AR TARGET SHEET

The following document was too large to scan as one unit, therefore it has been broken down into sections.

DOCUMENT # B07MK9-TMA-369

EDMC # 0045426

SECTION 10 OF 18

9613492.6492

0045426

40 of 42

E-93-22/2978-62

WESTINGHOUSE HANFORD COMPANY
241-T-106 DATA VALIDATION
DISTRIBUTION FORM

SDG: B07K05

Document Title Final QA Record Case #: N3-02-059

Fraction: Metals

Document Number: _____ Date: 4/15/94

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Project Files (1=Administrative; 2=Correspondence; 3=Source Data; 4=Technical Data)

1.1	File Index		1.6.6.3	Plans Doc. Log		3.4	Original Chemical Data
1.2	Distribution Lists		1.6.6.4	Deliverables Doc. Log		3.5	Original Radiochemical Data
1.3	Project Procedures		1.7	Budget			
1.4	Project Modifications		1.7.1	Downloads		4.1	Task Plan
1.5	Staff		1.7.2	M-113s			
1.5.1	Staff Resumes		1.7.3	A-208s		4.2	Data Pkg. Completeness Verif. Checklist
1.5.2	Staff Training		1.7.4	Budget Status		4.3	Data Valididation Calcs./Annotated DP X
1.5.3	Auth. Former Site Employee		1.7.5	Invoices		4.4	Prelim. QA Records
1.6	QA		1.8	Requisitions			
1.6.1	QA Manual		1.9	Meeting Minutes		4.5	Data Valid. & Qual. Summary Rpts.
1.6.2	QA Implementation		1.10	Record of Telecon		4.5.1	Internal Drafts/Comments/Resol.
1.6.3.1	QA Audits-Deliverables		1.11	Progress Reports		4.5.2	WHC Review Draft Comments/Resol.
1.6.3.2	QA Audits-Files		1.12	Subcontractor (HC)		4.5.3	Final Report
1.6.4.1	Audit Resps. - Deliverables					4.6	Weekly Status Reports
1.6.4.2	Audit Resps. - Files		2.1	Incoming Correspondence		4.7	Weekly Management Reports
1.6.5	QA Training		2.2	Outgoing Correspondence			
1.6.6.1	QA Manual Document Log		2.3	Internal Correspondence			
1.6.6.2	Procedure Document Log						
			3.1	Task Order			
			3.2	Sample Lists			
			3.3	Data Validation Procedures			

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V✓ COC✓

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: 241-T-106	REVIEWER:	DATE:
LABORATORY: TMA	CASE: N3-02-059	SDG: 307K05
SAMPLES/MATRIX:		
B07K05 / Soil		

1. COMPLETENESS AND CONTRACT COMPLIANCE

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for submittal of the omitted data.

Data Package Item	Present?: Yes	No	N/A
Case Narrative	X		
Cover Page	X		
Traffic Reports			X
Sample Data			
Inorganic Analysis Data Sheets	X		
Standards Data			
Initial and Continuing Calibration Verification	X		
CRDL Standard for AA and ICP			
QC Summary			
Blanks	X		
ICP Interference Check Summary	X		
Spike Sample Recovery	X		
Post-Digestion Spike Sample Recovery	X		
Duplicate	X		
Laboratory Control Sample	X		
Standard Addition Results	X		
ICP Serial Dilutions	X		
Instrument Detection Limits	X		
ICP Interelement Correction Factors	X		
ICP Linear Ranges	X		
Preparation Log	X		
Analysis Run Log	X		
Raw Data			
ICP Raw Data	X		
Furnace AA Raw Data	X		
Mercury Raw Data	X		
Cyanide Raw Data	X		
Additional Data			
Internal laboratory chain-of-custody			X
Laboratory Sample Preparation Records	X		

Data Package Item	Present?:	Yes	No	N/A
Percent Solids Analysis Records		___	___	___
Reduction Formulae		___	___	___
Instrument Run Logs		___	___	___
Chemist Notebook Pages		___	___	___

2. HOLDING TIMES

Have all samples been analyzed within holding times?	Yes	No	N/A

ACTION: If any holding times have been exceeded qualify all affected results as estimated (J for detects and UJ for nondetects).

3. INITIAL CALIBRATIONS

Were all instruments calibrated daily, each set-up time and were the proper number of standards used?	Yes	No	N/A
Are the correlation coefficients ≥0.995?	Yes	No	N/A
Was a midrange cyanide standard distilled?	Yes	No	N/A

ACTION: Qualify all data as unusable if reported from an analysis in which an instrument was not calibrated or was calibrated with less than the minimum number of standards. Qualify associated sample results > IDL as estimated (J) and results < IDL as estimated (UJ), if the correlation coefficient is < 0.995 or the laboratory did not distill the midrange cyanide standard.

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

Are ICV and CCV percent recoveries within control?	Yes	No	N/A
Are there calculation errors?	Yes	No	N/A

ACTION: Qualify all affected data in accordance with Section 8.3 of the validation requirements. If calculation errors are noted, contact the laboratory for clarification.

5. ICP INTERFERENCE CHECK SAMPLE

Has an ICS sample been analyzed at the proper frequency?	Yes	No	N/A
Are the AB solution %R values within control?	Yes	No	N/A
Are there calculation errors?	Yes	No	N/A

ACTION: Qualify all affected data in accordance with Section 8.3 of the validation requirements. If calculation errors are noted, contact the laboratory for clarification.

6. LABORATORY BLANKS

Are target analytes present in the laboratory blanks? Yes No N/A

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U). If analyte concentrations in the blank are >CRDL or below the negative CRDL, verify the laboratory has redigested and reanalyzed associated samples with analyte concentrations < 10 times the blank concentration. If the laboratory has not redigested and reanalyzed the samples, note in the validation narrative.

7. FIELD BLANKS

Are target analytes present in the field blanks? Yes No N/A

ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

8. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the control limits? Yes No N/A

ACTION: Qualify the affected sample data according to the following requirements:

If spike recovery is >125% and sample results are <IDL no qualification is required. If spike recovery is >125% or <75% qualify all positive results as estimated (J). If spike recovery is 30% to 74% qualify all nondetects as estimated (UJ). If spike recovery is <30%, reject all nondetects (R). If the field blank has been used for spike analysis, note in the validation narrative.

9. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify the sample data according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results >IDL, for which the LCS %R falls within the range 50-79% or >120%. Qualify as estimated (UJ), all sample results <IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R <50%.

SOLID LCS - Qualify as estimated (J), all sample results >IDL for which the LCS result is outside the established control limits. Qualify as estimated (UJ), all sample results <IDL for which the LCS %R are lower than the established control limits.

10. PERFORMANCE AUDIT ANALYSES

Are the performance audit sample results within the acceptance limits? Yes No N/A

ACTION: Note the results of the performance audit sample analyses in the data validation narrative.

11. DUPLICATE SAMPLE ANALYSIS

Are RPD values acceptable? Yes No N/A

ACTION: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD results fall outside the appropriate control limits. If field blanks were used for laboratory duplicates, note in the validation narrative.

12. ICP SERIAL DILUTION

Are the serial dilution results acceptable? Yes No N/A

Is there evidence of negative interference? Yes No N/A

ACTION: Qualify the associated data as estimated (J) for those analytes in which the %D is outside the control limits. If evidence of negative interference is found, use professional judgment to qualify the data.

13. FIELD DUPLICATE SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

ACTION: Note the results of the field duplicate samples in the validation narrative.

14. FIELD SPLIT SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

ACTION: Note the results of the field split samples in the validation narrative.

1516. FURNACE ATOMIC ABSORPTION QUALITY CONTROL

Do all applicable analyses have duplicate injections? Yes No N/A

Are applicable duplicate injection RSD values within control? Yes No N/A

If no, were samples rerun once as required? Yes No N/A

Does the RSD for the rerun fall within the control limits? Yes No N/A

Were analytical spike recoveries within the control limits? Yes No N/A

If no, were MSA analyses performed when required?	Yes	No	N/A
Are MSA correlation coefficients $\geq$0.995?	Yes	No	N/A
If no, was a second MSA analysis performed?	Yes	No	N/A

ACTION: If duplicate injections are outside the acceptance limits and the sample has not been reanalyzed or the reanalysis is outside the acceptance limits, qualify the associated data as estimated (J for detects and UJ for nondetects). If the analytical spike recovery is <40% qualify detects as estimated (J). If the analytical spike recovery is $\geq$10% but <40%, qualify all nondetects as estimated (UJ) and if the analytical spike recovery is <10%, reject all nondetects (R). If the sample absorbance is <50% of the analytical spike absorbance and the analytical spike recovery is <85% or >115%, qualify all results as estimated (J for detects and UJ for nondetects). If method of standard additions (MSA) was required but was not performed, the MSA samples were spiked incorrectly, or the MSA correllation coefficient was <0.995, qualify the associated detected results as estimated (J).

17. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly?	Yes	No	N/A
Are results within the calibrated range of the instruments and within the linear range of the ICP?	Yes	No	N/A
Are all detection limits below the CRQL?	Yes	No	N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

18. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?	Yes	No	N/A
Were project specific data quality objectives met for this analysis?	Yes	No	N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

COMMENTS (attach additional sheets as necessary):

HOLDING TIME SUMMARY - FORM B-1

SDG: B07K05	REVIEWER: Kristina Rolla	DATE: Oct. 16 1993	PAGE 1 OF ___

COMMENTS: All samples were analyzed within recommended holding time

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B07K05	ICP	2/8/93	2/15	2/22	10	3	-
B07K05	A	↓	2/15	3/2	10	15	—
B07K05	GFAA	↓	2/15	2/17	10	1	—
B07K05	CA	↓	2/16	3/17	6	1	—
B07K05	CV	↓	2/19	2/22	9	3	—

CALIBRATION DATA SUMMARY - FORM B-2

SDG: B07K05	REVIEWER: Kristine Ballard	DATE: 10/10/93	PAGE 2 OF ____
COMMENTS:			
CALIB. TYPE: INITIAL CONTINUING		INSTRUMENT:	

CALIB. DATE	COMPOUND	RF	RSD/%D/%R	SAMPLES AFFECTED	QUALIFIER
all TCVA and CCV Percent Recovery were within control limits					
	Bismuth r=0.981			B07K05	UJ
	Lead r=0.992			↓	J
	Thallium r=0.993			↓	UJ

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BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B07K0	REVIEWER: Kristine Rella	DATE: 10/16/93	PAGE 1 OF 3

COMMENTS: No results < 5x level in blank. No qualifiers.

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	~~5X~~ RESULT	~~10X~~ RESULT	SAMPLES AFFECTED	QUALIFIER
CCB1	Aluminum	34.8	B		ug/L		29,566	None	—
CCB2		40.5	B						
CCB3		27.6	B						
CCB4		24.0	B						
ICB	Barium	2.0	B				267	None	—
CCB1		1.6	B						
CCB2		2.0	B						
CCB3		1.6	B						
PB	<.1427	1.21							
CCB4		1.2	B						
CCB2	Cadmium	1.8	B				ND	None	—
CCB4		1.8	B						
ICB	Calcium	71.4	B				102,200	None	—
CCB1		2.7	B						
CCB2		139.1	B						
PB	<-8.0527	-40.27							
CCB4		12.5	B						

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BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B07K05	REVIEWER: Kristine Rella	DATE: 10/16/93	PAGE 2 OF 3
COMMENTS:			

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
ICB	Chromium	2.7	B		ug/L		11.7.1	None	—
CCB2		3.4	B						
ICB	Cobalt	2.5	B				55.48	None	—
CCB1		2.1	B						
CCB2		3.6	B						
CCB3		4.7	B						
CCB4		2.5	B						
ICB	Copper	7.3	B				62.34	None	—
CCB1		8.5	B						
CCB2		4.2	B						
CCB3		3.4	B						
CCB4		3.1	B						
PB	<2.3767	11.44	B			59.4			
CCB1	Iron	11.9	B			61,155		None	—
CCB3	<5.3427	8.1	B						
PB	<5.3427	26.71	B						
CCB4		16.7	B						

BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: 307K05	REVIEWER: Kristine Rella	DATE: 10/16/93	PAGE 3 OF 3

COMMENTS:

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	~~10X~~ RESULT	SAMPLES AFFECTED	QUALIFIER
ICB	Magnesium	34.9	B		ug/L				
CCB1		37.3	B						
CCB2		27.6	B						
CCB4		47.0	B				24,008	NONE	—
ICB	Manganese	1.1	B				1307.8	NONE	—
CCB2		1.8	B						
CCB3		1.6	B						
CCB4		1.3	B						
ICB	Nickel	3.1	B				47.5	NONE	—
CCB2		3.1	B						
CCB3		3.9	B						
CCB2	Potassium	128.9	B				7,117	NONE	
ICB	Zinc	8.6	B				170.7	NONE	—
CCB2		6.2	B						
PB	<2.4147	12.07	B						

9613482.0613

9615192.6001

ACCURACY DATA SUMMARY - FORM B-4

SDG: B07K05	REVIEWER: Kristin Pollock	DATE: 10/10/93	PAGE 1 OF 1	
COMMENTS:				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B07K05S	Antimony	55.2	B07K05	UJ
(Post digestion Spike % R in Control Limits)				
Sample not reanalyzed				
B07K05S	Selenium	0	B07K05	R
LCS results - were within established limits				—
Post digestion ⊕ %R < 85% (47.4%)				
Dup Post ⊕ also < 85% (62.9)				

PRECISION DATA SUMMARY - FORM B-5

SDG: B07K05	REVIEWER Kristine Bolka	DATE: 10/16/93	PAGE 1 OF 1
COMMENTS: Duplicates met the control limits and ICP Serial dilutions were < 10%.			

COMPOUND	SAMPLE ID:	SAMPLE ID:	RPD	SAMPLES AFFECTED	QUALIFIER

CALCULATION SUMMARY - FORM B-6

SDG: 307K05	REVIEWER: KRCollier	DATE: 10/17	PAGE 1 OF 1

COMMENTS:

[illegible]

9613492.6507

Calculations

HARTCROWSER

Correlation Coefficients

Page 1 of 1

Job No. 2978-02

Project Westinghouse Hanford

Date 10/16/93

Calculations for 241-T-106 Data Validation

Made by K Rolla

Bi

0	0.001
2	0.014
10.01	11.23
5	4.81

r = 0.981

UN 9/17

0	.04626
10	7.735
40	42.36
100	98.32
200	202.1
400	399.0

r = 0.999

As 9/19

0	0
10	0.039
50	0.1915
100	.3625

r = .9999

Se 9/19

0	0
5	.0115
50	.1625
100	.2320

r = .997

Pb 9/19

0	0
3	.0265
50	.469
100	.7415

r = .992

Tl 9/19

0	0
10	.0450
50	.2125
100	.3395

r = .993

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Calculations

ICV & CCV calculations.

HARTCROWSER

Page 1 of

Job No. 9478 02

Project Westinghouse, Hanford.

Date 10/17/93.

Calculations for 1341-T-106

Made by SRCHR.

	ICV	CCV1	CCV2	CCV3
Al	1975.3/20 = 98.8			
Sb		2469.1/25 98.8	4 CCV1 value	
As			49.39/.5 98.8	
Ba				2443.2/25 - 97.
Be	47.01/.5 94.2			
Cd		2435.8/25 97.4	24822/250 99.3	
Ca				2503.7/250 100.2
Cr	100.35/1 = 100.4	~~2455.5/25~~		
Co		2435.5/25 97.4		
Cu			2416.4/25 97.9	
Fe				101.4/100 101.0
Pb	25.81/.25 - 103.2			
Mg		24910/250 99.7		
Mn			2434.6/25 97.4	
Hg				1.95/2 97.5
Ni	381.71/4 = 95.4			
K		24936/250 99.7		
Se			47.62/.5 95.2	
Ag				498.69/5 99.7
Na	250.29/250 100.1			
Tl		47.68/.5 95.4		
V			2470.4/25 98.8	
Zn				2470.5/25 98.8
CN	200.13/2 100.1			
Bi		4830/50 96.6		

CCV4

CCV3

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HARTCROWSER

Calculations

Spike Sample 7200000 g. & Dupes *

Page 1 of

Job No. 2978-62

Project Westinghouse Hanford

Date 10/7/93

Calculations for 241-T-106 Data Validation

Made by Kristine K.

	SPIKE (mg/kg)	% R	DUP % RPD (mg/kg)
Al			5959.9 − 6440.4 / (5959.9 + 6440.4)/2 ·100 = 7.7
Sb	56.7374/1.0277	55.2	
As	(9.8818 − 2.2123)/.683	93.6	
Ba	(439.635 − 53.526)/4.1107	93.9	
Be	(10.3794 − 0.2358)/0.1028	95.7	
Bi	(8.9818 / .1028	97.4	
Ca	—		
Cr	(60.9446 − 20.9865)/.4111	97.2	
Co	(102.97 − 6.7467)/1.0277	93.6	
Cu	(60.6795 − 12.5665)/.5138	93.6	
Fe	—		
Pb	8.1619 − 4.2333/.6415	94.7	
Mg	—		
Mn	(370.2676 − 263.6268)/10.277	103.5	
Hg	0.4962 / .005	97.2	
Ni	(106.1475 − 7.5811) / 1.0277	98.0	
K	—		
Se	—		
Ag	9.9087 / .1025	96.4	
Na	—		
Tl	9.2991 / .1035	89.6	
V	(124.2179 − 24.4315)/1.0277	97.1	
Zn	(130.1866 − 34.4239)/ 1.0277	93.2	
CN	25.0692 / .2449	102.4	
Bi	986.5551 / 10.2766	96.0	

Dup % RPD (mg/kg)

5959.9 − 6440.4 / (5959.9 + 6440.4)/2 ·100 = 7.7

* AVG = the average of the 2 numbers

(20981.91097 − 24331.9)/(AVG) ·100 = 10.8

(20.986 − 21.676)/AVG ·100 = 3.2

12405.249 − 13136.8 / (AVG) ·100 = 5.3

(263.62 − 268.95)/AVG ·100 = 2.0

(379.0921 − 391.413)/AVG ·100 = 3.2

* Dups calculated for Results 7 5x CRDL

mg/kg Calculations ETC

Sb (27.605)(.2) / (.00102)(.754) = 56.7374 ✓

Ba (2.139) = 439.635 ✓

Be (.05051) = 10.38 ✓

Cd (.04371) = 8.984 ✓

Cr (.29652) = 60.9446 ✓

Co (.50099) = 102.97 ✓

Cu (.29524) = 60.68 ✓

Mn (~~24.561~~) (1.8015) = 370.2 ✓

Ni (.51646) = 106.14 ✓

Ag (.04821) = 9.908 ✓

V (.60437) = 124.21 ✓

Zn (.63342) = 130.188 ✓

mg/kg Calculations

	Sample	Duplicate
Al	29.566(.2) / (.00102)(.754) = ~~6416.3~~ KR 5959.9 ✓	33.743 (.2) / (.00100)(.754) = 6
Ca	(102.20) = ~~21425.5~~ KR 20601.51 ✓	(127.67) = 2433
Fe	(61.788) = ~~12455~~ KR 12455.249 ✓	(68.929) = 13136.8
Mn	(1.3078) = 263.62 ✓	(1.4112) = 268.95
Na	(1.8806) = 379.0921 ✓	(2.0938) = 391.4

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Calculations

HARTCROWSER

Laboratory Control Sample Verification

Page 1 of 1

Job No. 2978.62

Project Vesuvius/Hartford

Date 10/18/93

Calculations for 241-T-106 Data Validation

Made by Kella

mg/kg conversion check.

Al 23.847 (.2) / [(.00100)(= 4769.4 ✓
Sb .12303 = 24.6 ✓
As 128.16 = 25.6 ✓
Ba .47763 = 95.5 ✓
Be .30322 = 60.6 ✓
Cd .39439 = 78.9 ✓
Ca 11.725 = 2345.0 ✓
Cr .82720 = 165.4 ✓
Co .64207 = 128.4 ✓
Cu .49178 = 98.4 ✓
Fe 37.390 = 7478 ✓
Pb 224.21 44.8 ✓
Mg 3.0165 = 1603.3 ✓
Mn .70412 = 140.8 ✓
Hg 2.401 (.100)(50) / .001 (1000) = ~~142~~ 12 ✓
Ni .71617 = 143.2 ✓
K 12.233 = 2446.6 ✓
Se 175.62 35.12 ✓
Ag .39639 = 78.74 ✓
Tl 659.60 131.9 ✓
V .17435 = 34.9
Zn .44075 = 88.15 ✓
Cr 112.8 ✓ 112.8 (.05) (20) / .001 (1000) = ~~5640~~ 112.8 ✓
Bi ND
Na 1.7349 = 357 ✓

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9613492.0511

ICP Serial Dilution & Sample Results

Calculations

HARTCROWSER

Page 1 of

Job No. 9478-02

Project Westinghouse Hanford

Date 10/17/93

Calculations for 241-T-104

Made by KRella

		ICP	Sample B07K05
5.9923(5) ×1000	Al	29566 − 29961.5/29566100 = 1.3	(29.566)(.2) / (.00104)(.954) = 5960
	Sb	—	
	As	— 10.55(.2) / (.001)(.9521)(1000) = 2.2	
~~5.1123(5)~~ 0.05486(5) ×1000	Ba	267.02 − 274.25/267.02 = 2.7	(.267021)(.2) / (.00104)(.9521) = 55.8
	Be	—	(.00117)(.2) / (.00104)(.954) = 0.24
	Cd	—	
21.246(5) ×1000	Ca	102200 − 106730/1022 = 3.9	(102.20)(.2) / (.00104)(.954) = 20,601
	Cr	~~104.11 − 112.35/1.0411~~	(.10412)(.2) / (.00104)(.9521) = 20.0
	Co	~~33.47 − 35.55/33.47~~	(.033481)(.2) / (.00104)(.954) = 6.75
	Cu	~~62.34 − 65.10/62.34~~	(.06234)(.2) / (.00104)(.954) = 12.6
	Fe	~~61788 − 63550/61788~~	(61.788)(.2) / (.00104)(.954) = 12,455
	Pb	—	(20.19)(.2) / (.001)(.954)(1000) = 4.2
4.9293(5) = ×1000	Mg	24008 − 24646.5/240.08 = 2.7	(24.008)(.2) / (.00104)(.954) = 4839
.26936(5) ×1000	Mn	1307.8 − 1346.75/13.078 = 3.0	(1.3078)(.2) / (.00104)(.954) = 263.6
	Hg	—	
~~.0181(5)~~ ×1000	Ni	~~47.53 − 59.05/.4753~~	(.04754)(.2) / (.00104)(.954) = 9.58
1.5299(5)	K	7071.2 − 7649.5/70.712 = 8.2	(7.0712)(.2) / (.00104)(.954) = 1425
	Ag	—	
	Na	~~1880.6 − 1923.05/18.806~~	(1.8806)(.2) / (.00104)(.954) = 379
	Tl	— (.12121)(.2) / (.00104)(.954)	
	V	~~1271.71 − 1446.1/12.12~~ 24.43	
	Zn	~~170.77 − 203.5/170.77~~	(.17075)(.2) / (.00104)(.954) = 34

Recycled Paper

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B07K05	REVIEWER: KR	DATE: 10/16	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony	UJ	B07K05	Spike % R < 75%
Selenium	R	B07K05	Spike % R < 10% (c)
Bi, Tl	UJ	B07K05	r < .995
Pb	J	B07K05	r < .995

TELEPHONE CONTACT SUMMARY - FORM B-8

REVIEWER: Kristine Rollin	DATE: 10/16	TIME:	PAGE___OF___
COMPANY:			
ADDRESS:			
PERSON CONTACTED:			
TELEPHONE:		FAX:	
PROJECT/CASE/SDG:			
REMARKS:			
No Phone Contact			
ACTION:			

9613492.6514

05

Package ID: B07R04-TMA-440

INORGANIC ANALYSIS DATA VERIFICATION CHECKLIST - FORM A-6

Review the data package for completeness and check off the items below. If any data review elements are missing, contact the laboratory for submittal of the omitted data.

