	U-236 (Mass f)	.00000000
Reading 2	.33500	U-238 (Mass f)	.00000000

* No Uranium Mass Spectroscopy Analysis Performed

Calculation and Results

	Concentration mg/ml	Uncertainties %	Less than mg/ml
Total uranium	1.06E-04	13.	6.32E-06

106%

Data Entry by T Trang-Le Date 5/10/96

Calculation and Analytical Data Sheet Reviewed by L R Greenwood Date 5/10/96

URANIUM LASER

Client Silvers / BX112
Work Order # K41991

Procedure PNL- ALO-445

Sample	Dilution See Prep Sheets	R1	R2	R1	R2
96-2605 Blk	.01976 ml	.005	.18		
96-2606 Blk		.010	.18		
96-2611 Blk		.01	.185		
96-2612 Blk		.005	.18	.05	.18
Std		.175	.335	.17	.335
Blk	5 ml	.00	.18	.00	.175

Standard Information W-157 .1001 ug U/ml ACC-0029 p 4-7 volume .01976 ml

Working Standard Information Low .0996 ug U/ml ACC-0029 p10 volume .01976 ml

Pipets Used #3 01976 ml
BALANCE 132064-90

Analyst / Date [signature] 5/10/96 Reviewer / Date [signature] 5/13/96

2413

WHC-SD-WM-DP-170, REV. 1

P.O. Box 1970 Richland, WA 99352

PART II

WHC-SD-WM-DP-170, REV. 0

ANALYTICAL SERVICES

45-DAY SAFETY SCREENING RESULTS FOR TANK 241-BX-112, PUSH MODE CORES 118 AND 119

Project Coordinator: JOHN M. CONNER
KURT L. SILVERS (PNL)

Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management

by

Westinghouse Hanford Company
Box 1970
Richland, Washington

2-1

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WHC-SD-WM-DP-170, REV. 0

NARRATIVE

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45-DAY SAFETY SCREENING RESULTS FOR TANK 241-BX-112, PUSH MODE CORES 118 AND 119

ANALYTICAL SUMMARY

Two push mode core samples, 118 and 119, were taken from tank 241-BX-112 (BX-112). The samples were received at the 325 Laboratory and underwent safety screening analyses consisting of bulk density, differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), and determination of total alpha activity. The results were compared to the safety screening limits at a confidence level of 95%. None of the adjusted results exceeded the limits stated in the Sampling and Analysis Plan (SAP) [1].

Analyses are also being performed for IC and ICP. Preliminary results are presented for information use only. Final results will be included in a revision to this report.

The flammability of the tank vapor space was determined to be below levels of concern (0% of the Lower Explosive Limit) during auger sampling earlier in 1995 [2]. The analytical data presented in this report on the core samples and the earlier data on the auger samples and tank dome space flammability [2] indicate that the tank may be considered "safe" per the criteria in the *Tank Safety Screening Data Quality Objective* [3].

SCOPE

This document serves as the 45-day report deliverable for the tank BX-112 push mode core samples collected on December 21, 22, and 27, 1995 [core 118 (core samples 95-0288A through 95-0290) and core 119 (core samples 95-0292 through 95-0294)]. The 325 Laboratory received, extruded, and analyzed each sample in accordance with the SAP [1]. Included in this report are the primary safety screening results obtained from the analyses.

None of the safety screening notification limits were exceeded; therefore, no additional testing to support safety screening analyses is required. Additional analyses conducted by the 325 Laboratory on these push mode core samples will be included in a revision to this report. The BX-112 samples are being further analyzed for certain chemical constituents in accordance with the SAP.

A hydrostatic head fluid (HHF) blank was not provided to the laboratory as requested by the SAP. LiBr is added to the HHF as a tracer so that any HHF contamination of the core samples can be detected. Results of HHF blank analyses from tanks sampled during the same time frame as BX-112 (e.g., tanks 241-B-204 and 241-U-109) will be included in a revision to this report. These results should provide a reasonable estimate of the LiBr concentration in the HHF used during core sampling of tank BX-112.