Data Package Item	Present?: Yes	No	N/A
Cover Page (CLP only)	X		
Sample Data			
Inorganic Analysis Data Sheets	X		
Standards Data			
Initial and Continuing Calibration Verification	X		
CRDL Standard for AA and ICP (Detection Limit Verification)	X		
QC Summary			
Blanks	X		
ICP Interference Check Summary	X		
Spike Sample Recovery	X		
Post-Digestion Spike Sample Recovery	X		
Duplicates	X		
Laboratory Control Sample	X		
Standard Addition Results	X		
ICP Serial Dilutions	X		
Instrument Detection Limits	X		
ICP Interelement Correction Factors	X		
ICP Linear Ranges	X		
Preparation Log	X		
Instrument Run Log	X		
Raw Data			
ICP Raw Data	X		
Furnace AA Raw Data	X		
Flame AA Raw Data	X		
Mercury Raw Data	X		
Cyanide Raw Data	X		
Additional Data			
Moisture/% Solids data sheets			X
Sample preparation sheets	X		

Comments:

9613492.6615

000002C

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator Wendy S. Thompson — PROJECT NUMBER: 92-336

Company Contact Wendy S. Thompson — Telephone (509) 376-2153

Project Designation/Sampling Locations 241-T-106 — Collection Date 2-8-93

Borehole Number: 299-W10-196 — Time: ① 0910 ② 0730

Ice Chest No. SML 284 — Field Logbook No. ~~EFL-1053~~

Bill of Lading/Airbill No. 2536953034 — Offsite Property No. ~~W93-0-090-58~~

Method of Shipment AIR (EMERY)

Shipped to TMA-Norcal

Possible Sample Hazards/Remarks Keep samples chilled. All analysis per lab statement of work. Samples are nonhazardous/nonradioactive with field instruments

Sample Identification

① B07K05

1x120 ml., amber glass, soil, CLP-VOA

1x250 ml., amber glass, soil, CLP-Semi-VOA

1x250 ml., amber glass, soil, Anions-SO_4, PO_4, NO_2-NO_3, CL, F, pH

1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg

1x500 ml., amber glass, soil, gross alpha, gross beta, GEA, including Co_{60}, Ru_{106}, Ce_{144}, Cs_{137} isotopic U, total U, Am_{241}, Np_{237}, $Pu_{238/239/240}$, Sr_{90}, Tc_{99}, C_{14}

1x120ml., amber glass, soil, CLP-VOA

~~1x250 ml., amber glass, soil, CLP-Semi-VOA~~

1x250 ml., amber glass, soil, Anions-SO_4, PO_4, NO_2-NO_3, Cl, F, pH

1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg

1x500 ml., amber glass, soil, gross alpha, gross beta, GEA, including Co_{60}, Ru_{106}, Ce_{144}, Cs_{137} isotopic U, total U, Am_{241}, Np_{237}, $Pu_{238/239/240}$, Sr_{90}, Tc_{99}, C_{14}

② B07K07; 3x40ml; amberglass; water; CLP-VOA

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Name)

Relinquished By	Date	Time	Received By	Date	Time
W.S. Thompson Wendy S Thompson	2-9-93	1100	Al Gobaleza Alfonso Gobaleza	2-10-93	1140

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

9613092.0516

000002D

(TMA - soil)

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector Wendy S. Thompson Date 2-8-93

Company Contact Wendy S. Thompson Telephone (509) 376-2153

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
(1) B07K05	S	2-8-93	0910	1x120ml., amber glass, soil, CLP-VOA
				1x250 ml., amber glass, soil, CLP-Semi-VOA
				1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
				1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
				1x500 ml., glass, soil, gross alpha, gross beta, GEA,
		2-8-93		including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241,
		WSH		Np-237, Pu-238,-239,-240, Sr-90, Tc-99, total U, C-14
(2) B07K07	W	2-8-93	0730	3x40ml; amberglass; water CLP-VOA
	S			1x120ml., amber glass, soil, CLP-VOA
	WSH			1x250 ml., amber glass, soil, CLP-Semi-VOA
	2-8-93			1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
				1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
				1x500 ml., glass, soil, gross alpha, gross beta, GEA,
				including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241
				Np-237, Pu-238,-239,-240, Sr-90, Tc-99, total U, C-14
	X			1x120 ml., amber glass, soil, CLP-VOA
	WSH			1x250 ml., amber glass, soil, CLP-Semi-VOA
	2-8-93			1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
				1x250ml., glass, soil, ICP/AA metals, Bi, CN, Hg
				1x500 ml., glass, soil, gross alpha, gross beta, GEA
				including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241,
				Np-237, Pu-238,-239,-240, Sr-90, Tc-99, total U, C-14

*Type of Sample: A = Air; DL = Drum Liquids; DS = Drum Solids; L = Liquid; O = Oil; S = Soil; SE = Sediment; SL = Sludge; SO = Solid; T = Tissue; W = Water; WI = Wipe; X = Other

Field Information: Samples support the 241-T-106 characterization (soil). All analysis per lab statement of work.

Special Handling and/or Storage: KEEP SAMPLES CHILLED.

Possible Sample Hazards: Samples are nonhazardous with field instruments

9613492.6517

TMA
Thermo Analytical Inc.

Skinner & Sherman Labs., Inc.
300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890-3883

RECORD COPY

APR 1993
RECEIVED
OSM DMO

March 3, 1993

TMA/NORCAL
2030 Wright Avenue
Richmond, CA 94804
Attention: Dan Stuermer

Quality Control Narrative

Scope
One (1) soil sample was submitted to TMA/Skinner & Sherman Laboratories, Inc. on February 11, 1993 from TMA/Norcal. The sample was analyzed for the USEPA CLP Target Analyte List metals, cyanide and bismuth. The analysis were performed under TMA/Skinner and Sherman work order S302132.

Methodology
The samples were prepared, analyzed and reported in accordance with the USEPA Contract Laboratory Program Statement of Work ILM02. Bismuth was analyzed by flame atomic absorption spectroscopy.

Discussion
All quality control requirements were met for the samples with the following exceptions;

The antimony and selenium digestion spike recoveries exceeded the control limit requirements.

Please feel free to call if there are any questions concerning this package.

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

David N. Peterson
Assistant Laboratory Manager

9615492.6518

WESTINGHOUSE/HANFORD

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059 SAS No.: SDG No.: B07K05

SOW No.: ILM02.1

SAMPLE NUMBER:	Lab Sample ID.
B07K05	02132-01S
B07K05D	02132-01S2
B07K05S	02132-01DS

Were ICP interelement corrections applied? Yes/No YES
Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Steven R Provencal Name: Steven R. Provencal

Date: 3/3/93 Title: Lead Chemist

9613492.6619

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07K05

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Matrix (soil/water): SOIL Lab Sample ID: 02132-01S

Level (low/med): LOW Date Received: 02/11/93

% Solids: 95.4

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5960			P	
7440-36-0	Antimony	3.7	U	J N	P	Spike
7440-38-2	Arsenic	2.2			P	
7440-39-3	Barium	53.8			P	
7440-41-7	Beryllium	0.24	B		P	
7440-43-9	Cadmium	0.32	U		P	
7440-70-2	Calcium	20600			P	
7440-47-3	Chromium	21.0			P	
7440-48-4	Cobalt	6.7	B		P	
7440-50-8	Copper	12.6			P	
7439-89-6	Iron	12500			P	
7439-92-1	Lead	4.0		J	F	<2.995
7439-95-4	Magnesium	4840			P	
7439-96-5	Manganese	264			P	
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	9.6			P	
7440-09-7	Potassium	1430			P	
7782-49-2	Selenium	0.69	~~U~~	~~WN~~ R	F	Spike R
7440-22-4	Silver	0.79	U		P	
7440-23-5	Sodium	379	B		P	
7440-28-0	Thallium	0.55	U	J	F	<2.995
7440-62-2	Vanadium	24.4			P	
7440-66-6	Zinc	34.4			P	
	Cyanide	0.52	U		CA	
7440-69-9	Bismuth	101	U	J	A	<2.995

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

02

9613492.6520

WESTINGHOUSE/HANFORD

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-0595AS No.: SDG No.: B07K05

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	2000.0	1975.30	98.8	25000.0	24849.00	99.4	24703.00	98.8	P
Antimony	600.0	568.03	94.7	2500.0	2469.10	98.8	2473.10	98.9	P
Arsenic	50.0	52.29	104.6	50.0	49.39	98.8	46.78	93.6	F
Barium	2000.0	1847.80	92.4	2500.0	2456.60	98.3	2440.60	97.6	P
Beryllium	50.0	47.09	94.2	500.0	502.26	100.5	496.82	99.4	P
Cadmium	50.0	48.53	97.1	2500.0	2435.80	97.4	2361.60	94.5	P
Calcium	50000.0	48662.00	97.3	25000.0	25204.00	100.8	24822.00	99.3	P
Chromium	100.0	100.35	100.4	2500.0	2436.20	97.4	2419.50	96.8	P
Cobalt	500.0	477.96	95.6	2500.0	2435.50	97.4	2426.90	97.1	P
Copper	250.0	230.51	92.2	2500.0	2470.80	98.8	2446.60	97.9	P
Iron	1000.0	988.58	98.9	10000.0	10089.00	100.9	9988.40	99.9	P
Lead	25.0	25.81	103.2	50.0	49.84	99.7	49.72	99.4	F
Magnesium	50000.0	49421.00	98.8	25000.0	24913.00	99.7	24607.00	98.4	P
Manganese	150.0	143.41	95.6	2500.0	2440.10	97.6	2434.60	97.4	P
Mercury	5.0	4.48	89.6	2.0	1.94	97.0	2.00	100.0	CV
Nickel	400.0	381.71	95.4	2500.0	2428.10	97.1	2405.10	96.2	P
Potassium	50000.0	48944.00	97.9	25000.0	24936.00	99.7	24629.00	98.5	P
Selenium	50.0	52.41	104.8	50.0	52.76	105.5	47.62	95.2	F
Silver	100.0	98.67	98.7	500.0	497.31	99.5	494.48	98.9	P
Sodium	50000.0	48923.00	97.8	25000.0	24883.00	99.5	24784.00	99.1	P
Thallium	50.0	52.66	105.3	50.0	51.45	102.9	51.30	102.6	F
Vanadium	500.0	487.73	97.5	2500.0	2459.70	98.4	2444.30	97.8	P
Zinc	200.0	197.06	98.5	2500.0	2458.90	98.4	2437.60	97.5	P
Cyanide	94.0	94.13	100.1	200.0	206.13	103.1	202.36	101.2	CA
Bismuth	5000.0	4920.00	98.4	5000.0	5020.00	100.4	4960.00	99.2	A

KR 10/16

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

0-3

9613492.6521

WESTINGHOUSE/HANFORD

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found 3	Continuing Calibration %R(1)	Continuing Calibration Found 4	Continuing Calibration %R(1)	M
Aluminum				25000.0	24852.00	99.4	24915.00	99.7	P
Antimony				2500.0	2481.00	99.2	2490.70	99.6	P
Arsenic				50.0	47.88	95.8			F
Barium				2500.0	2443.20	97.7	2457.60	98.3	P
Beryllium				500.0	499.82	100.0	501.19	100.2	P
Cadmium				2500.0	2387.90	95.5	2417.30	96.7	P
Calcium				25000.0	25237.00	100.9	25207.00	100.8	P
Chromium				2500.0	2443.70	97.7	2454.30	98.2	P
Cobalt				2500.0	2461.80	98.5	2478.80	99.2	P
Copper				2500.0	2453.90	98.2	2466.90	98.7	P
Iron				10000.0	10104.00	101.0	10113.00	101.1	P
Lead				50.0	48.97	97.9	47.52	95.0	F
Magnesium				25000.0	24890.00	99.6	25112.00	100.4	P
Manganese				2500.0	2446.60	97.9	2459.20	98.4	P
Mercury				2.0	1.95	97.5	2.02	101.0	CV
Nickel				2500.0	2435.40	97.4	2442.50	97.7	P
Potassium				25000.0	24765.00	99.1	24824.00	99.3	P
Selenium				50.0	48.67	97.3			F
Silver				500.0	498.69	99.7	501.64	100.3	P
Sodium				25000.0	24900.00	99.6	25029.00	100.1	P
Thallium				50.0	48.50	97.0	47.68	95.4	F
Vanadium				2500.0	2460.10	98.4	2470.20	98.8	P
Zinc				2500.0	2457.90	98.3	2470.30	98.8	P
Cyanide				200.0	202.55	101.3	200.13	100.1	CA
Bismuth				5000.0	4830.00	96.6			A

KK 10/16

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

0 4

9613492.6522

WESTINGHOUSE/HANFORD

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead				50.0	45.52	91.0	45.83	91.7	F
Magnesium									NR
Manganese									NR
Mercury				2.0	1.96	98.0	2.02	101.0	CV
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium				50.0	47.49	95.0	48.38	96.8	F
Vanadium									NR
Zinc									NR
Cyanide									NR
Bismuth									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

0.5

9613492.6523

WESTINGHOUSE/HANFORD

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury				2.0	2.04	102.0			CV
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR
Bismuth									NR

KK 10/10

(1) Control limits: Mercury 80-120: Other Metals 90-110; Cyanide 85-115

0 6

9613492.0524

WESTINGHOUSE/HANFORD

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

AA CRDL Standard Source: SKINER

ICP CRDL Standard Source: SKINER

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
					Initial		Final	
	True	Found	%R	True	Found	%R	Found	%R
Aluminum								
Antimony				120.0	119.61	99.7	107.60	89.7
Arsenic	10.0	8.78	87.8					
Barium								
Beryllium				10.0	9.79	97.9	9.70	97.0
Cadmium				10.0	10.78	107.8	10.07	100.7
Calcium								
Chromium				20.0	18.36	91.8	17.67	88.4
Cobalt				100.0	101.21	101.2	100.85	100.8
Copper				50.0	47.53	95.1	44.46	88.9
Iron								
Lead	3.0	1.15	38.3					
Magnesium								
Manganese				30.0	28.87	96.2	29.85	99.5
Mercury								
Nickel				80.0	78.19	97.7	77.35	96.7
Potassium								
Selenium	5.0	3.47	69.4					
Silver				20.0	20.64	103.2	21.20	106.0
Sodium								
Thallium	10.0	8.98	89.8					
Vanadium				100.0	99.14	99.1	98.80	98.8
Zinc				40.0	36.93	92.3	38.67	96.7
Bismuth	2000.0	2100.00	105.0					

0 7

WESTINGHOUSE/HANFORD

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	27.0	U	34.8	B	40.5	B	27.6	B	5.400	U	P
Antimony	18.4	U	18.4	U	18.4	U	18.4	U	3.680	U	P
Arsenic	3.7	U	3.7	U	3.7	U	3.7	U	0.740	U	F
Barium	2.0	B	1.6	B	2.0	B	1.6	B	0.242	B	P
Beryllium	0.5	U	0.5	U	0.5	U	0.5	U	0.100	U	P
Cadmium	1.6	U	1.6	U	1.8	B	1.6	U	0.320	U	P
Calcium	71.4	B	25.7	B	139.1	B	17.2	U	-8.052	B	P
Chromium	2.7	B	2.7	U	3.4	B	2.7	U	0.540	U	P
Cobalt	2.5	B	2.9	B	3.6	B	4.7	B	0.500	U	P
Copper	7.3	B	8.8	B	4.2	B	3.4	B	2.376	B	P
Iron	6.5	U	11.9	B	6.5	U	8.1	B	5.342	B	P
Lead	1.2	U	1.2	U	1.2	U	1.2	U	0.240	U	F
Magnesium	34.9	B	37.3	B	27.6	B	24.6	U	4.920	U	P
Manganese	1.1	B	1.0	U	1.8	B	1.6	B	0.200	U	P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.050	U	CV
Nickel	3.1	B	3.0	U	3.1	B	3.9	B	0.600	U	P
Potassium	116.0	U	116.0	U	128.9	B	116.0	U	23.200	U	P
Selenium	3.3	U	3.3	U	3.3	U	3.3	U	0.660	U	F
Silver	3.9	U	3.9	U	3.9	U	3.9	U	0.780	U	P
Sodium	42.1	U	42.1	U	42.1	U	42.1	U	8.420	U	P
Thallium	2.6	U	2.6	U	2.6	U	2.6	U	0.520	U	F
Vanadium	2.5	U	2.5	U	2.5	U	2.5	U	0.500	U	P
Zinc	8.6	B	4.7	U	6.2	B	4.7	U	2.414	B	P
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.500	U	CA
Bismuth	500.0	U	500.0	U	500.0	U	500.0	U	100.000	U	A

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WESTINGHOUSE/HANFORD

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			28.0	B							P
Antimony			18.4	U							P
Arsenic											NR
Barium			1.2	B							P
Beryllium			0.5	U							P
Cadmium			1.8	B							P
Calcium			18.5	B							P
Chromium			2.7	U							P
Cobalt			2.5	B							P
Copper			3.1	B							P
Iron			16.7	B							P
Lead			1.2	U	1.2	U	1.2	U			F
Magnesium			47.0	B							P
Manganese			1.3	B							P
Mercury			0.1	U	0.1	U	0.1	U			CV
Nickel			3.0	U							P
Potassium			116.0	U							P
Selenium											NR
Silver			3.9	U							P
Sodium			42.1	U							P
Thallium			2.6	U	2.6	U	2.6	U			F
Vanadium			2.5	U							P
Zinc			4.7	U							P
Cyanide			10.0	U							CA
Bismuth											NR

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WESTINGHOUSE/HANFORD

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic											NR
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead											NR
Magnesium											NR
Manganese											NR
Mercury			0.1	U							CV
Nickel											NR
Potassium											NR
Selenium											NR
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR
Bismuth											NR

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4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

ICP ID Number: P2 ICS Source: SPEX INT-A1

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum	500000	500000	505160	504530.0	100.9	504980	506400.0	101.3
Antimony	0	0	10	-1.6		-8	-15.4	
Arsenic								
Barium	0	500	-11	451.1	90.2	-11	452.2	90.4
Beryllium	0	500	0	459.9	92.0	0	459.9	92.0
Cadmium	0	1000	0	874.2	87.4	0	865.5	86.6
Calcium	500000	500000	474840	473870.0	94.8	475340	476410.0	95.3
Chromium	0	500	17	468.6	93.7	19	469.3	93.9
Cobalt	0	500	-1	440.5	88.1	-2	445.9	89.2
Copper	0	500	5	467.6	93.5	2	466.9	93.4
Iron	200000	200000	183980	184060.0	92.0	184190	184640.0	92.3
Lead								
Magnesium	500000	500000	512010	511560.0	102.3	510750	511730.0	102.3
Manganese	0	500	12	458.4	91.7	11	461.2	92.2
Mercury								
Nickel	0	1000	1	866.4	86.6	1	874.0	87.4
Potassium	0	0	63	174.2		63	191.7	
Selenium								
Silver	0	1000	-8	983.8	98.4	2	994.6	99.5
Sodium	0	0	221	207.3		211	194.8	
Thallium								
Vanadium	0	500	4	469.9	94.0	3	471.9	94.4
Zinc	0	1000	31	963.3	96.3	31	972.9	97.3
Bismuth								

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5B

POST DIGEST SPIKE SAMPLE RECOVERY

SAMPLE NUMBER: B07K05A

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Matrix: SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony		117.30		18.40	U	120.0	97.8		P
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR
Bismuth									NR

Comments:

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WESTINGHOUSE/HANFORD

5A

SPIKE SAMPLE RECOVERY

SAMPLE NUMBER:

B07K05S

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Matrix: SOIL Level (low/med): LOW