A sample identification matrix is provided below in Table 1. This table provides the sample identification, description, and corresponding PNNL sample numbers.

Table 1. Tank BX-112 PNNL ACL Number Assignment

Sample Identification	Sample Description	PNNL ACL-Number
Core 118 Subsegment 1AA	Lower Half of Segment 1A	96-02605
Core 118 Subsegment 1AB	Upper Half of Segment 1A	96-02606
Core 118 Subsegment 2A	Lower Half of Segment 2	96-02607
Core 118 Subsegment 2B	Upper Half of Segment 2	96-02608
Core 118 Subsegment 3A	Segment 3 (no 1/2 segs)	96-02609
Core 119 Subsegment 1A	Lower Half of Segment 1	96-02611
Core 119 Subsegment 1B	Upper Half of Segment 1	96-02612
Core 119 Subsegment 2A	Lower Half of Segment 2	96-02613
Core 119 Subsegment 2B	Upper Half of Segment 2	96-02614
Core 119 Subsegment 3A	Lower Half of Segment 3	96-02615
Core 119 Subsegment 3B	Top of Segment 3	96-02616
Field Blank	--	96-02619
Liner Liquid	Composite of Core 118 Liner Liquids	96-02620
Core 118 Segment 1A Drainable Liquid	--	96-02848
Core 118 Segment 3 Drainable Liquid	--	96-02850

SAMPLE RECEIPT, EXTRUSION, AND SUBSAMPLING

Sample extrusions described below were performed following either WHC procedure LO-160-103 or PNNL procedure 325-A-33P.

Core 118, Segment 1, Sample 95-288

Push mode sample 95-288 was collected from riser 2 of tank BX-112 on November 30, 1995 and extruded at the 222-S 11A hot cell on December 19, 1995. No drainable liquid was present. The lower 9 inches appeared as a damp, smooth, yellow-green sludge which retained its shape on the extrusion tray. This material (203.7 g) was subsampled as the lower half-segment solids. The upper 7 inches (164.6 g) were segregated as upper half-segment solids. This material was a wet, medium brown sludge which tended to "melt" or sag on the extrusion tray.

Due to equipment problems in the field, the drill string was pulled after this segment was sampled and re-inserted at a later date. The core sample continued with segment 1A, 2 and 3. These segments, along with Core 119, were shipped directly to the 325 Laboratory for extrusion and analysis.

Subsamples of each half-segment from Core 118, Segment 1 were shipped from 222-S to the 325 laboratory for analysis. The results will be included in a revision to this report.

Core 118 Segment 1A, Sample 95-0288A

After reinsertion of the drill string, push mode sample 95-288A was collected from riser 2 of tank BX-112 on December 21, 1995 and extruded on January 18, 1996. The first 4 inches contained no solids. No crust was observed. Inches 4 to 6 were a light brown sludge that would not hold its shape in the pan. Inches 8 to 12 were a medium brown sludge that would not hold its shape in the pan. Subsampling revealed a light brown material on the interior with dark brown smearing on the surface. A total of 329.1 g of solid material was collected, with 69.9 g collected from the first 8 inches (lower half) and 224.2 g collected from the upper half-segment solids. A total of 28 mL of drainable liquid was collected. The segment material was divided into half-segments, homogenized and subsampled for further laboratory analyses and archiving.

Core 118 Segment 2, Sample 95-0289

Push mode sample 95-289 was collected from riser 2 of tank BX-112 on December 21, 1995 and extruded on January 19, 1996. A total of 19 inches of material was extruded from the sampler. The material was dark gray/brown in color and lost its shape in the pan. The first 9.5 inches contained a thick "liquid" that would not drain. The upper 9.5 inches contained less of this "liquid." A total of 380.6 g of solid material was collected, with 104.5 g collected from the first 9.5 inches and 211.8 g collected from the upper 9.5 inches. No drainable liquid was present. The segment material was divided into half-segments, homogenized and subsampled for further laboratory analyses and archiving.