% Solids for Sample: 95.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	56.7374		3.7091	U	102.77	55.2	N	P
Arsenic	75-125	9.8818		2.2123		8.30	92.4		F
Barium	75-125	439.6350		53.8260		411.07	93.9		P
Beryllium	75-125	10.3794		0.2358	B	10.28	98.7		P
Cadmium	75-125	8.9818		0.3225	U	10.28	87.4		P
Calcium									NR
Chromium	75-125	60.9446		20.9865		41.11	97.2		P
Cobalt	75-125	102.9700		6.7469	B	102.77	93.6		P
Copper	75-125	60.6795		12.5665		51.38	93.6		P
Iron									NR
Lead	75-125	8.1619		4.2333		4.15	94.7		F
Magnesium									NR
Manganese	75-125	370.2676		263.6268		102.77	103.8		P
Mercury	75-125	0.4862		0.0524	U	0.50	97.2		CV
Nickel	75-125	106.1475		9.5811		102.77	94.0		P
Potassium									NR
Selenium	75-125	0.6850	U	0.6918	U	2.08	0.0	N	F
Silver	75-125	9.9087		0.7862	U	10.28	96.4		P
Sodium									NR
Thallium	75-125	9.2991		0.5451	U	10.38	89.6		F
Vanadium	75-125	124.2179		24.4315		102.77	97.1		P
Zinc	75-125	130.1866		34.4239		102.77	93.2		P
Cyanide	75-125	25.0692		0.5189	U	24.49	102.4		CA
Bismuth	75-125	986.5581		100.7902	U	1027.66	96.0		A

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Comments:

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WESTINGHOUSE/HANFORD

6
DUPLICATES

SAMPLE NUMBER:

B07K05D

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 95.4 % Solids for Duplicate: 95.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M	CRDL
Aluminum		5959.9258		6440.4422		7.8		P	200
Antimony		3.7091	U	3.5068	U			P	
Arsenic	2.1	2.2123		2.5862		15.6		F	10
Barium	40.3	53.8260		62.3194		14.6		P	200
Beryllium		0.2358	B	0.2611	B	10.2		P	5
Cadmium		0.3225	U	0.3049	U			P	5
Calcium		20601.5159		24331.9992		16.6		P	5000
Chromium		20.9865		21.6962		3.3		P	10
Cobalt		6.7469	B	7.0650	B	4.6		P	50
Copper	5.0	12.5665		12.0621		4.1		P	25
Iron		12455.2492		13136.8401		5.3		P	100
Lead		4.2333		4.3304		2.3		F	3
Magnesium	1007.9	4839.5420		5176.8630		6.7		F	5000
Manganese		263.6268		268.9537		2.0		P	15
Mercury		0.0524	U	0.0499	U			CV	2
Nickel	8.1	9.5811		10.2382		6.6		P	40
Potassium	1007.9	1425.4153		1414.0842		0.8		P	5000
Selenium		0.6918	U	3.4249	U			F	5
Silver		0.7862	U	0.7433	U			P	10
Sodium		379.0921	B	391.4237	B	3.2		P	5000
Thallium		0.5451	U	0.5397	U			F	10
Vanadium	10.1	24.4315		26.4018		7.8		P	50
Zinc		34.4239		33.9947		1.3		P	20
Cyanide		0.5189	U	0.4992	U			CA	500
Bismuth		100.7902	U	95.2925	U			A	

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7

LABORATORY CONTROL SAMPLE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Solid LCS Source: ENV RES ASSOC

Aqueous LCS Source:

Analyte	Aqueous (ug/L) True	Aqueous (ug/L) Found	Aqueous (ug/L) %R	Solid (mg/kg) True	Solid (mg/kg) Found	C	Limits	Limits	%R
Aluminum				5110.0	4769.4		2040.0	7150.0	93.3
Antimony				21.3	24.6		9.0	130.0	115.5
Arsenic				34.2	25.6		13.0	51.0	74.9
Barium				97.4	95.5		68.0	127.0	98.0
Beryllium				58.1	60.6		35.0	87.0	104.3
Cadmium				70.3	78.9		35.0	112.0	112.2
Calcium				2330.0	2345.0		1630.0	3260.0	100.6
Chromium				182.0	165.4		82.0	255.0	90.9
Cobalt				120.0	128.4		66.0	180.0	107.0
Copper				92.7	98.4		46.0	139.0	106.1
Iron				8620.0	7478.0		5170.0	12100.0	86.8
Lead				44.5	44.8		20.0	65.0	100.7
Magnesium				1530.0	1603.3		842.0	2300.0	104.8
Manganese				145.0	140.8		101.0	203.0	97.1
Mercury				13.7	12.0		7.5	21.0	87.6
Nickel				137.0	143.2		68.0	212.0	104.5
Potassium				2560.0	2446.6		1530.0	3330.0	95.6
Selenium				33.1	35.1		17.0	53.0	106.0
Silver				64.4	79.3		26.0	113.0	123.1
Sodium				306.0	357.0	B	168.0	459.0	116.7
Thallium				140.0	131.9		70.0	210.0	94.2
Vanadium				40.1	34.9		26.0	54.0	87.0
Zinc				78.2	88.2		39.0	121.0	112.8
Cyanide				130.0	112.8		52.0	221.0	86.8
Bismuth					100.0	U	0.0	0.0	

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8

STANDARD ADDITION RESULTS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q

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9

ICP SERIAL DILUTIONS

SAMPLE NUMBER:

B07K05L

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Matrix (soil/water): SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	29566.00		29961.50		1.3		P
Antimony	18.40	U	92.00	U			P
Arsenic							NR
Barium	267.02		274.25	B	2.7		P
Beryllium	1.17	B	2.50	U	100.0		P
Cadmium	1.60	U	8.00	U			P
Calcium	102200.00		106230.00		3.9		P
Chromium	104.11		112.35		7.9		P
Cobalt	33.47	B	39.55	B	18.2		P
Copper	62.34		65.10	B	4.4		P
Iron	61788.00		63880.00		3.4		P
Lead							NR
Magnesium	24008.00		24646.50	B	2.7		P
Manganese	1307.80		1346.75		3.0		P
Mercury							NR
Nickel	47.53		59.05	B	24.2		P
Potassium	7071.20		7649.50	B	8.2		P
Selenium							NR
Silver	3.90	U	19.50	U			P
Sodium	1880.60	B	1923.05	B	2.3		P
Thallium							NR
Vanadium	121.20		114.60	B	5.4		P
Zinc	170.77		203.50		19.2		P
Bismuth							NR

017

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10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

ICP ID Number: P2 Date: 01/15/93

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.20		200	27.0	P
Antimony	206.80		60	18.4	P
Arsenic			10		NR
Barium	493.40		200	1.0	P
Beryllium	313.00		5	0.5	P
Cadmium	226.50		5	1.6	P
Calcium	317.90		5000	17.2	P
Chromium	267.70		10	2.7	P
Cobalt	228.60		50	2.5	P
Copper	324.70		25	2.9	P
Iron	259.90		100	6.5	P
Lead			3		NR
Magnesium	279.00		5000	24.6	P
Manganese	257.60		15	1.0	P
Mercury			0.2		NR
Nickel	231.60		40	3.0	P
Potassium	766.40		5000	116.0	P
Selenium			5		NR
Silver	328.00		10	3.9	P
Sodium	588.90		5000	42.1	P
Thallium			10		NR
Vanadium	292.40		50	2.5	P
Zinc	213.80		20	4.7	P
Bismuth			500		NR

Comments:
P2: THERMO JARRELL-ASH ICAP61 (#22982)

WESTINGHOUSE/HANFORD

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

ICP ID Number: Date: 01/15/93

Flame AA ID Number:

Furnace AA ID Number: F2

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead	283.30	BS	3	1.2	F
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium	276.80	BS	10	2.6	F
Vanadium			50		NR
Zinc			20		NR
Bismuth			500		NR

Comments:
F2: THERMO JARRELL-ASH VIDEO 22E (#2511)

WESTINGHOUSE/HANFORD

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

ICP ID Number: Date: 01/15/93

Flame AA ID Number:

Furnace AA ID Number: F4

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic	197.20	BS	10	3.7	F
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium	196.00	BS	5	3.3	F
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR
Bismuth			500		NR

Comments:
F4: THERMO JARRELL-ASH VIDEO 22E (#2664)

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10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

ICP ID Number: Date: 01/15/93

Flame AA ID Number: F7

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR
Bismuth	223.00	BS	500	500.0	A

Comments:
F7: PERKIN-ELMER 3030B

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10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

ICP ID Number: Date: 01/15/93

Flame AA ID Number: M3

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury	253.70		0.2	0.1	CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR
Bismuth			500		NR

Comments:
M3: LDC ANALYTICAL #050941

021

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11A

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

ICP ID Number: P2 Date: 07/01/92

Analyte	Wave-length (nm)	Al	Ca	Fe	Mg	Cr
Aluminum	308.20	0.0000000	0.0000000	0.0000000	0.0000000	-0.0006600
Antimony	206.80	0.0000000	0.0000000	0.0002200	0.0000000	0.0130700
Arsenic						
Barium	493.40	0.0000300	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0002000	0.0000000	0.0000000
Calcium	317.90	0.0000000	0.0000000	-0.0001800	0.0000700	0.0000000
Chromium	267.70	0.0000000	0.0000000	-0.0000300	0.0000000	0.0000000
Cobalt	228.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0002500
Copper	324.70	0.0000000	0.0000000	0.0000000	0.0000000	-0.0000600
Iron	259.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead						
Magnesium	279.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.60	0.0000200	0.0000000	-0.0000100	0.0000000	0.0000000
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium						
Silver	328.00	0.0000000	0.0000000	-0.0003100	0.0000000	0.0000000
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium						
Vanadium	292.40	0.0000000	0.0000000	-0.0000300	0.0000000	-0.0037800
Zinc	213.80	0.0000000	0.0000000	0.0001200	0.0000000	0.0000000
Bismuth						

Comments:

P2: THERMO JARRELL-ASH ICAP61 (#22982)

WESTINGHOUSE/HANFORD

11B

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

ICP ID Number: P2 Date: 07/01/92

Analyte	Wave-length (nm)	Cu	Mn	Mo	Ni	Sn
Aluminum	308.20	0.0000000	0.0009700	0.0006000	0.0000000	0.0000000
Antimony	206.80	0.0000000	0.0000000	0.0000000	-0.0017900	0.0000000
Arsenic						
Barium	493.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	-0.0002300	0.0000000
Calcium	317.90	0.0000000	0.0003000	0.0000000	0.0000000	0.0000000
Chromium	267.70	0.0000000	0.0002500	0.0000700	0.0000000	0.0000000
Cobalt	228.60	0.0000000	0.0000000	0.0000000	-0.0001800	0.0000000
Copper	324.70	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	259.90	0.0000000	-0.0030600	0.0002000	0.0000000	-0.0000500
Lead						
Magnesium	279.00	0.0000000	-0.0038500	0.0002000	0.0000000	0.0000000
Manganese	257.60	-0.0000400	0.0000000	0.0000000	0.0000000	0.0000000
Mercury						
Nickel	231.60	0.0000000	0.0000000	-0.0002300	0.0000000	0.0000000
Potassium	766.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium						
Silver	328.00	0.0000000	0.0001000	0.0000000	0.0000000	0.0000000
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium						
Vanadium	292.40	0.0000000	-0.0001100	0.0000000	0.0000000	0.0000000
Zinc	213.80	0.0018900	0.0001100	0.0000000	0.0039800	0.0000000
Bismuth						

Comments:

P2: THERMO JARRELL-ASH ICAP61 (#22982)

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WESTINGHOUSE/HANFORD

11B

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

ICP ID Number: P2 Date: 07/01/92

Analyte	Wave-length (nm)	Sr	Ti	V	Zn	__
Aluminum	308.20	0.0000000	0.0000000	-0.0323900	0.0000000	
Antimony	206.80	0.0000000	0.0015000	-0.0094100	-0.0007400	
Arsenic						
Barium	493.40	0.0000000	0.0000000	0.0000000	0.0000000	
Beryllium	313.00	0.0000000	0.0000000	-0.0014700	0.0000000	
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	
Calcium	317.90	0.0000300	0.0000000	0.0000000	0.0000000	
Chromium	267.70	0.0000000	0.0000000	0.0005100	0.0000000	
Cobalt	228.60	0.0000000	0.0014400	0.0000000	0.0000000	
Copper	324.70	0.0000000	0.0000000	0.0000000	0.0000000	
Iron	259.90	0.0000050	0.0000000	0.0000000	0.0000000	
Lead						
Magnesium	279.00	0.0000000	-0.0038300	0.0000000	0.0000000	
Manganese	257.60	0.0000000	0.0000000	0.0000000	0.0000000	
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	
Potassium	766.40	0.0000000	0.0000000	0.0000000	0.0000000	
Selenium						
Silver	328.00	0.0000000	-0.0001400	0.0000000	0.0000000	
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	
Thallium						
Vanadium	292.40	0.0000000	0.0003400	0.0000000	0.0000000	
Zinc	213.80	0.0000000	0.0000000	0.0000000	0.0000000	
Bismuth						

Comments:

P2: THERMO JARRELL-ASH ICAP61 (#22982)

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12

ICP LINEAR RANGES (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

ICP ID Number: P2 Date: 01/15/93

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	5.00	1000000.0	P
Antimony	5.00	25000.0	P
Arsenic			NR
Barium	5.00	100000.0	P
Beryllium	5.00	25000.0	P
Cadmium	5.00	25000.0	P
Calcium	5.00	900000.0	P
Chromium	5.00	200000.0	P
Cobalt	5.00	100000.0	P
Copper	5.00	250000.0	P
Iron	5.00	600000.0	P
Lead			NR
Magnesium	5.00	1000000.0	P
Manganese	5.00	100000.0	P
Mercury			NR
Nickel	5.00	250000.0	P
Potassium	5.00	1000000.0	P
Selenium			NR
Silver	5.00	40000.0	P
Sodium	5.00	1000000.0	P
Thallium			NR
Vanadium	5.00	50000.0	P
Zinc	5.00	150000.0	P
Bismuth			NR

Comments:
P2: THERMO JARRELL-ASH ICAP61 (#22982)

WESTINGHOUSE/HANFORD

13

PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Method: A

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
B07K05	02/18/93	1.04	200
B07K05D	02/18/93	1.10	200
B07K05S	02/18/93	1.02	200
LCSS	02/18/93	1.00	200
PBS	02/18/93	1.00	200

WESTINGHOUSE/HANFORD

13

PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Method: CA

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
B07K05	02/16/93	1.01	50
B07K05D	02/16/93	1.05	50
B07K05S	02/16/93	1.07	50
LCSS	02/16/93	1.00	50
PBS	02/16/93	1.00	50

WESTINGHOUSE/HANFORD

13
PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
B07K05	02/19/93	0.20	100
B07K05D	02/19/93	0.21	100
B07K05S	02/19/93	0.21	100
LCSS	02/19/93	0.20	100
PBS	02/19/93	0.20	100

WESTINGHOUSE/HANFORD

13

PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Method: F

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
B07K05	02/18/93	1.00	200
B07K05D	02/18/93	1.01	200
B07K05S	02/18/93	1.01	200
LCSS	02/18/93	1.00	200
PBS	02/18/93	1.00	200

WESTINGHOUSE/HANFORD

13

PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Method: P

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
B07K05	02/18/93	1.04	200
B07K05D	02/18/93	1.10	200
B07K05S	02/18/93	1.02	200
LCSS	02/18/93	1.00	200
PBS	02/18/93	1.00	200

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14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: P2 Method: P

Start date: 02/22/93 End date: 02/22/93

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	BI
S0	1.00	1403		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
S	1.00	1405		X						X				X		X				X			X					
S	1.00	1408			X		X	X	X		X	X	X				X		X						X	X		
S	1.00	1410																				X						
ICV	1.00	1413		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
ICB	1.00	1416		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
ICSA	1.00	1419		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
ICSAB	1.00	1422		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
CRI	1.00	1425			X			X	X		X	X	X				X		X			X			X	X		
CCV.	1.00	1427		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
CCB	1.00	1430		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
PBS	1.00	1433		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
LCSS	1.00	1436		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
ZZZZZZ	1.00	1439																										
B07K05	1.00	1441		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
B07K05D	1.00	1444		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
B07K05S	1.00	1447			X		X	X	X		X	X	X				X		X			X			X	X		
B07K05L	5.00	1450		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
B07K05A	1.00	1455			X																							
ZZZZZZ	1.00	1506																										
CCV	1.00	1509		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
CCB	1.00	1512		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X		
ZZZZZZ	1.00	1515																										
ZZZZZZ	1.00	1518																										
ZZZZZZ	1.00	1521																										
ZZZZZZ	1.00	1528																										
ZZZZZZ	1.00	1531																										
ZZZZZZ	5.00	1534																										
ZZZZZZ	1.00	1537																										
ZZZZZZ	1.00	1541																										
ZZZZZZ	1.00	1544																										
ZZZZZZ	1.00	1552																										

044

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WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: P2 Method: P

Start date: 02/22/93 End date: 02/22/93

EPA Sample No.	D/F	Time	% R	Analytes																									
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	BI
CCV	1.00	1555		X	X	_	X	X	X	X	X	X	X	X	_	X	X	_	X	X	_	X	X	_	X	X	_	_
CCB	1.00	1558		X	X	_	X	X	X	X	X	X	X	X	_	X	X	_	X	X	_	X	X	_	X	X	_	_
ICSA	1.00	1607		X	X	_	X	X	X	X	X	X	X	X	_	X	X	_	X	X	_	X	X	_	X	X	_	_
ICSAB	1.00	1610		X	X	_	X	X	X	X	X	X	X	X	_	X	X	_	X	X	_	X	X	_	X	X	_	_
CRI	1.00	1613		_	X	_	_	X	X	_	X	X	X	_	_	_	X	_	X	_	_	X	_	_	X	X	_	_
CCV	1.00	1616		X	X	_	X	X	X	X	X	X	X	X	_	X	X	_	X	X	_	X	X	_	X	X	_	_
CCB	1.00	1619		X	X	_	X	X	X	X	X	X	X	X	_	X	X	_	X	X	_	X	X	_	X	X	_	_

045

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C L P M E T A L S 3.03a

HANFORD NOR

Run id: P2 9305303
THERMO JARRELL-ASH ICAP61 (#22982)
Analytical method: P
Element: Multi-Element

Acquired: 02/22/93 by JON
Crunched: 02/27/93 by LYN
Time: 1223
Processing protocol: 3/90

Al Sb Ba Be Cd Ca Cr Co Cu Fe
Mg Mn Ni K Na V Zn Ag

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	CICV1	ICV	P			ICV	02/22/93	14:13
2	STDB	ICB	P			ICB	02/22/93	14:16
3	INTAA	ICSA0	P			ICSA	02/22/93	14:19
4	INTABB	ICSAB0	P			ICSAB	02/22/93	14:22
5	2XCRDL29301	CRI0	P		01/15/93	CRI	02/22/93	14:25
6	HALFSTD	CCV	P			CCV	02/22/93	14:27
7	STDB	CCB	P			CCB	02/22/93	14:30
8	PB	PBS	P	2621	02/18/93	PBS	02/22/93	14:33
9	CLCSPS	LCSS	P	2621	02/18/93	LCSS	02/22/93	14:36
10	X	X	P			ZZZZZZ	02/22/93	14:39
11	S302132-01	S	P	2621	02/18/93	B07K05	02/22/93	14:41
12	S302132-01	S2	P	2621	02/18/93	B07K05D	02/22/93	14:44
13	S302132-01	DS	P	2621	02/18/93	B07K05S	02/22/93	14:47
14	S302132-01	ISD	P	2621		B07K05L	02/22/93	14:50
15	S302132-01	PS	P	2621		B07K05A	02/22/93	14:55
16	X	X	P			ZZZZZZ	02/22/93	15:06
17	HALFSTD	CCV	P			CCV	02/22/93	15:09
18	STDB	CCB	P			CCB	02/22/93	15:12
19	X	X	P			ZZZZZZ	02/22/93	15:15
20	X	X	P			ZZZZZZ	02/22/93	15:18
21	X	X	P			ZZZZZZ	02/22/93	15:21
22	X	X	P			ZZZZZZ	02/22/93	15:28
23	X	X	P			ZZZZZZ	02/22/93	15:31
24	X	X	P			ZZZZZZ	02/22/93	15:34
25	X	X	P			ZZZZZZ	02/22/93	15:37
26	X	X	P			ZZZZZZ	02/22/93	15:41
27	X	X	P			ZZZZZZ	02/22/93	15:44
28	X	X	P			ZZZZZZ	02/22/93	15:50
29	HALFSTD	CCV	P			CCV	02/22/93	15:55
30	STDB	CCB	P			CCB	02/22/93	15:58
31	INTAA	ICSA1	P			ICSA	02/22/93	16:07
32	INTABB	ICSAB1	P			ICSAB	02/22/93	16:10
33	2XCRDL29301	CRI1	P		01/15/93	CRI	02/22/93	16:13
34	HALFSTD	CCV	P			CCV	02/22/93	16:16
35	STDB	CCB	P			CCB	02/22/93	16:19
36	STDB	WS0	P			S0	02/22/93	14:03
37	STD3	WS1	P			S	02/22/93	14:05
38	STD1	WS2	P			S	02/22/93	14:08
39	STD2	WS3	P			S	02/22/93	14:10

Standardization Rpt. Mon 02-22-93 02:06:32 PM page 1

Method: CLP01AP2 Standard: STDB

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Avge	.00967	.00067	-.00260	-.00007	.00047	.00000	.05032
SDev	.00200	.00208	.00140	.00023	.00023	.00020	.00149
%RSD	20.724	312.25	53.846	346.41	49.487	.00000	2.9539
#1	.01040	.00300	-.00320	-.00020	.00060	.00020	.05115
#2	.01120	-.00100	-.00100	.00020	.00060	-.00020	.05121
#3	.00740	.00000	-.00360	-.00020	.00020	.00000	.04861

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Avge	.00007	-.00027	.00087	.00627	.00160	.00187	.00107
SDev	.00058	.00012	.00012	.00094	.00000	.00083	.00012
%RSD	866.03	43.301	13.323	15.082	.00000	44.607	10.825
#1	.00040	-.00040	.00100	.00660	.00160	.00280	.00100
#2	.00040	-.00020	.00080	.00700	.00160	.00120	.00120
#3	-.00060	-.00020	.00080	.00520	.00160	.00160	.00100