Core 118 Segment 3, Sample 95-0290

Push mode sample 95-290 was collected from riser 2 of tank BX-112 on December 22, 1995 and extruded on January 19, 1996. The material poured from the sampler during extrusion. The material was medium brown in color. Two brown clay-like chunks (< 0.5 inches in diameter) were observed at approximately 6 inches. A total of 242.2 g of solid material was collected in the extrusion pan. A total of 45.3 mL of drainable liquid was collected. Due to the relatively low recovery, the sample was not divided into half-segments (per JM Conner, WHC). The sample was homogenized and subsampled for further laboratory analyses and archiving.

Core 119 Field Blank

In accordance with the SAP, a field blank was provided along with Core 119. The field blank was generated on December 27, 1995 and extruded on January 19, 1995. The field blank was a clear, colorless liquid. Subsamples were taken for analysis and archiving.

Core 119 Segment 1, Sample 95-0292

Push mode sample 95-292 was collected from riser 3 of tank BX-112 on December 27, 1995 and extruded on January 20, 1996. A total of 19 inches of material was extruded from the sampler. No crust was observed. The first 12 inches were a light brown sludge that held its shape in the pan. Inches 12 to 19 were a medium brown sludge that held its shape in the pan. A total of 387.4 g of solid material was collected, with 164.9 g collected from the first 9.5 inches and 197.4 g collected from the upper 9.5 inches. No drainable liquid was present. The segment material was divided into half-segments, homogenized and subsampled for further laboratory analyses and archiving.

Core 119 Segment 2, Sample 95-0293

Push mode sample 95-293 was collected from riser 3 of tank BX-112 on December 27, 1995 and extruded on January 22, 1996. A total of approximately 17 inches of material was extruded from the sampler. The material was a light brown sludge with a smooth texture that held its shape in the pan. A total of 393.7 g of solid material was collected, with 131.2 g collected from the first 9.5 inches and 232.5 g collected from the upper 9.5 inches. No drainable liquid was present. The segment material was divided into half-segments, homogenized and subsampled for further laboratory analyses and archiving.

Core 119 Segment 3, Sample 95-0294

Push mode sample 95-294 was collected from riser 3 of tank BX-112 on December 27, 1995 and extruded on January 22, 1996. A total of approximately 17 inches of material was extruded from the sampler. The first extrusion stroke contained approximately 2 inches of solids. The material was a light brown sludge with a smooth texture that held its shape in the pan. A total of 327.6 g of solid material was collected, with 122.4 g collected from the first 9.5 inches and 164.9 g collected from the upper 9.5 inches. No drainable liquid was present. The segment material was divided into half-segments, homogenized and subsampled for further laboratory analyses and archiving.

ANALYTICAL RESULTS

DENSITY

The density of the lower half-segment solids (plus whole-segment 3A of Core 118), drainable liquids, and field blank were measured in duplicate. The density was measured according to technical procedure PNL-ALO-501. The volume of the drainable liquids and field blank were measured in a graduated cylinder with a calibrated balance. The volume of the solids subsamples were measured in graduated centrifuge cones after the samples were centrifuged for 30

minutes. All sample masses were measured with a calibrated electronic balance. The density of these samples was calculated by dividing the mass of the sample by its volume.

The density data for the samples and duplicates is reported in Table 2. The average density for each sample, the variance between samples, and the relative percent differences (RPDs) are also reported for each sample. None of the measurements exceeded the required precision (20% as measured by RPD).

The density of the field blank is consistent with the density of water. The drainable liquid densities are higher than water indicating that the drainable liquids contain a significant quantity of dissolved salts. This is consistent with the weight percent water data presented in the thermal analysis section. The density of the solids subsamples is fairly consistent, ranging from 1.24 to 1.34 g/mL. These densities are consistent with the fluid nature of these samples.