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Avge	-.00000	-.00393	.03453	.06633	.00013	.00060
SDev	.00053	.00140	.00338	.00147	.00031	.00020
%RSD	3636e6	35.714	9.8000	2.2224	229.13	33.333
#1	.00020	-.00380	.03740	.06580	.00020	.00040
#2	.00040	-.00260	.03540	.06800	.00040	.00080
#3	-.00060	-.00540	.03080	.06520	-.00020	.00060

Standardization Rpt. Mon 02-22-93 02:08:53 PM page 1

Method: CLP01AP2 Standard: STD3

Elem	Al3082	Ca3179	Fe2599	Mg2790	K_7664	Na5889
Avge	8.8262	21.524	10.889	4.1135	.95253	4.0703
SDev	.0258	.086	.047	.0123	.00392	.0166
%RSD	.29250	.40002	.43418	.29973	.41163	.40692
#1	8.8460	21.468	10.873	4.1084	.95620	4.0860
#2	8.8356	21.623	10.942	4.1276	.95300	4.0720
#3	8.7970	21.481	10.851	4.1046	.94840	4.0530

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Standardization Rpt. Mon 02-22-93 02:11:29 PM page 1

Method: CLP01AP2 Standard: STD1

Elem	Sb2068	As1936	Ba4934	Be3130	Cd2265	Cr2677	Co2286
Avge	1.1653	1.1421	1.6473	.73940	1.8867	.97747	.92527
SDev	.0088	.0092	.0047	.00350	.0150	.00540	.00469
%RSD	.75213	.80653	.28586	.47393	.79286	.55257	.50708
#1	1.1628	1.1444	1.6476	.73960	1.8852	.97760	.92420
#2	1.1580	1.1320	1.6424	.73580	1.8726	.97200	.92120
#3	1.1750	1.1500	1.6518	.74280	1.9024	.98280	.93040

Elem	Cu3247	Pb2203	Mn2576	Ni2316	V_2924	Zn2138
Avge	.87087	.84667	2.0554	1.1850	.99607	.96433
SDev	.00271	.00530	.0110	.0050	.00401	.00630
%RSD	.31180	.62602	.53305	.41991	.40225	.65333
#1	.86940	.84240	2.0522	1.1840	.99580	.96040
#2	.86920	.84500	2.0464	1.1806	.99220	.96100
#3	.87400	.85260	2.0676	1.1904	1.0002	.97160

Standardization Rpt. Mon 02-22-93 02:13:33 PM page 1

Method: CLP01AP2 Standard: STD2

Elem	Ag3280
Avge	2.5051
SDev	.0042
%RSD	.16924
#1	2.5096
#2	2.5012
#3	2.5044

Analysis Report QC Standard Mon 02-22-93 02:16:28 PM page 1

Method: CLP01AP2 Sample Name: CICV1:ICV Operator: JST
Run Time: 02/22/93 14:13:43
Comment: ICV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.9753	.56803	.10338	1.8478	.04709	.04853	48.662
SDev	.0150	.01238	.01709	.0033	.00015	.00081	.254
%RSD	.75904	2.1794	16.532	.18091	.32932	1.6683	.52130
#1	1.9776	.56089	.09026	1.8480	.04691	.04871	48.466
#2	1.9593	.58233	0.12271	1.8443	.04717	.04765	48.571
#3	1.9890	.56088	.09717	1.8510	.04718	.04924	48.948
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	2.0000	.60000	.10000	2.0000	.05000	.05000	50.000
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.10035	.47797	.23051	.98858	.04509	49.421	.14342
SDev	.00213	.00390	.00066	.00222	.00651	.206	.00000
%RSD	2.1208	.81503	.28763	.22411	14.431	.41701	.00021
#1	.09967	.47472	.23089	.98650	.04824	49.247	.14342
#2	.09865	.47689	.23089	.98834	0.03761	49.367	.14342
#3	.10274	.48229	.22975	.99091	.04942	49.649	.14342
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.10000	.50000	.25000	1.0000	.05000	50.000	.15000
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.38172	48.944	.09868	48.923	.48774	.19707
SDev	.00212	.133	.00067	.085	.00363	.00311
%RSD	.55636	.27216	.68304	.17359	.74369	1.5757
#1	.37975	49.010	.09921	48.924	.48874	.19396
#2	.38143	48.791	.09792	48.837	.48372	.19707
#3	.38397	49.031	.09889	49.007	.49076	.20017
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.40000	50.000	.10000	50.000	.50000	.20000
Range	10.000	10.000	10.000	10.000	10.000	10.000

Analysis Report Mon 02-22-93 02:19:17 PM page 1

Method: CLP01AP2 Sample Name: STDB;ICB Operator: JST
Run Time: 02/22/93 14:16:34
Comment: ICB#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01586	.00140	.00372	.00202	-.00000	.00088	.07137
SDev	.02348	.01126	.00918	.00061	.00016	.00110	.00545
%RSD	148.08	803.25	246.60	30.041	16264.	124.80	7.6285
#1	-.00944	.01342	-.00609	.00263	-.00009	.00000	.07737
#2	.03696	-.00032	.01211	.00142	-.00009	.00053	.06999
#3	.02005	-.00890	.00515	.00202	.00018	.00212	.06675
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01460	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01460	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00273	.00252	.00728	-.00269	-.00119	.03486	.00114
SDev	.00177	.00216	.00239	.00110	.00739	.01655	.00028
%RSD	64.922	85.727	32.872	40.934	619.56	47.482	24.708
#1	.00375	.00252	.00651	-.00159	-.00354	.04783	.00081
#2	.00068	.00036	.00536	-.00379	-.00713	.01622	.00130
#3	.00375	.00468	.00996	-.00269	.00709	.04054	.00130
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01620	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01620	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00309	.10455	.00108	.03580	-.00066	.00862
SDev	.00351	.01597	.00237	.01249	.00175	.00118
%RSD	113.55	15.275	220.02	34.884	264.91	13.702
#1	.00422	.09061	.00375	.03580	.00035	.00931
#2	-.00084	.10107	-.00078	.02331	-.00267	.00726
#3	.00591	.12198	.00027	.04829	.00035	.00930
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

Analysis Report Mon 02-22-93 02:22:07 PM page 1

Method: CLP01AP2 Sample Name: INTAA;ICSA Operator: JST
Run Time: 02/22/93 14:19:23
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	505.16	.01032	-.09609	-.01131	.00001	.00004	474.84
SDev	1.81	.02646	.02327	.00058	.00015	.00108	2.10
%RSD	.35793	256.52	24.220	5.1485	2476.9	2917.8	.44305
#1	503.34	-.02014	-.12297	-.01126	-.00008	-.00075	472.42
#2	505.18	.02344	-.08250	-.01192	.00018	.00126	475.91
#3	506.95	.02765	-.08281	-.01076	-.00008	-.00040	476.20
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	600.00						600.00
Low	400.00						400.00

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01677	-.00108	.00508	183.98	.04008	512.01	.01169
SDev	.00120	.00165	.00132	.65	.02882	2.13	.00072
%RSD	7.1509	152.18	25.995	.35409	71.918	.41624	6.1930
#1	.01538	-.00289	.00568	183.29	.01107	509.68	.01156
#2	.01745	-.00072	.00356	184.06	.04045	512.46	.01105
#3	.01747	.00036	.00599	184.59	.06871	513.87	.01248
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK	LC Pass	NOCHECK
High				240.00		600.00	
Low				160.00		400.00	

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00056	.06273	-.00839	.22061	.00425	.03109
SDev	.00176	.01597	.00123	.00500	.00155	.00251
%RSD	312.25	25.459	14.704	2.2641	36.416	8.0585
#1	-.00084	.05925	-.00961	.21562	.00388	.03261
#2	.00000	.04879	-.00842	.22061	.00291	.03247
#3	.00253	.08016	-.00714	.22561	.00594	.02820
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High						
Low						

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Analysis Report Mon 02-22-93 02:24:57 PM page 1

Method: CLP01AP2 Sample Name: INTABB;ICSAB Operator: JST
Run Time: 02/22/93 14:22:13
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	504.53	-.00158	-.09791	.45107	.45991	.87422	473.87
SDev	1.66	.01582	.03048	.00148	.00178	.00839	2.48
%RSD	.32851	1001.6	31.133	.32769	.38765	.95933	.52362
#1	504.60	.01459	-.06297	.45127	46154	.88278	476.54
#2	502.83	-.00230	-.11909	.44950	.45801	.86602	471.64
#3	506.14	-.01702	-.11165	.45244	.46018	.87387	473.42
Errors	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High	600.00			.60000	.60000	1.2000	600.00
Low	400.00			.40000	.40000	.80000	400.00

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.46864	.44051	.46757	184.06	.91747	511.56	.45842
SDev	.00428	.00511	.00187	.72	.03548	1.80	.00194
%RSD	.91263	1.1592	.40109	.39067	3.8676	.35218	.42250
#1	.47343	.44447	.46813	184.77	.95799	513.21	.46038
#2	.46521	.43474	.46548	183.33	.89193	509.64	.45650
#3	.46728	.44231	.46911	184.07	.90250	511.84	.45839
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.60000	.60000	.60000	240.00	1.2000	600.00	.60000
Low	.40000	.40000	.40000	160.00	.80000	400.00	.40000

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.86639	.17425	.98379	.20729	.46989	.96334
SDev	.00645	.06360	.00660	.01505	.00557	.00652
%RSD	.74393	36.497	.67116	7.2623	1.1849	.67658
#1	.87342	.21607	.98593	.22311	.47562	.96802
#2	.86076	.10107	.97638	.19314	.46450	.95590
#3	.86498	.20562	.98905	.20563	.46955	.96611
Errors	LC Pass	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass
High	1.2000		1.2000		.60000	1.2000
Low	.80000		.80000		.40000	.80000

Analysis Report Mon 02-22-93 02:27:46 PM page 1

Method: CLP01AP2 Sample Name: 2XCRDL293Q1;CRI Operator: JST
Run Time: 02/22/93 14:25:03
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.26558	.11962	.03012	.00019	.00980	.01078	.12670
SDev	.05885	.00608	.00298	.00105	.00000	.00110	.05637
%RSD	22.159	5.0828	9.8802	540.71	.00874	10.221	44.490
#1	.33063	.12505	.03159	.00080	.00980	.01166	.18663
#2	.25007	.11305	.02669	-.00102	.00980	.00954	.11871
#3	.21604	.12076	.03207	.00080	.00980	.01114	.07475

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01836	.10121	.04754	.10252	.01953	.23359	.02888
SDev	.00118	.00062	.00132	.02793	.00761	.07088	.00028
%RSD	6.4342	.61623	2.7813	27.240	38.966	30.343	.97068
#1	.01904	.10193	.04678	.13266	.01633	.31304	.02904
#2	.01700	.10085	.04677	.09737	.02822	.21089	.02904
#3	.01904	.10085	.04906	.07752	.01405	.17684	.02856

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.07820	.03834	.02064	.02081	.09915	.03693
SDev	.00049	.01046	.00062	.00500	.00058	.00207
%RSD	.62304	27.273	3.0243	24.000	.58777	5.6109
#1	.07848	.03834	.02046	.02581	.09982	.03900
#2	.07764	.04879	.02013	.01582	.09881	.03694
#3	.07848	.02788	.02134	.02081	.09881	.03486

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Analysis Report Mon 02-22-93 02:30:36 PM page 1

Method: CLP01AP2 Sample Name: HALFSTD:CCV Operator: JST
Run Time: 02/22/93 14:27:51
Comment: CCV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.849	2.4691	2.4486	2.4566	.50226	2.4358	25.204
SDev	.161	.0243	.0127	.0138	.00315	.0169	.171
%RSD	.64742	.98514	.51833	.56186	.62719	.69386	.67655
#1	24.712	2.4533	2.4383	2.4452	.50044	2.4245	25.053
#2	24.809	2.4568	2.4448	2.4525	.50045	2.4277	25.168
#3	25.027	2.4971	2.4628	2.4719	.50590	2.4552	25.389
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4362	2.4355	2.4708	10.089	2.4270	24.913	2.4401
SDev	.0170	.0138	.0157	.060	.0171	.161	.0161
%RSD	.69851	.56634	.63395	.59792	.70611	.64563	.65985
#1	2.4239	2.4237	2.4585	10.040	2.4196	24.818	2.4276
#2	2.4290	2.4323	2.4654	10.070	2.4148	24.821	2.4344
#3	2.4556	2.4507	2.4884	10.156	2.4466	25.098	2.4582
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4281	24.936	.49732	24.883	2.4597	2.4589
SDev	.0177	.121	.00487	.141	.0174	.0187
%RSD	.72930	.48596	.97927	.56817	.70545	.76235
#1	2.4143	24.807	.49658	24.769	2.4460	2.4438
#2	2.4219	24.953	.49286	24.838	2.4540	2.4531
#3	2.4481	25.047	.50252	25.041	2.4792	2.4799
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

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Analysis Report Mon 02-22-93 02:33:24 PM page 1

Method: CLP01AP2 Sample Name: STDB;CCB Operator: JST
Run Time: 02/22/93 14:30:42
Comment: CCB#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.03483	-.00945	.00013	.00162	.00000	.00088	.02569
SDev	.02473	.00623	.00369	.00093	.00016	.00031	.00589
%RSD	70.994	65.966	2835.7	57.323	7964.4	34.712	22.938
#1	.06318	-.01663	-.00290	.00141	-.00009	.00053	.03236
#2	.01778	-.00629	-.00095	.00081	-.00009	.00106	.02119
#3	.02352	-.00543	.00424	.00263	.00018	.00106	.02353
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01460	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01460	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00170	.00288	.00882	.01189	-.00634	.03730	.00097
SDev	.00205	.00165	.00115	.00306	.00273	.01404	.00056
%RSD	120.02	57.272	13.049	25.756	43.024	37.655	57.724
#1	.00375	.00468	.00997	.01532	-.00478	.04540	.00130
#2	-.00034	.00252	.00767	.00944	-.00475	.02108	.00032
#3	.00170	.00144	.00881	.01091	-.00948	.04540	.00130
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01620	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01620	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00253	.05576	-.00081	-.00916	.00135	.00274
SDev	.00146	.02176	.00103	.00900	.00101	.00060
%RSD	57.735	39.031	127.82	98.333	74.910	22.079
#1	.00338	.08016	-.00199	-.00666	.00135	.00204
#2	.00084	.04879	-.00029	-.01915	.00033	.00309
#3	.00338	.03834	-.00013	-.00167	.00235	.00308
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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Analysis Report Mon 02-22-93 02:36:13 PM page 1

Method: CLP01AP2 Sample Name: PB;PBS Operator: JST
Run Time: 02/22/93 14:33:30
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02116	-.01290	-.00155	.00121	-.00000	-.00000	-.04027
SDev	.00601	.01248	.00785	.00035	.00016	.00106	.00253
%RSD	28.397	96.704	506.73	28.868	32382.	30461.	6.2730
#1	.02569	-.02524	-.01059	.00142	-.00009	-.00000	-.04026
#2	.02345	-.00030	.00251	.00142	-.00009	.00106	-.03775
#3	.01434	-.01316	.00344	.00081	.00018	-.00106	-.04280
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01460	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01460	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00171	.00144	.01188	.02671	.00827	.01379	.00081
SDev	.00205	.00187	.00176	.00110	.00615	.01519	.00000
%RSD	119.95	129.91	14.777	4.1281	74.351	110.18	.00715
#1	.00375	.00252	.01227	.02782	.00472	.02595	.00081
#2	.00171	.00252	.01342	.02671	.01537	.01865	.00081
#3	-.00034	-.00072	.00997	.02561	.00472	-.00324	.00081
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01620	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01620	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00113	.02440	-.00059	.02497	-.00033	.01207
SDev	.00195	.09371	.00134	.03162	.00058	.00158
%RSD	173.21	384.12	227.82	126.62	177.10	13.077
#1	.00000	-.03485	-.00207	-.00916	-.00065	.01035
#2	.00338	.13243	-.00021	.05328	.00034	.01345
#3	.00000	-.02440	.00052	.03080	-.00067	.01243
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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Analysis Report Mon 02-22-93 02:39:02 PM page 1

Method: CLP01AP2 Sample Name: CLCSPS;LCSS Operator: JST
Run Time: 02/22/93 14:36:19
Comment: LCS
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	23.847	.12303	.13041	.47763	.30322	.39439	11.725
SDev	.104	.00542	.00392	.00230	.00149	.00185	.054
%RSD	.43558	4.4065	3.0097	.48057	.49235	.47010	.46222
#1	23.741	.12481	.12886	.47602	.30168	.39459	11.665
#2	23.949	.11694	.13487	.48026	.30466	.39613	11.772
#3	23.850	.12734	.12749	.47662	.30330	.39244	11.736
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	35.750	.65000	.25500	.63500	.43500	.56000	16.300
Low	10.200	.04500	.06500	.34000	.17500	.17500	8.1500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.82720	.64207	.49178	37.390	.22765	8.0165	.70412
SDev	.00446	.00495	.00293	.170	.01079	.0342	.00424
%RSD	.53947	.77107	.59636	.45441	4.7413	.42636	.60265
#1	.82413	.63667	.48906	37.211	.23918	7.9840	.69925
#2	.83232	.64640	.49489	37.549	.22599	8.0522	.70704
#3	.82515	.64316	.49140	37.409	.21778	8.0133	.70607
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	1.2750	.90000	.69500	60.500	.32500	11.500	1.0150
Low	.41000	.33000	.23000	25.850	.11000	4.2100	.50500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.71617	12.233	.39639	1.7849	.17435	.44075
SDev	.00319	.142	.00269	.0357	.00176	.00569
%RSD	.44610	1.1604	.67859	2.0002	1.0096	1.2919
#1	.71392	12.083	.39386	1.7541	.17333	.43527
#2	.71983	12.250	.39921	1.8240	.17638	.44036
#3	.71477	12.365	.39610	1.7766	.17334	.44664
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	1.0600	16.650	.56500	2.2950	.27000	.60500
Low	.34000	7.6500	.13000	.84000	.13000	.19500

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Analysis Report Mon 02-22-93 02:44:39 PM page 1

Method: CLP01AP2 Sample Name: S302132-01;S Operator: JST
Run Time: 02/22/93 14:41:57
Comment: B07K05
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	29.566	.00042	.00879	.26702	.00117	-.00140	102.20
SDev	.117	.00722	.00780	.00000	.00000	.00109	.34
%RSD	.39719	1708.9	88.761	.00132	.12546	77.914	.33209
#1	29.439	.00507	.00295	.26702	.00117	-.00225	101.8[illegible]
#2	29.670	.00410	.01764	.26702	.00117	-.00177	102.46
#3	29.590	-.00290	.00577	.26702	.00117	-.00017	102.33

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.10410	.03348	.06234	61.288	.02822	24.008	1.3028
SDev	.00118	.00249	.00136	.197	.00109	.093	.0047
%RSD	1.1375	7.4536	2.1768	.31847	3.8485	.38533	.35892
#1	.10343	.03060	.06152	61.563	.02714	23.904	1.3025
#2	.10549	.03492	.06391	61.929	.02931	24.082	1.3112
#3	.10344	.03492	.06160	61.872	.02819	24.038	1.3098

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04754	7.0712	.00071	1.8806	.12121	.17028
SDev	.00129	.0423	.00330	.0215	.00100	.00244
%RSD	2.7116	.59755	465.85	1.1450	.82427	1.4282
#1	.04641	7.0328	.00281	1.8615	.12020	.17359
#2	.04895	7.0642	.00242	1.9039	.12122	.16936
#3	.04726	7.1165	-.00310	1.8765	.12020	.16938

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Analysis Report Mon 02-22-93 02:47:28 PM page 1

Method: CLP01AP2 Sample Name: S302132-01:S2 Operator: JST
Run Time: 02/22/93 14:44:44
Comment: B07K05D
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	33.793	.00520	.01691	.32699	.00138	-.00116	127.67
SDev	.096	.00563	.01776	.00121	.00016	.00103	.44
%RSD	.28367	108.20	105.07	.37087	11.352	89.322	.34233
#1	33.790	-.00081	.01109	.32821	.00120	-.00116	127.55
#2	33.699	.00608	.00278	.32578	.00147	-.00219	127.31
#3	33.890	.01034	.03685	.32699	.00147	-.00012	128.16

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.11385	.03708	.06329	68.929	.03249	27.163	1.4112
SDev	.00204	.00108	.00117	.185	.00796	.060	.0055
%RSD	1.7937	2.9146	1.8540	.26788	24.501	.22110	.39228
#1	.11385	.03600	.06444	68.936	.03052	27.147	1.4096
#2	.11589	.03708	.06210	68.741	.04125	27.113	1.4066
#3	.11180	.03816	.06334	69.110	.02570	27.230	1.4173

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.05373	7.4197	-.00103	2.0538	.13854	.17838
SDev	.00176	.0209	.00027	.0090	.00000	.00180
%RSD	3.2696	.28182	26.784	.43845	.00115	1.0082
#1	.05316	7.3988	-.00123	2.0463	.13854	.17630
#2	.05570	7.4197	-.00122	2.0513	.13854	.17944
#3	.05232	7.4406	-.00108	2.0638	.13854	.17938

Analysis Report Mon 02-22-93 02:50:17 PM page 1

Method: CLP01AP2 Sample Name: S302132-01:DS Operator: JST
Run Time: 02/22/93 14:47:33
Comment: B07K055
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	34.188	.27605	1.9371	2.1390	.05051	.04371	91.604
SDev	.123	.00840	.0175	.0101	.00016	.00064	.315
%RSD	.36034	3.0426	.90329	.47387	.31534	1.4654	.34434
#1	34.063	.27123	1.9558	2.1281	.05033	.04410	91.302
#2	34.192	.27118	1.9211	2.1408	.05060	.04406	91.579
#3	34.309	.28575	1.9345	2.1481	.05060	.04297	91.932

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.29652	.50099	.29524	64.694	.48857	24.561	1.8015
SDev	.00103	.00165	.00072	.253	.01235	.095	.0050
%RSD	.34674	.32942	.24368	.39131	2.5276	.38625	.27731
#1	.29550	.49955	.29441	64.428	.49460	24.502	1.7960
#2	.29652	.50279	.29563	64.722	.47437	24.510	1.8028
#3	.29755	.50063	.29568	64.932	.49675	24.670	1.8058

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.51646	7.1966	.04821	2.1254	.60437	.63342
SDev	.00304	.0160	.00204	.0052	.00254	.00544
%RSD	.58914	.22192	4.2399	.24461	.42006	.85927
#1	.51392	7.1792	.05051	2.1312	.60202	.62725
#2	.51561	7.2001	.04752	2.1212	.60404	.63756
#3	.51983	7.2106	.04660	2.1237	.60706	.63543

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Analysis Report Mon 02-22-93 02:53:04 PM page 1

Method: CLP01AP2 Sample Name: S302132-01:TSD/5 Operator: JST
Run Time: 02/22/93 14:50:22
Comment: B07K05L
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.9923	.00460	.00424	.05486	.00048	-.00073	21.246
SDev	.0041	.01239	.01030	.00035	.00000	.00105	.068
%RSD	.06789	269.21	243.02	.63908	.30458	145.27	.32080
#1	5.9957	.00805	.01559	.05466	.00048	-.00178	21.204
#2	5.9934	-.00915	-.00449	.05466	.00048	-.00073	21.209
#3	5.9877	.01491	.00161	.05526	.00049	.00033	21.325

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02247	.00792	.01303	12.776	.00492	4.9293	.26936
SDev	.00000	.00108	.00199	.042	.01692	.0377	.00101
%RSD	.00495	13.646	15.260	.33084	343.73	.76498	.37637
#1	.02247	.00792	.01417	12.729	.01952	4.8912	.26855
#2	.02247	.00684	.01073	12.789	-.01362	4.9301	.26903
#3	.02247	.00900	.01419	12.810	.00887	4.9666	.27049

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01181	1.5299	-.00074	.38462	.02292	.04071
SDev	.00169	.0712	.00172	.01180	.00100	.00158
%RSD	14.286	4.6516	232.09	3.0687	4.3821	3.8898
#1	.01181	1.5857	-.00162	.39794	.02292	.03898
#2	.01013	1.4498	-.00184	.37546	.02192	.04210
#3	.01350	1.5543	.00124	.38045	.02393	.04104

Analysis Report Mon 02-22-93 02:58:13 PM page 1

Method: CLP01AP2 Sample Name: S302132-01;PS Operator: JST
Run Time: 02/22/93 14:55:29
Comment: B07K05A
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	29.146	.11730	.21512	.66444	.01223	.00927	99.098
SDev	.077	.01255	.00607	.00404	.00016	.00153	.396
%RSD	.26517	10.698	2.8233	.60813	1.2846	16.533	.39921
#1	29.168	.12735	.20861	.66889	.01215	.00750	98.931
#2	29.060	.12132	.21612	.66101	.01214	.01017	98.813
#3	29.210	.10324	.22063	.66343	.01242	.01013	99.550

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.12039	.13613	.10679	60.207	.22154	23.318	1.2979
SDev	.00156	.00062	.00063	.161	.00007	.088	.0039
%RSD	1.2994	.45826	.59152	.26798	.03091	.37864	.30314
#1	.11869	.13649	.10218	60.219	.22152	23.330	1.2986
#2	.12073	.13649	.10714	60.040	.22161	23.223	1.2937
#3	.12176	.13541	.10607	60.382	.22148	23.399	1.3015

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.12574	6.9039	.02072	1.8390	.22096	.21427
SDev	.00223	.0680	.00307	.0025	.00209	.00299
%RSD	1.7757	.98532	14.813	.13580	.94667	1.3952
#1	.12321	6.9701	.02421	1.8415	.22263	.21081
#2	.12658	6.8342	.01954	1.8365	.21861	.21602
#3	.12743	6.9074	.01842	1.8390	.22164	.21596

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Analysis Report Mon 02-22-93 03:12:03 PM page 1

Method: CLP01AP2 Sample Name: HALFSTD;CCV Operator: JST
Run Time: 02/22/93 15:09:16
Comment: CCV#2
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.703	2.4731	2.4346	2.4406	.49683	2.3616	24.822
SDev	.114	.0104	.0265	.0070	.00238	.0144	.183
%RSD	.46106	.41882	1.0885	.28815	.47862	.60794	.73920
#1	24.576	2.4612	2.4084	2.4325	.49420	2.3466	24.628
#2	24.739	2.4783	2.4338	2.4452	.49746	2.3630	24.846
#3	24.796	2.4798	2.4614	2.4440	.49882	2.3752	24.992
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4195	2.4269	2.4466	9.9884	2.4085	24.607	2.4346
SDev	.0169	.0146	.0081	.0640	.0163	.114	.0124
%RSD	.70015	.60219	.33064	.64080	.67824	.46368	.50984
#1	2.4035	2.4118	2.4389	9.9217	2.3948	24.485	2.4222
#2	2.4178	2.4280	2.4458	9.9942	2.4042	24.624	2.4344
#3	2.4372	2.4409	2.4550	10.049	2.4266	24.711	2.4470
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4051	24.629	.49448	24.784	2.4443	2.4376
SDev	.0158	.089	.00112	.079	.0091	.0111
%RSD	.65737	.36270	.22645	.31994	.37319	.45672
#1	2.3873	24.535	.49371	24.694	2.4348	2.4253
#2	2.4101	24.639	.49397	24.814	2.4449	2.4407
#3	2.4177	24.712	.49577	24.843	2.4531	2.4469
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

Analysis Report Mon 02-22-93 03:14:53 PM page 1

Method: CLP01AP2 Sample Name: STDB;CCB Operator: JST
Run Time: 02/22/93 15:12:09
Comment: CCB#2
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04053	.00256	.00301	.00202	.00018	.00177	.13909
SDev	.02081	.00247	.00356	.00000	.00027	.00162	.00176
%RSD	51.348	96.347	118.23	.03088	146.77	91.647	1.2675
#1	.05868	-.00029	.00410	.00202	.00045	.00318	.14104
#2	.04510	.00398	.00589	.00202	-.00009	.00212	.13761
#3	.01781	.00399	-.00097	.00202	.00018	.00000	.13862
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01460	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01460	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00341	.00360	.00422	.00589	.00352	.02757	.00178
SDev	.00118	.00108	.00230	.00170	.00355	.00743	.00049
%RSD	34.641	29.991	54.523	28.863	100.94	26.943	27.265
#1	.00273	.00360	.00652	.00687	-.00004	.02595	.00178
#2	.00477	.00468	.00192	.00687	.00707	.02109	.00227
#3	.00273	.00252	.00422	.00392	.00354	.03568	.00130
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01620	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01620	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00309	.12895	.00275	.02248	.00236	.00620
SDev	.00129	.02176	.00110	.02321	.00101	.00103
%RSD	41.660	16.878	40.029	103.24	42.784	16.574
#1	.00422	.15334	.00238	.01582	.00235	.00723
#2	.00169	.11152	.00400	.04829	.00337	.00518
#3	.00338	.12198	.00189	.00333	.00135	.00620
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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Analysis Report Mon 02-22-93 03:58:23 PM page 1

Method: CLP01AP2 Sample Name: HALFSTD;CCV Operator: JST
Run Time: 02/22/93 15:55:38
Comment: CCV#3
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.852	2.4810	2.4739	2.4432	.49983	2.3879	25.237
SDev	.044	.0154	.0072	.0049	.00068	.0016	.040
%RSD	.17728	.62166	.29288	.20231	.13634	.06658	.16046
#1	24.821	2.4721	2.4778	2.4410	.49991	2.3863	25.236
#2	24.902	2.4721	2.4783	2.4489	.50046	2.3895	25.278
#3	24.833	2.4988	2.4655	2.4398	.49911	2.3879	25.197
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4437	2.4618	2.4539	10.104	2.4569	24.890	2.4466
SDev	.0039	.0012	.0087	.027	.0025	.011	.0046
%RSD	.15850	.05066	.35362	.26309	.10055	.04616	.18980
#1	2.4454	2.4626	2.4447	10.118	2.4550	24.877	2.4490
#2	2.4464	2.4626	2.4620	10.121	2.4561	24.899	2.4495
#3	2.4393	2.4604	2.4551	10.073	2.4597	24.894	2.4412
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4354	24.765	.49870	24.900	2.4601	2.4579
SDev	.0022	.054	.00246	.065	.0027	.0070
%RSD	.09167	.21937	.49322	.26046	.10785	.28670
#1	2.4363	24.702	.49603	24.886	2.4571	2.4603
#2	2.4371	24.796	.49919	24.971	2.4621	2.4634
#3	2.4329	24.796	.50088	24.843	2.4611	2.4499
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

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Analysis Report Mon 02-22-93 04:01:30 PM page 1

Method: CLP01AP2 Sample Name: STDB;CCB Operator: JST
Run Time: 02/22/93 15:58:29
Comment: CCB#3
Mode: CONC Corr. Factor: 1

Ignore check table JST 2/22/93

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02763	-.00087	.00686	.00162	.00018	.00141	.00502
SDev	.02330	.01154	.00913	.00070	.00027	.00061	.00553
%RSD	84.330	1328.3	133.16	43.344	150.40	43.319	110.02
#1	.04047	.00741	.01031	.00081	.00018	.00106	.00665
#2	.04170	.00403	.01377	.00202	.00046	.00212	.00956
#3	.00073	-.01405	-.00350	.00202	-.00009	.00106	-.00113
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00205	.00468	.00345	.00809	.00116	.02190	.00162
SDev	.00059	.00108	.00176	.00106	.00353	.00612	.00056
%RSD	28.885	23.079	50.888	13.124	303.87	27.953	34.632
#1	.00273	.00360	.00192	.00871	.00115	.02109	.00227
#2	.00170	.00468	.00537	.00870	.00470	.02838	.00130
#3	.00171	.00576	.00307	.00687	-.00237	.01622	.00130
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00394	.08364	.00114	.00916	.00101	.00274
SDev	.00097	.06961	.00311	.02019	.00209	.00261
%RSD	24.744	83.229	274.04	220.44	206.43	94.970
#1	.00338	.10107	-.00167	.02081	.00035	-.00002
#2	.00506	.14289	.00448	.02081	.00335	.00516
#3	.00338	.00697	.00060	-.01415	-.00066	.00309
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High						
Low						

9613492.6574

Analysis Report Mon 02-22-93 04:10:42 PM page 1

Method: CLP01AP2 Sample Name: INTAA:ICSA Operator: JST
Run Time: 02/22/93 16:07:57
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	504.98	-.00780	-.10447	-.01090	-.00009	.00001	475.34
SDev	2.23	.02197	.02328	.00095	.00000	.00191	.77
%RSD	.44190	281.64	22.286	8.6897	3.9786	23573.	.16132
#1	502.41	.01407	-.08970	-.01062	-.00008	.00185	474.75
#2	506.09	-.00760	-.09241	-.01012	-.00009	.00014	476.20
#3	506.44	-.02987	-.13131	-.01196	-.00009	-.00196	475.06
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	600.00						600.00
Low	400.00						400.00

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01916	-.00181	.00244	184.19	.04532	510.75	.01073
SDev	.00256	.00108	.00232	.48	.02607	1.09	.00078
%RSD	13.377	59.831	94.854	.26300	57.524	.21288	7.2950
#1	.02153	-.00073	.00231	183.63	.07443	509.52	.01158
#2	.01952	-.00289	.00483	184.53	.03739	511.59	.01055
#3	.01644	-.00180	.00019	184.40	.02413	511.13	.01005
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK	LC Pass	NOCHECK
High				240.00		600.00	
Low				160.00		400.00	

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00141	.06273	.00203	.21062	.00326	.03071
SDev	.00129	.09135	.00436	.02382	.00231	.00419
%RSD	91.652	145.61	214.85	11.312	71.008	13.629
#1	.00169	.16380	.00706	.23810	.00593	.03151
#2	.00253	.03834	-.00059	.19564	.00193	.03444
#3	.00000	-.01394	-.00039	.19814	.00191	.02618
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High						
Low						

9613492.6575

Analysis Report Mon 02-22-93 04:13:32 PM page 1

Method: CLP01AP2 Sample Name: INTAB8:ICSAB Operator: JST
Run Time: 02/22/93 16:10:48
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	506.40	-.01542	-.11520	.45223	.45991	.86549	476.41
SDev	2.02	.01860	.00656	.00189	.00081	.00396	.49
%RSD	.39944	120.63	5.6951	.41810	.17640	.45801	.10383
#1	504.07	.00523	-.11054	.45007	.45992	.86534	476.98
#2	507.35	-.02062	-.11237	.45301	.46072	.86952	476.15
#3	507.76	-.03086	-.12270	.45361	.45910	.86160	476.10
Errors	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High	600.00			.60000	.60000	1.2000	600.00
Low	400.00			.40000	.40000	.80000	400.00

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.46934	.44591	.46695	184.64	.93541	511.73	.46115
SDev	.00177	.00330	.00530	.18	.01188	.52	.00055
%RSD	.37643	.74023	1.1341	.09764	1.2695	.10181	.11889
#1	.47138	.44879	.46116	184.46	.94774	511.36	.46087
#2	.46832	.44663	.46814	184.82	.92405	512.32	.46178
#3	.46832	.44231	.47155	184.64	.93442	511.50	.46080
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.60000	.60000	.60000	240.00	1.2000	600.00	.60000
Low	.40000	.40000	.40000	160.00	.80000	400.00	.40000

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.87398	.19168	.99463	.19481	.47192	.97289
SDev	.00465	.11890	.00208	.02551	.00153	.00392
%RSD	.53179	62.032	.20953	13.095	.32521	.40325
#1	.87848	.28926	.99411	.20563	.47360	.97119
#2	.86920	.22653	.99285	.21312	.47058	.97010
#3	.87426	.05925	.99692	.16567	.47158	.97738
Errors	LC Pass	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass
High	1.2000		1.2000		.60000	1.2000
Low	.80000		.80000		.40000	.80000

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Analysis Report Mon 02-22-93 04:16:24 PM page 1

Method: CLP01AP2 Sample Name: 2XCRDL293Q1;CRI Operator: JST
Run Time: 02/22/93 16:13:38
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.22890	.10761	.03202	-.00001	.00971	.01008	.13854
SDev	.06631	.01738	.00687	.00035	.00015	.00053	.05806
%RSD	28.971	16.155	21.461	5095.6	1.5964	5.2298	41.909
#1	.30341	.11302	.03956	.00019	.00953	.01060	.20371
#2	.20690	.08816	.03039	-.00041	.00980	.00955	.11956
#3	.17638	.12164	.02611	.00020	.00980	.01008	.09234

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01768	.10085	.04447	.09015	.01364	.21252	.02985
SDev	.00257	.00000	.00305	.02883	.01594	.07059	.00028
%RSD	14.562	.00075	6.8536	31.983	116.87	33.215	.94069
#1	.02007	.10085	.04792	.12274	.02936	.29359	.03001
#2	.01495	.10085	.04217	.07973	-.00251	.17928	.02953
#3	.01802	.10085	.04331	.06797	.01408	.16469	.03002

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.07736	-.06622	.02121	-.00333	.09881	.03867
SDev	.00176	.02766	.00150	.01663	.00175	.00215
%RSD	2.2709	41.775	7.0656	499.36	1.7695	5.5731
#1	.07595	-.03485	.02208	-.01415	.09982	.04109
#2	.07679	-.08713	.01948	-.01166	.09679	.03799
#3	.07932	-.07667	.02207	.01582	.09981	.03694

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Analysis Report Mon 02-22-93 04:19:14 PM page 1

Method: CLP01AP2 Sample Name: HALFSTD:CCV Operator: JST
Run Time: 02/22/93 16:16:30
Comment: CCV#4
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.915	2.4907	2.4881	2.4576	.50120	2.4173	25.207
SDev	.074	.0018	.0246	.0039	.00114	.0104	.080
%RSD	.29739	.07271	.98738	.15680	.22697	.43097	.31887
#1	24.899	2.4901	2.5158	2.4598	.50156	2.4213	25.267
#2	24.850	2.4927	2.4689	2.4531	.49992	2.4054	25.115
#3	24.996	2.4892	2.4795	2.4598	.50211	2.4250	25.238
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4543	2.4788	2.4669	10.113	2.4589	25.112	2.4592
SDev	.0087	.0088	.0058	.014	.0076	.050	.0074
%RSD	.35434	.35676	.23466	.13706	.30756	.19914	.29950
#1	2.4546	2.4809	2.4677	10.120	2.4620	25.108	2.4617
#2	2.4454	2.4690	2.4608	10.097	2.4502	25.064	2.4509
#3	2.4628	2.4863	2.4723	10.122	2.4643	25.164	2.4651
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4425	24.824	.50164	25.029	2.4702	2.4703
SDev	.0081	.074	.00195	.066	.0073	.0098
%RSD	.33200	.29881	.38811	.26481	.29447	.39736
#1	2.4439	24.890	.50332	25.033	2.4722	2.4706
#2	2.4338	24.744	.49950	24.961	2.4621	2.4603
#3	2.4498	24.838	.50210	25.093	2.4762	2.4799
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

9613492.6578

Analysis Report Mon 02-22-93 04:22:04 PM page 1

Method: CLP01AP2 Sample Name: STDB;CCB Operator: JST
Run Time: 02/22/93 16:19:20
Comment: CCB#4
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02799	-.00460	-.00508	.00121	.00018	.00177	.01852
SDev	.00786	.00522	.00567	.00093	.00027	.00110	.00685
%RSD	28.074	113.54	111.80	76.444	149.18	62.518	37.009
#1	.03249	-.00204	-.01062	.00142	.00045	.00053	.02626
#2	.03256	-.00115	.00072	.00020	.00018	.00265	.01322
#3	.01892	-.01061	-.00533	.00202	-.00009	.00212	.01608
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01460	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01460	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00205	.00252	.00307	.01667	-.00239	.04703	.00130
SDev	.00059	.00187	.00199	.00424	.00313	.00743	.00097
%RSD	28.895	74.235	64.899	25.465	130.90	15.803	75.005
#1	.00273	.00360	.00537	.02157	-.00121	.05513	.00130
#2	.00170	.00360	.00192	.01422	-.00002	.04541	.00227
#3	.00171	.00036	.00192	.01421	-.00593	.04054	.00032
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01620	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01620	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00281	-.00697	.00108	-.01998	.00034	.00448
SDev	.00195	.09135	.00080	.01663	.00100	.00060
%RSD	69.282	1310.5	73.635	83.229	292.09	13.526
#1	.00506	.01743	.00198	-.00916	-.00066	.00412
#2	.00169	.06970	.00044	-.01166	.00135	.00414
#3	.00169	-.10804	.00084	-.03913	.00034	.00518
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: F7 Method: A

Start date: 03/02/93 End date: 03/02/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	BI
S0	1.00	1100																										X
S2000	1.00	1100																										X
S5000	1.00	1100																										X
S10000	1.00	1101																										X
ICV	1.00	1101																										X
ICB	1.00	1101																										X
CRA	1.00	1102																										X
CCV	1.00	1102																										X
CCB	1.00	1102																										X
ZZZZZZ	1.00	1103																										
ZZZZZZ	1.00	1103																										
ZZZZZZ	1.00	1103																										
ZZZZZZ	1.00	1104																										
ZZZZZZ	1.00	1104																										
ZZZZZZ	1.00	1104																										
ZZZZZZ	1.00	1105																										
CCV	1.00	1105																										X
CCB	1.00	1105																										X
PBS	1.00	1106																										X
LCSS	1.00	1106																										X
B07K05	1.00	1106																										X
B07K05D	1.00	1107																										X
B07K05S	1.00	1107																										X
CCV	1.00	1107																										X
CCB	1.00	1108																										X

032

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C L P M E T A L S 3.03a

S302132--BISMUTH

Run id: F7 9306102
PERKIN-ELMER 3030B
Analytical method: A
Element: Bi

Acquired: 03/02/93 by SRP
Crunched: 03/02/93 by SRP
Time: 1413
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	A			S0	03/02/93	11:00
2	2000 PPB	WS1	A			S2000	03/02/93	11:00
3	5000 PPB	WS2	A			S5000	03/02/93	11:00
4	10000 PPB	WS3	A			S10000	03/02/93	11:01
5	ICVBI	ICV	A			ICV	03/02/93	11:01
6	CAL BLK	ICB	A			ICB	03/02/93	11:01
7	CRA	CRA0	A			CRA	03/02/93	11:02
8	5000 PPB	CCV	A			CCV	03/02/93	11:02
9	CAL BLK	CCB	A			CCB	03/02/93	11:02
10	X	X	A			ZZZZZZ	03/02/93	11:03
11	X	X	A			ZZZZZZ	03/02/93	11:03
12	X	X	A			ZZZZZZ	03/02/93	11:03
13	X	X	A			ZZZZZZ	03/02/93	11:04
14	X	X	A			ZZZZZZ	03/02/93	11:04
15	X	X	A			ZZZZZZ	03/02/93	11:04
16	X	X	A			ZZZZZZ	03/02/93	11:05
17	5000 PPB	CCV	A			CCV	03/02/93	11:05
18	CAL BLK	CCB	A			CCB	03/02/93	11:05
19	PB	PBS	A	2621	02/18/93	PBS	03/02/93	11:06
20	CLCSPS	LCSS	A	2621	02/18/93	LCSS	03/02/93	11:06
21	S302132-01	S	A	2621	02/18/93	B07K05	03/02/93	11:06
22	S302132-01	S2	A	2621	02/18/93	B07K05D	03/02/93	11:07
23	S302132-01	DS	A	2621	02/18/93	B07K05S	03/02/93	11:07
24	5000 PPB	CCV	A			CCV	03/02/93	11:07
25	CAL BLK	CCB	A			CCB	03/02/93	11:08

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FLAME ATOMIC ABSORPTION RUN BENCH SHEET
Skinner and Sherman Laboratories, Inc.