Table 2. Density Results from Tank BX-112

Sample #	Core	Segment	Density (g/mL)	Average	RPD (%)
96-02605	118	1AA (Lower Half) 1AA Dup	1.24 1.28	1.26	3.52
96-02607	118	2A (Lower Half) 2A Dup	1.31 1.30	1.31	0.69
96-02609	118	3A (Whole Seg) 3A Dup	1.27 1.34	1.31	5.15
96-02611	119	1A (Lower Half) 1A Dup	1.34 1.34	1.34	0.35
96-02613	119	2A (Lower Half) 2A Dup	1.25 1.33	1.29	5.81
96-02615	119	3A (Lower Half) 3A Dup	1.28 1.28	1.28	0.20
96-02848	118	1 Drainable Liq 1 Drainable Liq Dup	1.16 1.16	1.16	0.34
96-02850	119	3 Drainable Liq 3 Drainable Liq Dup	1.19 1.22	1.20	2.83
96-02619		Field Blank Field Blank Dup	0.97 1.03	1.00	6.41

THERMOGRAVIMETRIC ANALYSIS (TGA)

Percent water determinations by TGA were made on homogenized subsamples from Core 118 Segments 1A, 2, and 3 and Core 119 Segments 1, 2, and 3. Samples were run on a SEIKO 5200[1] instrument per procedure PNL-ALO-508. Balance calibration of the instrument was checked against a known 20 mg standard laboratory weight. The instrument temperature was calibrated using indium and lead standards; instrument temperature was checked using the indium standard. Temperature readings for the instrument were within 2 °C of the reported literature value. Balance calibration of the TGA was within 0.01 mg of its expected value. The temperature range for the TGA runs was from ambient (~20 °C) to 550 °C, using a scan rate of 10 °C per minute to permit good thermal conductivity in the sample. Analyses were conducted using platinum sample pans under a nitrogen cover gas. Data for percent water are provided in Table 3.

Results ranged from 58.6 to 67.8 percent moisture for solids and 63.3 to 74.3% for drainable liquids. All sample/duplicate results fell well within the established 20% RPD precision limit. Confidence intervals listed in Table 3 correspond to the 95% lower limit values for percent water in the samples. No action limit for moisture is given in the safety screening DQO [3].

DIFFERENTIAL SCANNING CALORIMETRY (DSC)

Energetics of Core 118 and Core 119 samples were determined by DSC. DSC analyses were conducted using a SEIKO 5200[1] instrument per procedure PNL-ALO-508. Temperature and enthalpy calibrations of the DSC instrument were made using indium and lead standards. Calibration was checked periodically using an indium standard. A melting temperature of 155.5 °C was measured for the indium standard. This melting temperature was within ± 2 °C of the reported literature value (156.6 °C).

The temperature range for the DSC runs was from ambient (~20 °C) to 550 °C, using a scan rate of 10 °C per minute to permit good thermal conductivity in the sample. Analyses were conducted using platinum sample pans under a nitrogen cover gas.

Enthalpy data are tabulated in Table 4. Confidence intervals listed in Table 4 represent the maximum potential values for samples exhibiting exothermic behavior (e.g., upper confidence limit), and minimum values for sample exhibiting endothermic behavior (lower confidence limit). Sample behavior is broken down into first transition (typically assumed to be water loss) and second transition results. Note that exotherms are recorded as negative numbers. Thus, in the context of Table 4, the confidence limit would have to exceed -480 J/g to impact the notification limit.

Only one sample, 96-02848 (Core 118 Segment 1 drainable liquid) exhibited exothermic activity, based on initial enthalpy determinations. Mean enthalpy for this sample and its duplicate was -226.3 J/g (dry weight basis) at the

[1]Seiko Instrument USA, Inc. 20525 Mahattan Pl., Torrance, CA 90501

upper 95% confidence level. When the 95% confidence levels are calculated, three additional samples show a negative enthalpy. This is merely an artifact of the calculation - these samples did not exhibit exotherms. All of the calculated results are well below the action limit of 480 J/g for an exotherm. As a consequence, no safety screening limit notifications are required for either sample.

For the initial water transition, only two samples, 96-02605 (Core 118 subsegment 1AA) and 96-02612 (Core 119 Subsegment 1B) exhibited RPD values in excess of the 20% precision limit, with RPD values of 23.9% and 29.3%, respectively. Seven samples (96-02605, 96-02612, 96-02613, 96-02614, 96-02615, 96-02848, and 96-02850) exceeded the 20% RPD precision criterion for second transition enthalpies. Such results are expected for transitions which exhibit low overall enthalpies. In these samples, small enthalpy differences contribute to the larger calculated RPD values.

TABLE 3. TGA Results for Homogenized Samples from Tank 241-BX-112

Description	Sample#	Wt% H2O	Avg Wt% H2O	RPD	95% LL
C118,S1AA,LH	96-02605	67.5	67.2	0.89	65.3
Duplicate	96-02605D	66.9			
C118,S1AB,UH	96-02606	66.1	65.8	0.91	63.9
Duplicate	96-02606D	65.5			
C118,S2A,LH	96-02607	63.3	61.95	4.36	53.4
Duplicate	96-02607D	60.6			
C118,S2B,UH	96-02608	67.1	67.45	1.04	65.2
Duplicate	96-02608D	67.8			
C118,S3A	96-02609	63.9	65.2	3.99	57.0
Duplicate	96-02609D	66.5			
C119,S1A,LH	96-02611	66.6	65.15	4.45	56.0
Duplicate	96-02611D	63.7			
C119,S1B,UH	96-02612	63.9	61.25	8.65	44.5
Duplicate	96-02612D	58.6			
C119,S2A,LH	96-02613	65.3	64.7	1.85	60.9
Duplicate	96-02613D	64.1			
C119,S2B,UH	96-02614	61.4	62.45	3.36	55.8
Duplicate	96-02614D	63.5			
C119,S3A,LH	96-02615	64	65.2	3.68	57.6
Duplicate	96-02615D	66.4			
C119,S3B,UH	96-02616	65.2	65.7	1.52	62.5
Duplicate	96-02616D	66.2			
Field Blank	96-02619	97.6	98.2	1.22	94.4
Duplicate	96-02619D	98.8			
C118,S1A,DL	96-02848	63.3	64.35	3.26	57.7
Duplicate	96-02848D	65.4			
C118,S3,DL	96-02850	72.7	73.5	2.18	68.4
Duplicate	96-02850D	74.3			

TABLE 4. DSC Results for Homogenized Samples from Tank 241-BX-112

		First Transition				Second Transition			
Description	Sample#	DeltaH1	AvgH1 J/g	95% C.L	RPD	DeltaH2*	AvgH2 J/g **	95% C.L.	RPD
C118, S1AA, LH	96-0260	898.1	1020	252	23.9	16.9	14.25	-2.5	37.2
Duplicate	96-0260	1141.3				11.6			
C118, S1AB, UH	96-0260	1049.3	1012	776	7.4	16.8	15.45	6.9	17.5
Duplicate	96-0260	974.5				14.1			
C118, S2A, LH	96-0260	855.4	839.9	742	3.7	13.1	11.95	4.7	19.2
Duplicate	96-0260	824.3				10.8			
C118, S2B, UH	96-0260	1043	1059	961	2.9	18.6	17.4	9.8	13.8
Duplicate	96-0260	1074				16.2			
C118, S3A, WS	96-0260	949.2	1011	623	12.1	15.8	15.35	12.5	5.9
Duplicate	96-0260	1071.9				14.9			
C119, S1A, LH	96-0261	1069.3	1022	726	9.2	11.2	10.25	4.3	18.5
Duplicate	96-0261	975.4				9.3			
C119, S1B, UH	96-0261	1110.5	968.6	72	29.3	24.2	31.35	-13.8	45.6
Duplicate	96-0261	826.6				38.5			
C119, S2A, LH	96-0261	1061.4	1101	849	7.3	9.6	11	2.2	25.5
Duplicate	96-0261	1141.3				12.4			
C119, S2B, UH	96-0261	915.2	1001	461	17.1	22.1	19.25	1.3	29.6
Duplicate	96-0261	1086.2				16.4			
C119, S3A, LH	96-0261	1086.5	1051	830	6.7	6.5	8.1	-2.0	39.5
Duplicate	96-0261	1016.3				9.7			
C119, S3B, UH	96-0261	1168.8	1105	700	11.6	12.3	11.2	4.3	19.6
Duplicate	96-0261	1040.6				10.1			
Field Blank	96-0261	1542.7	1549	1510	0.8	n/a	n/a	n/a	n/a
Duplicate	96-0261	1555				n/a			
C118, S1A, DL	*96-028	948	988.9	731	8.3	-130.2	-112	-226.3	32.3
Duplicate	*96-028	1029.8				-94.0			
C118, S3, DL	96-0285	1064.8	1073	1023	1.5	31.6	35.95	8.5	24.2
Duplicate	96-0285	1080.7				40.3			