AA Sequence #: 299 Instrument ID: F7 Page 1 of 1
Date: 3/2/93 Operator: SRP Reviewed by:

Instrument Method: 29
Background: BS BD
Time Calibrated: 11:00
ACQ
Run ID: 9306101 (02)(03)(04)
Element: Bi
STD1: 0 ppm STD2: 2 ppm
STD3: 5 ppm STD4: 10 ppm

Standard Source:
1. Calibration: HPBi-1 1000 µm
2. ICV: 5 ppm
3. CCV: 5 ppm
Wavelength (nm): 223
Slitwidth (nm): .2
Integration Time (sec):

S302132

	SAMPLE ID	DILUTION	COMMENTS
1	ICV		
2	ICB		
3	CRA		
4	CCV		
5	CCB		
6	IDL-1		
7	2		
8	3		
9	4		
10	5		
11	6		
12	7		
13	CCV		
14	CCB		
15	PBS		
16	LCSS		
17	S302132-01		
18	01D		
19	01S		
20	CCV		
21	CCB		
22	PBS		
23	LCSS		
24	S302145-01		
25	-02		
26	02D		
27	02S		
28	CCV		
29	CCB		
30	PBW		
31	LCSW		
32	S302149-01		
33	01D		
34	01S		
35	CCV		
36	CCB		
37			
38			

9613492.6582

BI

	AA	AA-BG	BG
ABSORBANCE	0.002	0.001	0.000

0.001

	AA	AA-BG	BG
ABSORBANCE	0.000	0.001	0.000

0.001

	AA	AA-BG	BG
ABSORBANCE	0.002	0.001	0.001

0.001 11:00

MEAN= 0.001 STD.DEV.= 0.000 COEF.VAR.= 40.70 %

****

0.000 ppm AUTOZERO

****

BI

	AA	AA-BG	BG
ABSORBANCE	0.015	0.015	0.000

0.015

	AA	AA-BG	BG
ABSORBANCE	0.015	0.015	0.000

0.015

	AA	AA-BG	BG
ABSORBANCE	0.013	0.013	0.000

0.013

MEAN= 0.014 STD.DEV.= 0.001 COEF.VAR.= 9.59 %

****

2.00 ppm STANDARD 1

****

BI

	AA	AA-BG	BG
ABSORBANCE	0.035	0.033	0.001

4.58

	AA	AA-BG	BG
ABSORBANCE	0.035	0.036	0.000

4.90 076

	AA	AA-BG	BG
ABSORBANCE	0.036	0.036	0.000

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(CONTINUED)

4.95

MEAN= 4.81 STD.DEV.= 0.20 COEF.VAR.= 4.18 %

5.00 ppm STANDARD 2

B I

	AA	AA-BG	BG
ABSORBANCE	0.072	0.073	0.000

11.24

	AA	AA-BG	BG
ABSORBANCE	0.072	0.071	0.001

10.98

	AA	AA-BG	BG
ABSORBANCE	0.073	0.074	-0.001

r = 0.9823 ooc

11.48 11.01

MEAN= 11.23 STD.DEV.= 0.28 COEF.VAR.= 2.53 %

10.01 ppm STANDARD 3

B I

	AA	AA-BG	BG
ABSORBANCE	0.036	0.036	0.000

5.12

	AA	AA-BG	BG
ABSORBANCE	0.037	0.034	0.003

4.83

	AA	AA-BG	BG
ABSORBANCE	0.036	0.034	0.002

4.80 ICV #1

MEAN= 4.92 STD.DEV.= 0.17 COEF.VAR.= 3.42 %

B I

	AA	AA-BG	BG
ABSORBANCE	-0.001	-0.001	0.000

077

-0.10

	AA	AA-BG	BG
ABSORBANCE	-0.001	0.000	-0.001

9613492.6584

(CONTINUED)

	AA	AA-BG	BG
ABSORBANCE	-0.001	0.000	-0.002

0.06 ICB#1

MEAN= -0.02 STD.DEV.= 0.08 COEF.VAR.= 99.99 %

****

B I

	AA	AA-BG	BG
ABSORBANCE	0.014	0.015	0.000

2.11

	AA	AA-BG	BG
ABSORBANCE	0.015	0.015	0.000

2.13

	AA	AA-BG	BG
ABSORBANCE	0.014	0.014	0.000

2.05 CRA 11:02

MEAN= 2.10 STD.DEV.= 0.04 COEF.VAR.= 2.11 %

****

B I

	AA	AA-BG	BG
ABSORBANCE	0.035	0.035	0.001

4.93

	AA	AA-BG	BG
ABSORBANCE	0.036	0.036	0.000

5.08

	AA	AA-BG	BG
ABSORBANCE	0.036	0.036	0.000

5.06 CCV#1

MEAN= 5.02 STD.DEV.= 0.08 COEF.VAR.= 1.56 %

****

B I

	AA	AA-BG	BG
ABSORBANCE	-0.001	0.001	-0.002

078

0.10

	AA	AA-BG	BG
ABSORBANCE	0.000	0.000	0.000

9613492.6585

(CONTINUED)

	AA	AA-BG	BG
ABSORBANCE	-0.001	0.001	-0.002

0.16 CCB#1

MEAN= 0.10 STD.DEV.= 0.06 COEF.VAR.= 60.89 %

****

B I

	AA	AA-BG	BG
ABSORBANCE	0.004	0.006	-0.001

0.85

	AA	AA-BG	BG
ABSORBANCE	0.006	0.006	-0.001

0.94

	AA	AA-BG	BG
ABSORBANCE	0.006	0.005	0.001

0.74 IDL #1 11:03

MEAN= 0.84 STD.DEV.= 0.10 COEF.VAR.= 11.70 %

****

B I

	AA	AA-BG	BG
ABSORBANCE	0.006	0.006	-0.001

0.91

	AA	AA-BG	BG
ABSORBANCE	0.008	0.007	0.001

1.02

	AA	AA-BG	BG
ABSORBANCE	0.004	0.004	0.000

0.62 IDL #2

MEAN= 0.85 STD.DEV.= 0.21 COEF.VAR.= 24.14 %

****

B I

	AA	AA-BG	BG
ABSORBANCE	0.006	0.006	0.000

079

0.89

	AA	AA-BG	BG
ABSORBANCE	0.006	0.008	-0.002

9613492.6586

(CONTINUED)

	AA	AA-BG	BG
ABSORBANCE	0.004	0.006	-0.002

0.85 IDL #3

MEAN= 0.97 STD.DEV.= 0.17 COEF.VAR.= 17.56 %

****

BI

	AA	AA-BG	BG
ABSORBANCE	0.005	0.008	-0.002

1.10

	AA	AA-BG	BG
ABSORBANCE	0.006	0.008	-0.001

1.15

	AA	AA-BG	BG
ABSORBANCE	0.007	0.008	0.000

1.10 IDL #4 11:04

MEAN= 1.12 STD.DEV.= 0.03 COEF.VAR.= 2.69 %

****

BI

	AA	AA-BG	BG
ABSORBANCE	0.006	0.009	-0.003

1.29

	AA	AA-BG	BG
ABSORBANCE	0.004	0.005	-0.001

0.76

	AA	AA-BG	BG
ABSORBANCE	0.005	0.008	-0.004

1.23 IDL #5

MEAN= 1.09 STD.DEV.= 0.29 COEF.VAR.= 26.48 %

****

BI

	AA	AA-BG	BG
ABSORBANCE	0.005	0.006	-0.002

030

0.92

	AA	AA-BG	BG
ABSORBANCE	0.005	0.007	-0.002

9613492.6587

(CONTINUED)

	AA	AA-BG	BG
ABSORBANCE	0.006	0.005	0.001

0.72 IDL #6

MEAN= 0.90 STD.DEV.= 0.17 COEF.VAR.= 19.28 %

****

BI

	AA	AA-BG	BG
ABSORBANCE	0.005	0.007	-0.002

1.06

	AA	AA-BG	BG
ABSORBANCE	0.005	0.006	0.000

0.83

	AA	AA-BG	BG
ABSORBANCE	0.004	0.004	0.000

0.55 IDL #7 11:05

MEAN= 0.82 STD.DEV.= 0.25 COEF.VAR.= 31.16 %

****

BI 0013

	AA	AA-BG	BG
ABSORBANCE	0.034	0.035	-0.001

5.00

	AA	AA-BG	BG
ABSORBANCE	0.033	0.034	-0.001

4.84

	AA	AA-BG	BG
ABSORBANCE	0.033	0.036	-0.002

5.03 CCV #2

MEAN= 4.96 STD.DEV.= 0.10 COEF.VAR.= 2.01 %

****

BI 0014

	AA	AA-BG	BG
ABSORBANCE	-0.002	0.000	-0.003

081

0.02

	AA	AA-BG	BG
ABSORBANCE	-0.003	0.000	-0.002

9613492.6588

	AA	AA-BG	BG
ABSORBANCE	-0.003	0.002	-0.004

0.23 CCB#3

MEAN= 0.07 STD.DEV.= 0.15 COEF.VAR.= 99.99 %

****

BI 0015

	AA	AA-BG	BG
ABSORBANCE	-0.002	-0.001	-0.001

-0.11

	AA	AA-BG	BG
ABSORBANCE	-0.002	0.001	-0.003

0.12

	AA	AA-BG	BG
ABSORBANCE	-0.003	-0.002	-0.001

-0.31 5302132 PBS 11:06

MEAN= -0.10 STD.DEV.= 0.21 COEF.VAR.= 99.99 %

****

BI 0016

0016 (CONTINUED)

	AA	AA-BG	BG
ABSORBANCE	-0.003	-0.001	-0.002

-0.18

	AA	AA-BG	BG
ABSORBANCE	-0.003	-0.001	-0.002

-0.18

	AA	AA-BG	BG
ABSORBANCE	-0.002	0.000	-0.002

0.03 LCSS

MEAN= -0.09 STD.DEV.= 0.11 COEF.VAR.= 99.99 %

****

BI 0017

	AA	AA-BG	BG
ABSORBANCE	-0.001	-0.001	0.000

-0.20 082

	AA	AA-BG	BG
ABSORBANCE	0.000	0.000	0.000

-0.01

9613492.6589

	AA	AA-BG	BG
ABSORBANCE	-0.001	-0.001	0.000

-0.10 5302132-01 B07K05

MEAN= -0.10 STD.DEV.= 0.09 COEF.VAR.= 89.36 %

****

BI 0018

	AA	AA-BG	BG
ABSORBANCE	-0.001	-0.001	0.000

-0.09

	AA	AA-BG	BG
ABSORBANCE	0.000	0.001	-0.001

0.12

	AA	AA-BG	BG
ABSORBANCE	-0.002	-0.004	0.002

11:07

-0.57 -01D B07K05D

MEAN= -0.18 STD.DEV.= 0.35 COEF.VAR.= 99.99 %

****

BI 0019

0019 (CONTINUED)

	AA	AA-BG	BG
ABSORBANCE	0.033	0.032	0.001

4.57

	AA	AA-BG	BG
ABSORBANCE	0.034	0.035	-0.001

4.96

	AA	AA-BG	BG
ABSORBANCE	0.034	0.035	-0.001

4.89 -01S B07K05S

MEAN= 4.80 STD.DEV.= 0.20 COEF.VAR.= 4.22 %

****

BI 0020

	AA	AA-BG	BG
ABSORBANCE	0.033	0.036	-0.002

5.06 083

	AA	AA-BG	BG
ABSORBANCE	0.031	0.032	-0.001

4.55

9613492.6590

	AA	AA-BG	BG
ABSORBANCE	0.033	0.035	-0.002

4.89 CCV#3

MEAN= 4.83 STD.DEV.= 0.25 COEF.VAR.= 5.22 %

****

BI 0021

	AA	AA-BG	BG
ABSORBANCE	-0.002	0.002	-0.005

0.36

	AA	AA-BG	BG
ABSORBANCE	-0.003	-0.001	-0.002

-0.20

	AA	AA-BG	BG
ABSORBANCE	-0.004	-0.001	-0.003

-0.16 CCB #3 11:08

MEAN= 0.00 STD.DEV.= 0.31 COEF.VAR.= 99.99 %

****

BI 0022

0022 (CONTINUED)

	AA	AA-BG	BG
ABSORBANCE	-0.003	0.001	-0.004

end of run 3/2/93 SRP

0.21

	AA	AA-BG	BG
ABSORBANCE	-0.003	0.000	-0.003

-0.03

	AA	AA-BG	BG
ABSORBANCE	-0.004	-0.002	-0.002

-0.27 PBS 5302145

MEAN= -0.03 STD.DEV.= 0.24 COEF.VAR.= 99.99 %

****

BI 0023

	AA	AA-BG	BG
ABSORBANCE	-0.003	0.001	-0.003

0.10

084

	AA	AA-BG	BG
ABSORBANCE	-0.002	0.001	-0.003

0.15

9613492.6591

WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: C1 Method: CA

Start date: 02/17/93 End date: 02/17/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALB	SBS	ASA	BBA	BED	CDA	CAR	CRO	CUE	FEB	PBG	MGN	HGI	NIK	SEG	AGA	NAL	TLV	VZN	CNB	BI		
S0	1.00	1831																						X		
S10	1.00	1832																						X		
S40	1.00	1833																						X		
S100	1.00	1834																						X		
S200	1.00	1834																						X		
S400	1.00	1835																						X		
S400	1.00	1836																						X		
S40	1.00	1837																						X		
S40	1.00	1837																						X		
ICV	1.00	1838																						X		
ICB	1.00	1839																						X		
CCV	1.00	1840																						X		
CCB	1.00	1840																						X		
ZZZZZZ	1.00	1841																								
ZZZZZZ	1.00	1842																								
ZZZZZZ	1.00	1843																								
ZZZZZZ	1.00	1843																								
ZZZZZZ	1.00	1844																								
ZZZZZZ	1.00	1845																								
ZZZZZZ	1.00	1846																								
ZZZZZZ	1.00	1846																								
ZZZZZZ	1.00	1847																								
CCV	1.00	1848																						X		
CCB	1.00	1849																						X		
ZZZZZZ	1.00	1849																								
ZZZZZZ	1.00	1850																								
ZZZZZZ	1.00	1851																								
ZZZZZZ	1.00	1852																								
ZZZZZZ	1.00	1852																								
ZZZZZZ	1.00	1853																								
ZZZZZZ	1.00	1854																								
CCV	1.00	1855																						X		

9613492.6592

WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: C1 Method: CA

Start date: 02/17/93 End date: 02/17/93

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	BI
CCB	1.00	1855																									X	
PBS	1.00	1856																									X	
LCSS	20.00	1857																									X	
B07K05	1.00	1858																									X	
B07K05D	1.00	1858																									X	
B07K05S	2.00	1859																									X	
B07K05A	1.00	1900																										
CCV	1.00	1901																									X	
CCB	1.00	1901																									X	

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C L P M E T A L S 3.03a

S302132--CYANIDE

Run id: C1 9304803
TRAACS 800 AUTOANALYZER (#TC0451)
Analytical method: CA
Element: CN

Acquired: 02/17/93 by SRP
Crunched: 03/02/93 by SRP
Time: 1532
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
2	0 PPB	WS1	CA			S0	02/17/93	18:31:45
3	10 PPB	WS2	CA			S10	02/17/93	18:32:30
4	40 PPB	WS3	CA			S40	02/17/93	18:33:15
5	100 PPB	WS4	CA			S100	02/17/93	18:34:00
6	200 PPB	WS5	CA			S200	02/17/93	18:34:45
7	400 PPB	WS6	CA			S400	02/17/93	18:35:30
8	400 PPB	WS7	CA			S400	02/17/93	18:36:15
9	40 PPB	WS8	CA			S40	02/17/93	18:37:00
10	40 PPB	WS9	CA			S40	02/17/93	18:37:45
11	ICV-6	ICV	CA			ICV	02/17/93	18:38:30
12	CAL BLK	ICB	CA			ICB	02/17/93	18:39:15
13	200 PPB	CCV	CA			CCV	02/17/93	18:40:00
14	CAL BLK	CCB	CA			CCB	02/17/93	18:40:45
15	DIST STD	X	CA			ZZZZZZ	02/17/93	18:41:30
16	X	X	CA			ZZZZZZ	02/17/93	18:42:15
17	X	X	CA			ZZZZZZ	02/17/93	18:43:00
18	X	X	CA			ZZZZZZ	02/17/93	18:43:45
19	X	X	CA			ZZZZZZ	02/17/93	18:44:30
20	X	X	CA			ZZZZZZ	02/17/93	18:45:15
21	X	X	CA			ZZZZZZ	02/17/93	18:46:00
22	X	X	CA			ZZZZZZ	02/17/93	18:46:45
23	X	X	CA			ZZZZZZ	02/17/93	18:47:30
24	200 PPB	CCV	CA			CCV	02/17/93	18:48:15
25	CAL BLK	CCB	CA			CCB	02/17/93	18:49:00
26	X	X	CA			ZZZZZZ	02/17/93	18:49:45
27	X	X	CA			ZZZZZZ	02/17/93	18:50:30
28	X	X	CA			ZZZZZZ	02/17/93	18:51:15
29	X	X	CA			ZZZZZZ	02/17/93	18:52:00
30	X	X	CA			ZZZZZZ	02/17/93	18:52:45
31	X	X	CA			ZZZZZZ	02/17/93	18:53:30
32	X	X	CA			ZZZZZZ	02/17/93	18:54:15
33	200 PPB	CCV	CA			CCV	02/17/93	18:55:00
34	CAL BLK	CCB	CA			CCB	02/17/93	18:55:45
35	PB	PBS	CA	2621	02/16/93	PBS	02/17/93	18:56:30
36	CLCSCN	LCSS	CA	2621	02/16/93	LCSS	02/17/93	18:57:15
37	S302132-01	S	CA	2621	02/16/93	B07K05	02/17/93	18:58:00
38	S302132-01	S2	CA	2621	02/16/93	B07K05D	02/17/93	18:58:45
39	S302132-01	DS	CA	2621	02/16/93	B07K05S	02/17/93	18:59:30
40	S302132-01	PS	CA	2621		B07K05A	02/17/93	19:00:15
41	200 PPB	CCV	CA			CCV	02/17/93	19:01:00
42	CAL BLK	CCB	CA			CCB	02/17/93	19:01:45

9615492.6594

SKINNER & SHERMAN LAB
TRAACS 800 SYSTEM BENCH SHEET
CYANIDE ANALYSIS

DATE: 2-17-93
ANALYST: DUFFY

METHOD: 335.3
SEMI-AUTOMATED MIDI DISTILLATION

FRM VER 2.4b 03/30/92

RUN ID'S		WORKORDER	
93048	- 01	5302097	
	- 02	5302133	✓
	- 03	5302132	✓ 2621
	- 04	5302131	✓
	- 05	5302135	✓
	- 06	5302121	
	- 07	5302039	

STANDARDS:	NAME	SOURCE	PREPARED
ICV	ICV-6	0789	
CCV & DIST STD	200 PPB	5PPM	
ICB/CCB	CAL BLK		

POS	LAB ID	SAMPLE ID	COMMENTS
01	PRIMER	400 PPB	ABS: 0.25
02	STD0	0 PPB	
03	STD1	10 PPB	
04	STD2	40 PPB	
05	STD3	100 PPB	
06	STD4	200 PPB	
07	STD5	400 PPB	
08	HIGH STD	400 PPB	
09	LOW STD1	40 PPB	
10	LOW STD2	40 PPB	
11	ICV	ICV-6	
12	ICB	CAL BLK	
13	CCV	200 PPB	
14	CAL BLK	CAL BLK	
15	200 PPB	DIST STD	
16	PBS		
17	CCSS		
18	ID 2-17-93 ~~5302~~	5302097 01	
19		01b	
20		01S	Spike is 1:1 Dilution
21		01AS	
22		02	
23		03	
24	CCV 2		
25	CCB 2		
26	PBS		
27	CCSS		
28		5302133 01	
29		02	
30		02D	
31		02S	Spike is 1:1 Dilution
32		02AS	
33	CCV 3		
34	CCB 3		
35	PBS		