* Adjustment factor for exothermic dry weight-basis correction, transition (2): 0.3565
Sample 96-02848 second transition data (columns 7, 8, and 9) represent corrected exothermic values.
** Exothermic values are preceeded by a "-".
(1) Represents data and/or calculations for the first DSC transition.
(2) Represents data and/or calculations for the second DSC transition.
LH - lower half, UH - upper half, WS - whole segment, DL - drainable liquid
Confidence levels are lower limits for endotherms and upper limits for exotherms.

TOTAL ALPHA ANALYSES

Radiochemical analyses were performed on fusion preparations of samples from Core 118 Subsegments 1AA, 2A, and 3A; Core 119 Subsegments 1A, 2A, and 3A; acidified drainable liquid samples from Core 118 Segments 1 and 3; and a field blank. All samples were analyzed in duplicate except the field blank and the Core 118 Segment 1A drainable liquid. The duplicates for these samples will be analyzed and reported in the 105 day report. For each batch of sample preparations (fusion or acidification), a process blank was also analyzed. The fused samples and drainable liquids were analyzed for total alpha activity. All of the fusion samples were obtained from the potassium hydroxide (KOH) fusion preparation (procedure PNL-ALO-115).

Total alpha analyses were performed according to procedures PNL-ALO-420/421, and results are presented in Table 5. In this method, small aliquots of highly diluted samples are dried on counting disks and counted using Ludlum ZnS scintillation counters. Although the post fusion spike performed on one sample from this set had acceptable recovery at 85%, the plates prepared by this method appeared to have a glassy look suggesting the potential for significant alpha mass absorption. The mass loading on the counting plates due to the core material was very low (typically < 0.1 mg); however, solids loading from the KOH fusion preparation flux may result in an alpha absorption effect. Consequently, all of the samples were reanalyzed with a spike added to a duplicate aliquot for each sample. The results showed that the mass absorption effects were small with an average matrix spike recovery of 108%. The uncertainties on the matrix spikes were high because the added activity of the spike was not high enough to produce more reliable counting statistics. Nevertheless, the consistency between recoveries as well as the repeatability of the replicate runs indicate that the alpha mass absorption is not significant. Total alpha results were thus averaged between the two runs.

All of the total alpha results for both cores yielded about the same level of activity. The highest result returned was 0.195 μCi/g, which is far below the limit of 41 μCi/g. No alpha activity was detected in the drainable liquid.

The RPD values for sample duplicates show excellent agreement, the largest value being only 8.6%. All of the process blanks and lab blanks indicate no detectable alpha activity. Low-level activity was detected in the field blank; however, the activity is well below that of the samples (<0.1% contribution).

TABLE 5. Total Alpha Analysis Results for Tank BX-112

ALO #	DESCRIPTION	Prep	ANALYSIS BATCH	Total Alpha uCi/g	+/-% Error	Mean	95% upper CL
96-2605	PROCESS BLANK		1	<2.E-3			
96-2605	C118 Seg 1AA	Fusion	1	1.52E-01	14%	0.154	0.186
96-2605	C118 Seg 1AA Dup	Fusion	1	1.56E-01	15%		
	RPD			2.6%			
96-2607	C118 Seg 2A	Fusion	1	1.65E-01	8%	0.167	0.167
96-2607	C118 Seg 2A Dup	Fusion	1	1.69E-01	8%		
	RPD			2.4%			
96-2609	C118 Seg 3A	Fusion	1	1.79E-01	15%	0.187	0.408
96-2609	C118 Seg 3A Dup	Fusion	1	1.95E-01	8%		
	RPD			8.6%			
	LAB BLANK		1	<2.E-3			
	LAB STANDARD		1	114%			
	MATRIX SPIKE		1	85%			
96-2611	PROCESS BLANK		2	<2.E-3			
96-2611	C119 Seg 1A	Fusion	2	1.92E-01	7%	0.188	0.188
96-2611	C118 Seg 1A Dup	Fusion	2	1.84E-01	7%		
	RPD			4.3%			
96-2613	C119 Seg 2A	Fusion	2	1.89E-01	8%	0.189	0.189
96-2613	C119 Seg 2A Dup	Fusion	2	1.89E-01	8%		
	RPD			0.0%			
96-2615	C119 Seg 3A	Fusion	2	1.61E-01	8%	0.168	0.168
96-2615	C119 Seg 3A Dup	Fusion	2	1.75E-01	8%		
	RPD			8.3%			
	LAB BLANK		2	<2.E-3			
	LAB STANDARD		2	110%			
	AV.MATRIX SPIKE		2	108%			
96-2619	FIELD BLANK	Direct	1	5.00E-5	38%		
96-2848	PROCESS BLANK		3	<5.E-6			
96-2848	C118 Seg 1A DL	Direct	3	<2.E-3			
96-2850	C118 Seg 3 DL	Direct	3	<2.E-3			
96-2850	C118 Seg 3 DL Dup	Direct	3	<2.E-3			
	LAB STANDARD		3	100%			
	AV.MATRIX SPIKE		3	102%			

INORGANIC RESULTS

Preliminary IC and ICP results are presented in Table 6. These analyses were requested to determine whether intrusion of hydrostatic head fluid (with LiBr added as a tracer) in the sample occurred during sampling operations. The data set presented in Table 6 includes the 45-day fusion preparations and the drainable liquids. The balance of this data set will be reported in the final data report, and are provided for information purposes only. The preliminary results indicate HHF intrusion for Core 118, segment 1A, and perhaps segment 3 as well. Solids samples were prepared via fusion per procedure PNL-ALO-115. The ICP and IC analyses were conducted according to procedure PNL-ALO-211 and PNL-ALO-212, respectively.

Table 6. Preliminary Lithium and Bromide Results from Tank BX-112

PNNL ACL Number	Sample ID	Lithium, µg/g	Bromide, µg/mL
96-02605	Core 118, Seg 1AA	202	--
96-02607	Core 118 Seg 2A	≤ EQL *	--
96-02609	Core 118 Seg 3A	≤ EQL	--
96-02611	Core 119 Seg 1A	≤ EQL	--
96-02613	Core 119 Seg 2A	≤ EQL	--
96-02615	Core 119 Seg 3A	≤ EQL	--
96-02848	Core 118 Seg 1A DL	337, µg/mL	3800
96-02850	Core 118 Seg 3A DL	31, µg/mL	300
96-02619	BX-112 Field Blank	--	1.2
96-02620	BX-112 Liner Liquid	--	20,100

* EQL = Estimated Quantitation Limit

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[3] G. T. Dukelow, et al., *Tank Safety Screening Data Quality Objective*, WHC-SD-WM-SP-004, Rev. 2, Westinghouse Hanford Company, Richland, Washington, August 31, 1995.

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