9613492.6595

SKINNER & SHERMAN LAB
TRAACS BENCH SHEET CYANIDE
DATE: 2-17-93

RUN ID: 9304801

POS	LAB ID	SAMPLE ID	COMMENTS
36	CLCSS		
37		5302132 01	
38		01D	
39		01S	SPIKE IS 1:1 DILUTION
40		01PS	
41	CCV 4		
42	CCB 4		
43	PBW		
44		5302131 01	
45		02	
46		02D	
47		02S	SPIKE IS 1:1 DILUTION
48		02PS	
49	CCV 5		
50	CCB 5		
51	PBW		
52		5302135 01	
53		01D	
54		01S	SPIKE IS 1:1 DILUTION
55		01PS	
56		5302121 02	
57	CCV 6		
58	CCB 6		
59	~~5302039 01~~	PBW	
60	01D	5302039 01	REACTIVITIES
61	02	01D	
62	03	02	
63	JD 2-17-93 04	03	
64	05	04	
65	~~CCV~~	05	
66	~~CCB~~	CCV 7	
67		CCB 7	
68	H		
69	L		
70	L		
71	G		
72			
73			
74			
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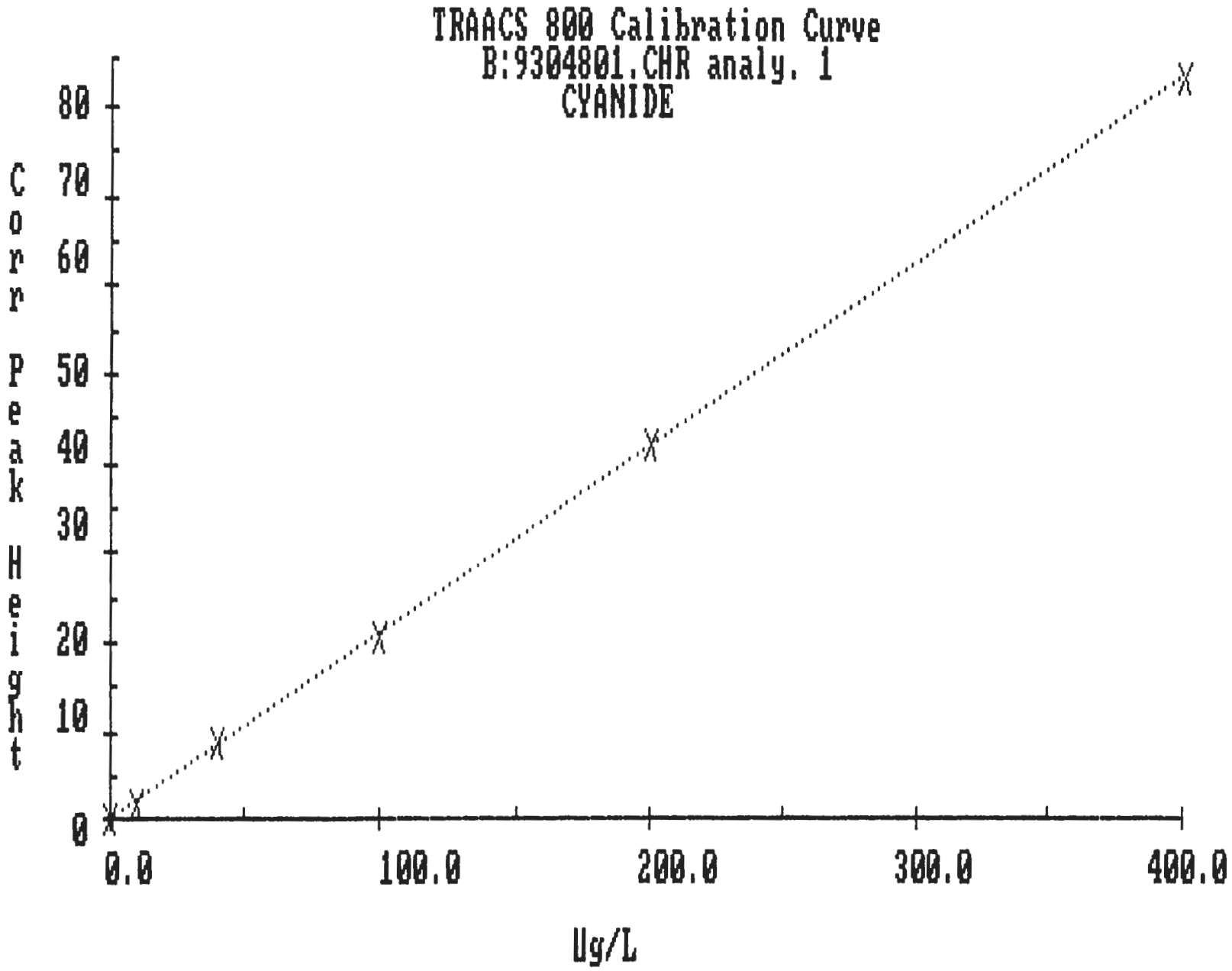
83			
84			
85			



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Time: 18:31; Date: 02-17-93
Operator: DUFFY

Comment: CYANIDE AT SEVENTY FIVE SAMPLES PER HOUR

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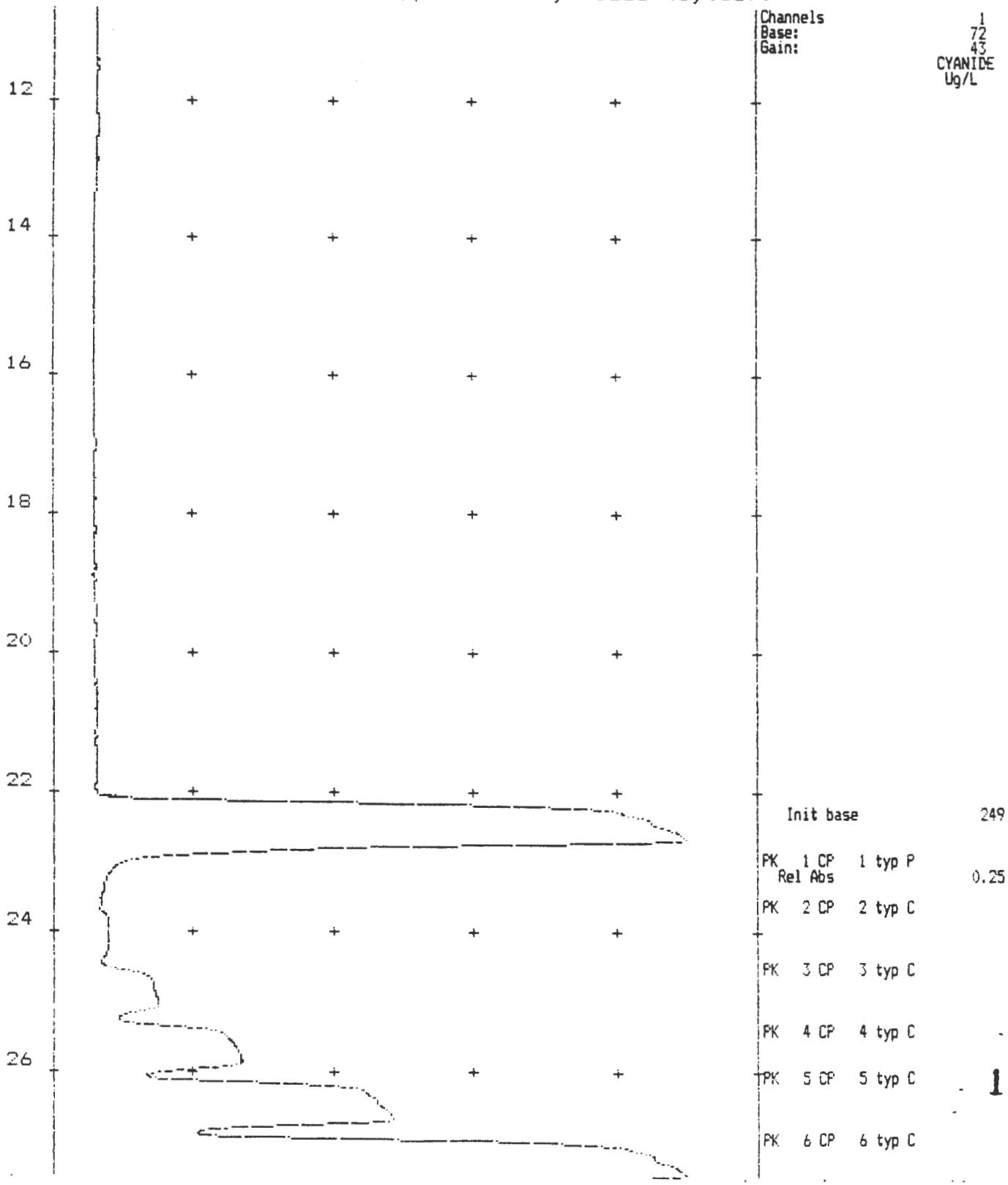
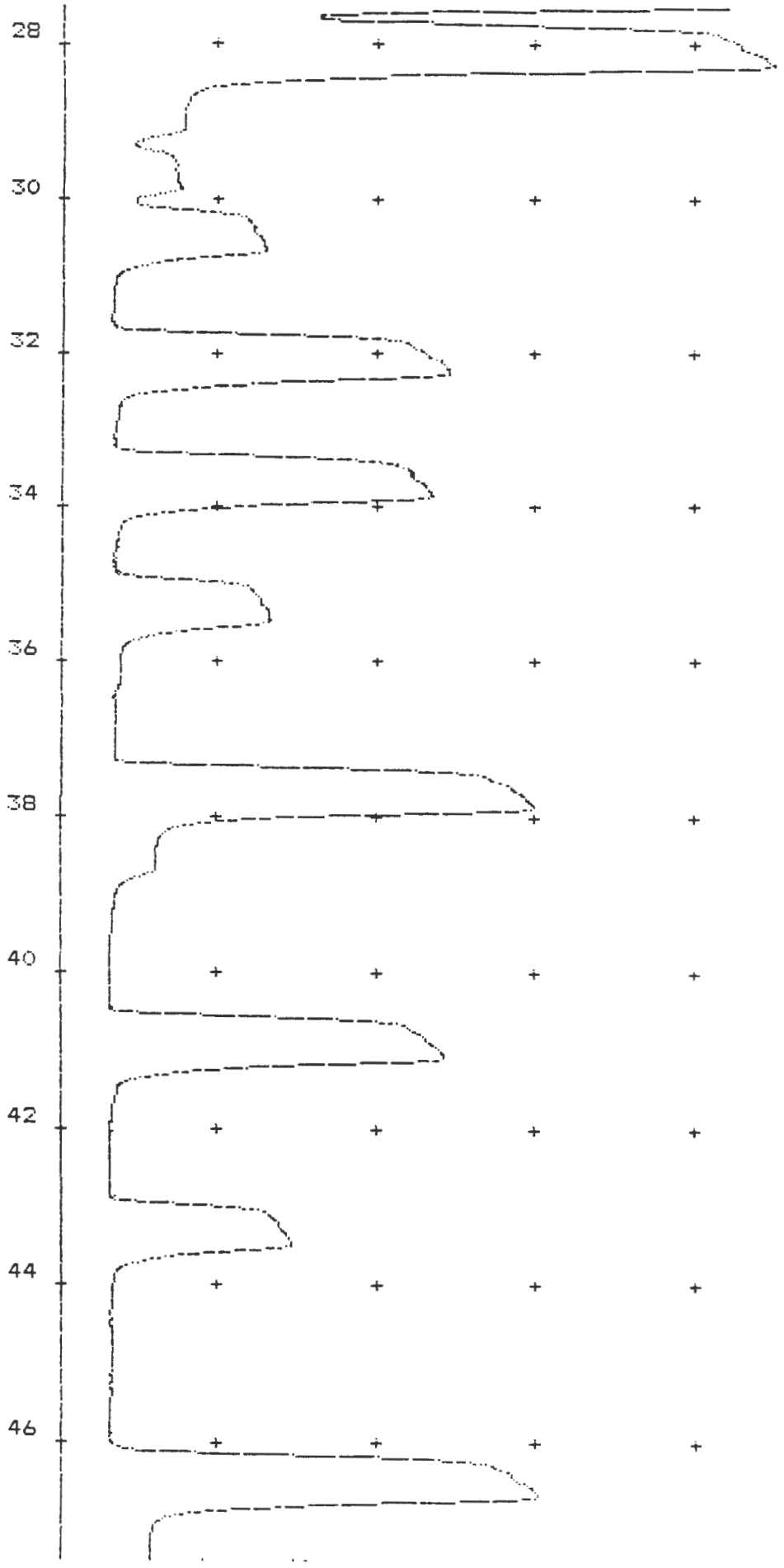
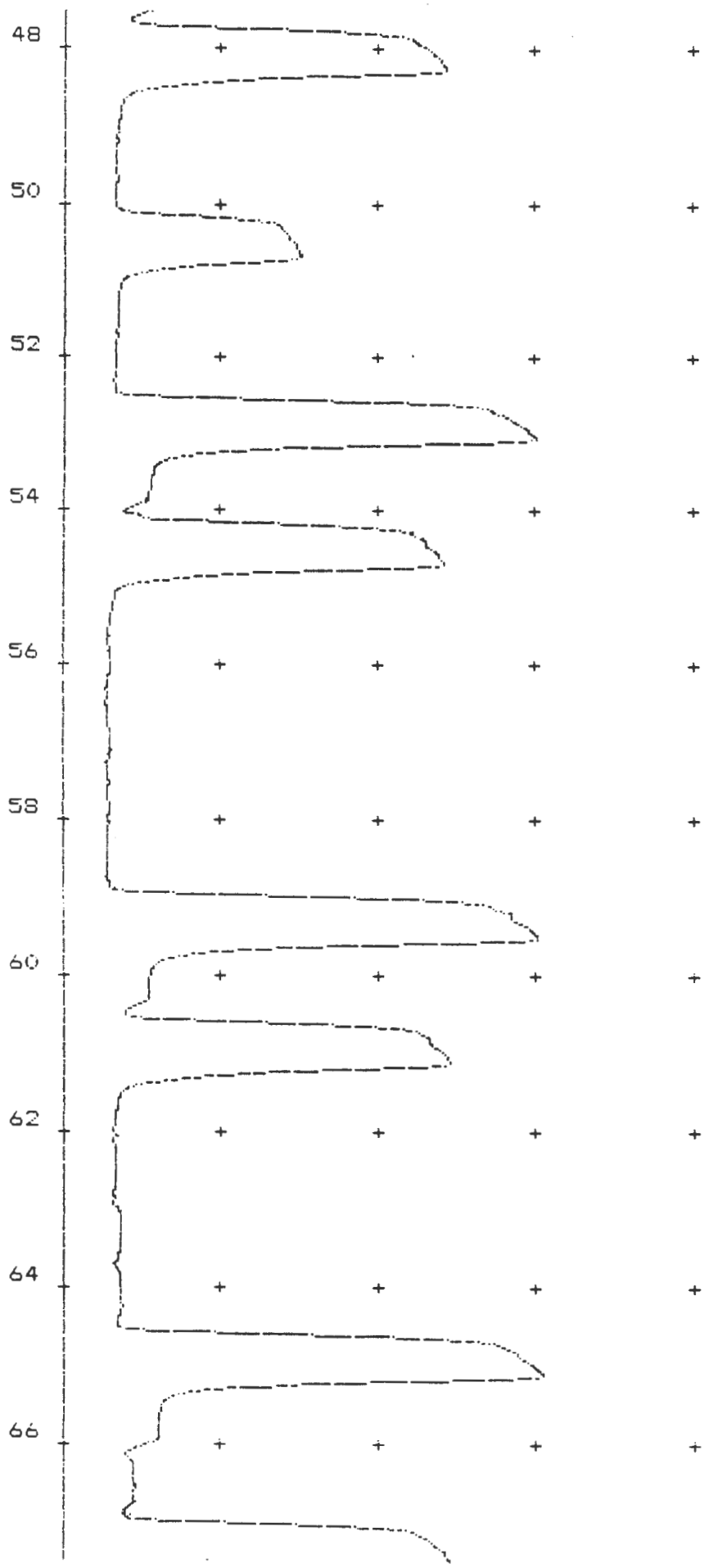


157

9613492.6598

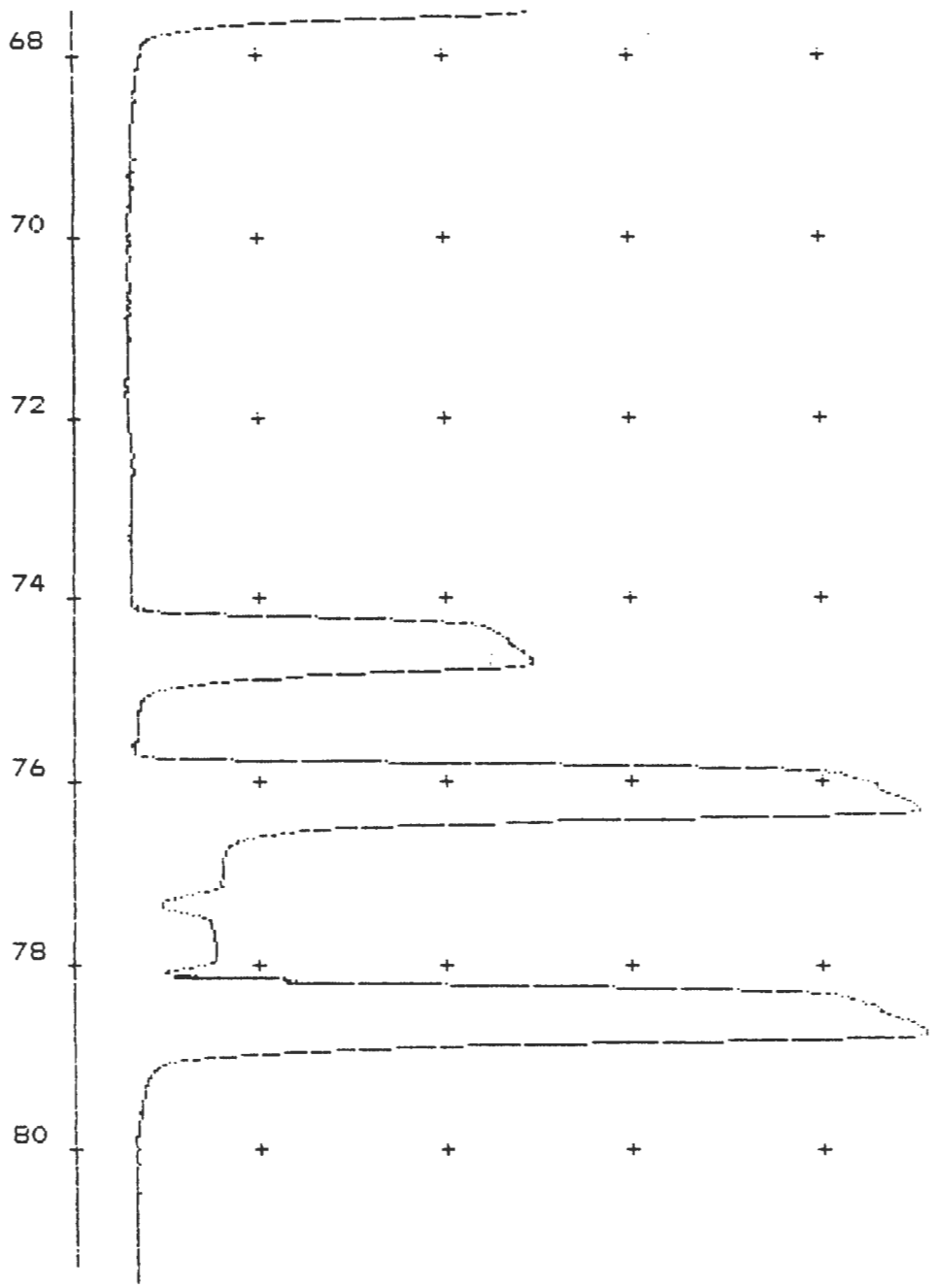


PK	7 CP	7 typ C	399.3 N
PK	8 CP	8 typ H	401.4 N
PK	9 CP	9 typ L	44.02
PK	10 CP	10 typ L	41.09
PK	11 CP	11 typ S	93.98
PK	12 CP	12 typ S	0.1662 M
PK	13 CP	13 typ S	205.7 N
PK	14 CP	14 typ S	1.808 M
PK	15 CP	15 typ S	195.1 N
PK	16 CP	16 typ S	1.573 M
PK	17 CP	17 typ S	96.56
PK	18 CP	18 typ S	5.209 M
PK	19 CP	19 typ S	2.981 M
PK	20 CP	20 typ S	256.9 N
PK	21 CP	21 typ S	27.14
PK	22 CP	22 typ S	0.4008 M
PK	23 CP	23 typ S	-0.5373 M
PK	24 CP	24 typ S	202.9 N
PK	25 CP	25 typ S	0.1662 M
PK	26 CP	26 typ S	-0.7719 M
PK	27 CP	27 typ S	109.9
PK	28 CP	28 typ S	0.5180 M
PK	29 CP	29 typ S	1.222 M
PK	30 CP	30 typ S	-0.4201 M
PK	31 CP	31 typ S	258.8 N



PK	32 CP	32 typ S		23.85
PK	33 CP	33 typ S		204.1 N
PK	34 CP	34 typ S		2.394 M
PK	35 CP	35 typ S		0.8698 M
PK	36 CP	36 typ S		113.9
PK	37 CP	37 typ S		1.691 M
PK	38 CP	38 typ S		0.6353 M
PK	39 CP	39 typ S		258.1 N
PK	40 CP	40 typ S		20.57 M
PK	41 CP	41 typ S		202.3 N
PK	42 CP	42 typ S		-1.944 M
PK	43 CP	43 typ S		-4.055 M
PK	44 CP	44 typ S		-1.944 M
PK	45 CP	45 typ S		-2.883 M
PK	46 CP	46 typ S		-3.703 M
PK	47 CP	47 typ S		259.1 N
PK	48 CP	48 typ S		20.69 M
PK	49 CP	49 typ S		205.7 N
PK	50 CP	50 typ S		0.9871 M
PK	51 CP	51 typ S		0.5180 M
PK	52 CP	52 typ S		4.036 M
PK	53 CP	53 typ S		5.091 M
PK	54 CP	54 typ S		261.5 N
PK	55 CP	55 typ S		27.25
PK	56 CP	56 typ S		12.13 M

9613492.6600



PK	57 CP	57 typ S		205.1 N
PK	58 CP	58 typ S		2.629 M
PK	59 CP	59 typ S		-0.7719 M
PK	60 CP	60 typ S		-1.593 M
PK	61 CP	61 typ S		-1.593 M
PK	62 CP	62 typ S		-2.765 M
PK	63 CP	63 typ S		-1.006 M
PK	64 CP	64 typ S		-0.3028 M
PK	65 CP	65 typ S		-0.1855 M
PK	66 CP	66 typ S		206.9 N
PK	67 CP	67 typ S		2.042 M
PK	68 CP	68 typ H		404.1 N
PK	69 CP	69 typ L		45.43
PK	70 CP	70 typ L		42.73
PK	71 CP	71 typ G		407.2 N
Last base				269

Time: 18:31; Date: 02-17-93
Operator: DUFFY

Comment: CYANIDE AT SEVENTY FIVE SAMPLES PER HOUR

Channels	1
Base:	72
Gain:	43

CYANIDE
Ug/L

Base drift correction made
Carryover correction made
Gain drift correction made
Init base 249

9613492.6601

	PK	1	CP	1	typ	P	401.7	N	
	Rel	Abs					0.25		
	PK	2	CP	2	typ	C	0.4626	M	
	PK	3	CP	3	typ	C	7.735	M	
	PK	4	CP	4	typ	C	42.36		
	PK	5	CP	5	typ	C	98.82		
	PK	6	CP	6	typ	C	202.1	N	
	PK	7	CP	7	typ	C	399.0	N	
	PK	8	CP	8	typ	H	399.4	N	
	PK	9	CP	9	typ	L	41.33		
	PK	10	CP	10	typ	L	41.22		
18:38:30	PK	11	CP	11	typ	S	94.13		ICV
18:39:15	PK	12	CP	12	typ	S	-0.2197	M	ICB
18:40:00	PK	13	CP	13	typ	S	206.1	N	CCV 1
18:40:45	PK	14	CP	14	typ	S	0.4650	M	CCB 1
	PK	15	CP	15	typ	S	195.3	N	DIST STD
	PK	16	CP	16	typ	S	-0.2525	M	PBS
	PK	17	CP	17	typ	S	96.68		LCSS
	PK	18	CP	18	typ	S	4.608	M	MABH 26
	PK	19	CP	19	typ	S	3.080	M	200
	PK	20	CP	20	typ	S	256.5	N	20 S 2x = 513
	PK	21	CP	21	typ	S	25.12		20 PS
	PK	22	CP	22	typ	S	0.2335	M	21
	PK	23	CP	23	typ	S	-0.5206	M	22
18:48:15	PK	24	CP	24	typ	S	202.4	N	CCV 2
18:49:00	PK	25	CP	25	typ	S	-1.497	M	CCB 2
	PK	26	CP	26	typ	S	-0.8465	M	PBS
	PK	27	CP	27	typ	S	109.4		CCCS
	PK	28	CP	28	typ	S	-0.4986	M	BO90N 1
	PK	29	CP	29	typ	S	1.042	M	0
	PK	30	CP	30	typ	S	-0.6294	M	0D
	PK	31	CP	31	typ	S	257.4	N	0S 2x = 514.8
	PK	32	CP	32	typ	S	21.41		0 PS
18:55:00	PK	33	CP	33	typ	S	202.5	N	CCV 3
18:55:45	PK	34	CP	34	typ	S	0.4306	M	CCB 3
	PK	35	CP	35	typ	S	0.4877	M	PBS
	PK	36	CP	36	typ	S	112.8		CLCSS
	PK	37	CP	37	typ	S	0.3538	M	BO7K 05
	PK	38	CP	38	typ	S	0.1658	M	D
	PK	39	CP	39	typ	S	255.9	N	S 2x = 511.8
	PK	40	CP	40	typ	S	17.86	M	PS
19:01:00	PK	41	CP	41	typ	S	200.1	N	CCV 4
19:01:45	PK	42	CP	42	typ	S	-4.113	M	CCB 4
	PK	43	CP	43	typ	S	-4.616	M	PBW
	PK	44	CP	44	typ	S	-2.536	M	BO7K04
	PK	45	CP	45	typ	S	-3.513	M	MLO
	PK	46	CP	46	typ	S	-4.350	M	MLO D
	PK	47	CP	47	typ	S	256.0	N	MLO S 2x = 512
	PK	48	CP	48	typ	S	17.68	M	MLO PS
19:07:00	PK	49	CP	49	typ	S	202.8	N	CCV 5
19:07:45	PK	50	CP	50	typ	S	-1.478	M	CCB 5
	PK	51	CP	51	typ	S	-0.3517	M	PBW
	PK	52	CP	52	typ	S	3.102	M	BO92X6
	PK	53	CP	53	typ	S	4.087	M	D
	PK	54	CP	54	typ	S	257.7	N	S 2x = 515.4
	PK	55	CP	55	typ	S	23.90		PS
	PK	56	CP	56	typ	S	10.76	M	101 GRAB
19:13:00	PK	57	CP	57	typ	S	201.6	N	CCV 6
19:13:45	PK	58	CP	58	typ	S	-0.09760	M	CCB 6
	PK	59	CP	59	typ	S	-1.887	M	PBW

KR

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	PK	60	CP	60	typ	S	-2.702	M CU SLUDGE TANK 1 ↓ D
	PK	61	CP	61	typ	S	-2.726	M
	PK	62	CP	62	typ	S	-3.913	M CU SLUDGE TANK 2
	PK	63	CP	63	typ	S	-2.199	M DEMISTER
	PK	64	CP	64	typ	S	-1.549	M CU TANK 1 LINER
	PK	65	CP	65	typ	S	-1.470	M VENT AFTER DEMISTER
9:19:45	PK	66	CP	66	typ	S	202.6	N CCU7
9:20:20	PK	67	CP	67	typ	S	-0.9691	M CCB7
	PK	68	CP	68	typ	H	396.8	N H
	PK	69	CP	69	typ	L	40.15	L
	PK	70	CP	70	typ	L	40.28	L
	PK	71	CP	71	typ	G	399.0	N G
	Last base						269	

Sample statistics

Anal	level	cups	avg	std dev	cv
1	all	57	59.69	94.2	158%

Anal 1: linear fit
Carryover factor: 0.80%.

Chart saved to file B:9304801.CHR.

text file B:9304801.TXT has been saved to disk.

~~16~~

3/3/93 SRP

162

9615492.6603

WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: M3 Method: CV

Start date: 02/22/93 End date: 02/22/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	BI
S0	1.00	1258																X									
S0.2	1.00	1302																X									
S1.0	1.00	1306																X									
S2.0	1.00	1311																X									
S5.0	1.00	1315																X									
ICV	2.00	1324																X									
ICB	1.00	1328																X									
CCV	1.00	1332																X									
CCB	1.00	1337																X									
ZZZZZZ	1.00	1341																									
ZZZZZZ	1.00	1345																									
ZZZZZZ	1.00	1350																									
ZZZZZZ	1.00	1354																									
ZZZZZZ	1.00	1358																									
ZZZZZZ	1.00	1402																									
ZZZZZZ	1.00	1407																									
ZZZZZZ	1.00	1411																									
ZZZZZZ	1.00	1415																									
ZZZZZZ	1.00	1420																									
CCV	1.00	1424																X									
CCB	1.00	1428																X									
ZZZZZZ	1.00	1433																									
ZZZZZZ	1.00	1437																									
ZZZZZZ	1.00	1441																									
ZZZZZZ	1.00	1446																									
ZZZZZZ	1.00	1450																									
ZZZZZZ	1.00	1454																									
ZZZZZZ	1.00	1459																									
ZZZZZZ	1.00	1503																									
ZZZZZZ	1.00	1507																									
ZZZZZZ	1.00	1512																									
CCV	1.00	1516																X									

9613492.6604

WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: M3 Method: CV

Start date: 02/22/93 End date: 02/22/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALK	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	BI
CCB	1.00	1520																X										
ZZZZZZ	1.00	1524																										
ZZZZZZ	1.00	1529																										
ZZZZZZ	1.00	1533																										
ZZZZZZ	1.00	1537																										
ZZZZZZ	1.00	1542																										
ZZZZZZ	1.00	1546																										
ZZZZZZ	1.00	1550																										
ZZZZZZ	1.00	1555																										
ZZZZZZ	1.00	1559																										
ZZZZZZ	1.00	1603																										
CCV	1.00	1608																X										
CCB	1.00	1612																X										
ZZZZZZ	1.00	1616																										
ZZZZZZ	1.00	1621																										
ZZZZZZ	1.00	1625																										
ZZZZZZ	1.00	1629																										
ZZZZZZ	1.00	1633																										
ZZZZZZ	1.00	1638																										
ZZZZZZ	1.00	1642																										
ZZZZZZ	1.00	1646																										
ZZZZZZ	1.00	1651																										
ZZZZZZ	1.00	1655																										
CCV	1.00	1659																X										
CCB	1.00	1704																X										
ZZZZZZ	1.00	1708																										
ZZZZZZ	1.00	1712																										
ZZZZZZ	1.00	1717																										
ZZZZZZ	1.00	1721																										
ZZZZZZ	1.00	1725																										
ZZZZZZ	1.00	1730																										
PBS	1.00	1734																X										

FORM XIV - IN ILM02.1

9613492.6605

WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: M3 Method: CV

Start date: 02/22/93 End date: 02/22/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALK	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	BI
LCSS	10.00	1738																X									
B07K05	1.00	1743																X									
B07K05D	1.00	1747																X									
CCV	1.00	1751																X									
CCB	1.00	1755																X									
B07K05S	1.00	1800																X									
ZZZZZZ	1.00	1804																									
ZZZZZZ	1.00	1808																									
ZZZZZZ	1.00	1813																									
ZZZZZZ	1.00	1817																									
ZZZZZZ	1.00	1821																									
CCV	1.00	1826																X									
CCB	1.00	1830																X									

037

C L P M E T A L S 3.03a

S302132--MERCURY

Run id: M3 9305306
LDC ANALYTICAL #050941
Analytical method: CV
Element: Hg

Acquired: 02/22/93 by SRP
Crunched: 03/02/93 by SRP
Time: 1251
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	CV			S0	02/22/93	12:58
2	0.2 PPB	WS1	CV			S0.2	02/22/93	13:02
3	1.0 PPB	WS2	CV			S1.0	02/22/93	13:06
4	2.0 PPB	WS3	CV			S2.0	02/22/93	13:11
5	5.0 PPB	WS4	CV			S5.0	02/22/93	13:15
6	ICV-5	ICV	CV			ICV	02/22/93	13:24
7	CAL BLK	ICB	CV			ICB	02/22/93	13:28
8	2 PPB	CCV	CV			CCV	02/22/93	13:32
9	CAL BLK	CCB	CV			CCB	02/22/93	13:37
10	X	X	CV			ZZZZZZ	02/22/93	13:41
11	X	X	CV			ZZZZZZ	02/22/93	13:45
12	X	X	CV			ZZZZZZ	02/22/93	13:50
13	X	X	CV			ZZZZZZ	02/22/93	13:54
14	X	X	CV			ZZZZZZ	02/22/93	13:58
15	X	X	CV			ZZZZZZ	02/22/93	14:02
16	X	X	CV			ZZZZZZ	02/22/93	14:07
17	X	X	CV			ZZZZZZ	02/22/93	14:11
18	X	X	CV			ZZZZZZ	02/22/93	14:15
19	X	X	CV			ZZZZZZ	02/22/93	14:20
20	2 PPB	CCV	CV			CCV	02/22/93	14:24
21	CAL BLK	CCB	CV			CCB	02/22/93	14:28
22	X	X	CV			ZZZZZZ	02/22/93	14:33
23	X	X	CV			ZZZZZZ	02/22/93	14:37
24	X	X	CV			ZZZZZZ	02/22/93	14:41
25	X	X	CV			ZZZZZZ	02/22/93	14:46
26	X	X	CV			ZZZZZZ	02/22/93	14:50
27	X	X	CV			ZZZZZZ	02/22/93	14:54
28	X	X	CV			ZZZZZZ	02/22/93	14:59
29	X	X	CV			ZZZZZZ	02/22/93	15:03
30	X	X	CV			ZZZZZZ	02/22/93	15:07
31	X	X	CV			ZZZZZZ	02/22/93	15:12
32	2 PPB	CCV	CV			CCV	02/22/93	15:16
33	CAL BLK	CCB	CV			CCB	02/22/93	15:20
34	X	X	CV			ZZZZZZ	02/22/93	15:24
35	X	X	CV			ZZZZZZ	02/22/93	15:29
36	X	X	CV			ZZZZZZ	02/22/93	15:33
37	X	X	CV			ZZZZZZ	02/22/93	15:37
38	X	X	CV			ZZZZZZ	02/22/93	15:42
39	X	X	CV			ZZZZZZ	02/22/93	15:46
40	X	X	CV			ZZZZZZ	02/22/93	15:50
41	X	X	CV			ZZZZZZ	02/22/93	15:55
42	X	X	CV			ZZZZZZ	02/22/93	15:59
43	X	X	CV			ZZZZZZ	02/22/93	16:03

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S302132--MERCURY

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	2 PPB	CCV	CV			CCV	02/22/93	16:08
45	CAL BLK	CCB	CV			CCB	02/22/93	16:12
46	X	X	CV			ZZZZZZ	02/22/93	16:16
47	X	X	CV			ZZZZZZ	02/22/93	16:21
48	X	X	CV			ZZZZZZ	02/22/93	16:25
49	X	X	CV			ZZZZZZ	02/22/93	16:29
50	X	X	CV			ZZZZZZ	02/22/93	16:33
51	X	X	CV			ZZZZZZ	02/22/93	16:38
52	X	X	CV			ZZZZZZ	02/22/93	16:42
53	X	X	CV			ZZZZZZ	02/22/93	16:46
54	X	X	CV			ZZZZZZ	02/22/93	16:51
55	X	X	CV			ZZZZZZ	02/22/93	16:55
56	2 PPB	CCV	CV			CCV	02/22/93	16:59
57	CAL BLK	CCB	CV			CCB	02/22/93	17:04
58	X	X	CV			ZZZZZZ	02/22/93	17:08
59	X	X	CV			ZZZZZZ	02/22/93	17:12
60	X	X	CV			ZZZZZZ	02/22/93	17:17
61	X	X	CV			ZZZZZZ	02/22/93	17:21
62	X	X	CV			ZZZZZZ	02/22/93	17:25
63	X	X	CV			ZZZZZZ	02/22/93	17:30
64	PB	PBS	CV	2621	02/19/93	PBS	02/22/93	17:34
65	CLCSHG	LCSS	CV	2621	02/19/93	LCSS	02/22/93	17:38
66	S302132-01	S	CV	2621	02/19/93	B07K05	02/22/93	17:43
67	S302132-01	S2	CV	2621	02/19/93	B07K05D	02/22/93	17:47
68	2 PPB	CCV	CV			CCV	02/22/93	17:51
69	CAL BLK	CCB	CV			CCB	02/22/93	17:55
70	S302132-01	DS	CV	2621	02/19/93	B07K05S	02/22/93	18:00
71	X	X	CV			ZZZZZZ	02/22/93	18:04
72	X	X	CV			ZZZZZZ	02/22/93	18:08
73	X	X	CV			ZZZZZZ	02/22/93	18:13
74	X	X	CV			ZZZZZZ	02/22/93	18:17
75	X	X	CV			ZZZZZZ	02/22/93	18:21
76	2 PPB	CCV	CV			CCV	02/22/93	18:26
77	CAL BLK	CCB	CV			CCB	02/22/93	18:30

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Copy
Original is filed in CSF 19419/MABM05

TMA/Skinner & Sherman Labs
MERCURY BENCH SHEET

SEQ NO: 170
RUN IDS:
Reviewed SRP 3/2/93

Pg 1 of 2

9305302 03 04 05 06 07 08

ANALYST JLS
INSTR: M3(auto)
METHOD: HG
WAVELENGTH 253.7 mm

RUN DATE 2/22/93
STANDARDS PREPPED
DATE: 2/22/93
STANDARD SOURCE
CALIB: Lot # 290930
ICV: ICV-5-24 CCV: 2 ppb

CALIBRATION TIME 12:58

CALIBRANTS
01 BLANK
02 0.2 PPB
03 1.0 PPB
04 2.0 PPB
05 5.0 PPB

	SAMPLE ID	CLIENT ID	DILUTION FACTOR	COMMENT
06	ICV-5	ICV	2X	
07	CAL BLK	ICB		
08	2 PPB	CCV		
09	CAL BLK	CCB		
10	S302130-07			
11	08			
12	09			
13	10			
14	11			Dil. 5X
15	12			
16	13			
17	14			
18	15			
19	16			
20	CCV			
21	CCB			
22	17			
23	18			
24	PB			
25	LCSS		10X	
26	S302128-01			
27	01D			
28	01S			
29	02			
30	03			
31	04			
32	CCV			
33	CCB			
34	05			
35	06			
36	PB			
37	LCSS		10X	
38	S302108-01			
39	01D			

revised 07/92

9613492.6609

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TMA/Skinner & Sherman Labs
COLD VAPOR ATOMIC ABSORPTION
MERCURY BENCH SHEET

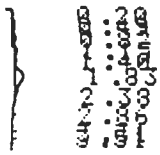
SEQ: 170

	SAMPLE ID	CLIENT ID	DILUTION FACTOR	COMMENT
40	01S			
41	02			
42	03			
43	04			
44	CCV			
45	CCB			
46	05			
47	06			
48	07			
49	PB			
50	LCSS		10X	
51	5302097-01			
52	01D			
53	01S			
54	02			
55	03			
56	CCV			
57	CCB			
58	PB			
59	CLCSS		10X	
60	5302133-01			
61	02			
62	02D			
63	02S			
64	PB			
65	CLCSS		10X	
66	5302132-01			
67	01D			
68	CCV			
69	CCB			
70	01S			
71	PB			
72	LCSS		10X	
73	5302109 01			
74	01D			
75	01S			
76	CCV			
77	CCB			
78	5302130-01		2X	
79	02		2X	
80	03		5X	
81	11		5X	
82	CCV			
83	CCB			
84				
85				

9613492.6610

Copy
Original is filed in CSF 19419/MABM05

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 12:58



INJ NO. OF STD : 1 / 1 REP , 1st level

D-2500 02/22/93 12:58

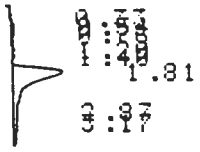
METHOD: MERCURY TAG: 1 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.83	56	0.000		HG

RAW DATA STORAGE NO. 1

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 13:02



INJ NO. OF STD : 1 / 1 REP , 2nd level

D-2500 02/22/93 13:02

METHOD: MERCURY TAG: 2 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

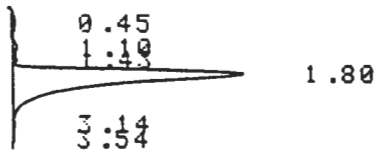
NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.81	330	0.200		HG

RAW DATA STORAGE NO. 2

9613492.6611

Copy 19419/MABM05
Original is filed in CSF _____

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 13:06



INJ NO. OF STD : 1 / 1 REP , 3rd level

D-2500 02/22/93 13:06

METHOD: MERCURY TAG: 3 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.80	1556	1.000		HG

RAW DATA STORAGE NO. 3

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 13:11

INJ NO. OF STD : 1 / 1 REP , 4th level

D-2500 02/22/93 13:11

METHOD: MERCURY TAG: 4 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.80	3110	2.000		HG

RAW DATA STORAGE NO. 4

9613492.6612

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CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 13:15

INJ NO. OF STD : 1 / 1 REP , 5th level

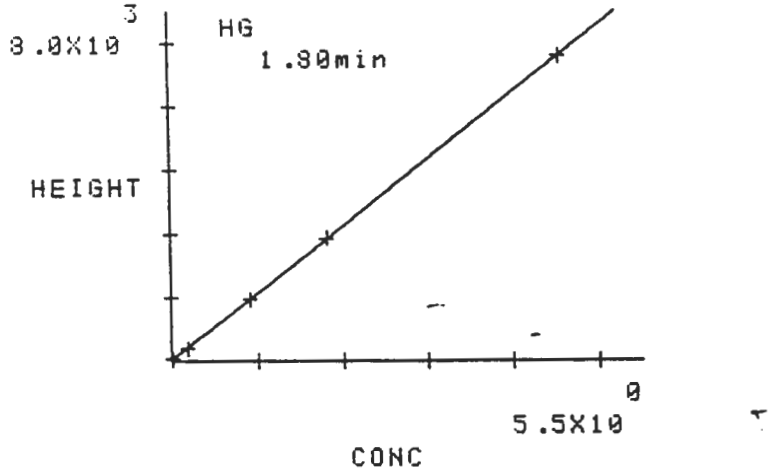
D-2500 02/22/93 13:15

METHOD: MERCURY TAG: 5 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.80	7668	5.000		HG

TABLE NO. = 1
NO. OF LEVELS = 5
CALIB TYPE = LINEAR



RAW DATA STORAGE NO. 5

9613492.6613

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 13:24

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D-2500 02/22/93 13:24

METHOD: MERCURY TAG: 6 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

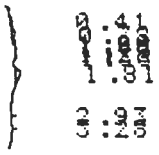
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	3459	2.240		HG
TOTAL		3459	2.240		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

ICV
2X

RAW DATA STORAGE NO. 6

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 13:28



D-2500 02/22/93 13:28

METHOD: MERCURY TAG: 7 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
8	1.81	35	-0.004		HG
TOTAL		35	-0.004		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

ICB

RAW DATA STORAGE NO. 7

9613492.6614

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 13:32

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D-2500 02/22/93 13:32

METHOD: MERCURY TAG: 8 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

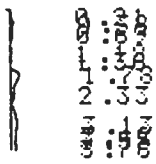
NO.	RT	HEIGHT	UG/L	BC	NAME
7	1.80	2999	1.938		HG
TOTAL		2999	1.938		

CCV

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 8

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 13:37



D-2500 02/22/93 13:37

METHOD: MERCURY TAG: 9 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.78	56	0.010		HG
TOTAL		56	0.010		

CCB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 9

9613492.6615

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 13:41

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D-2500 02/22/93 13:41

METHOD: MERCURY TAG: 10 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	5908	3.844		HG
TOTAL		5908	3.844		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 10

5302130-07
MBLN 35

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 13:45

D-2500 02/22/93 13:45

METHOD: MERCURY TAG: 11 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	2439	1.571		HG
TOTAL		2439	1.571		

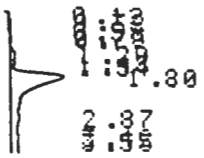
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 11

08
MBLN 36

9613492.6616

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 13:50



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Original is filed in CSF 19419/MABM05

D-2500 02/22/93 13:50

METHOD: MERCURY TAG: 12 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
9	1.80	358	0.208		HG
TOTAL		358	0.208		

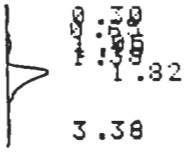
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 12

09

MBLN 37

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 13:54



D-2500 02/22/93 13:54

METHOD: MERCURY TAG: 13 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.82	275	0.153		HG
TOTAL		275	0.153		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 13

10

MBLN 38

120

9613492.6617

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 13:58

19419/MABM05

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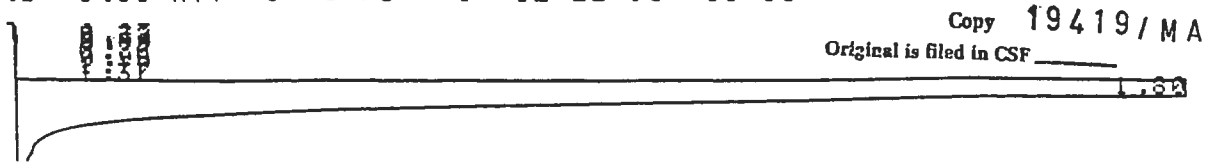


D-2500 02/22/93 13:58

METHOD: MERCURY TAG: 14 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
9	1.80	20169	13.189		HG
TOTAL		20169	13.189		

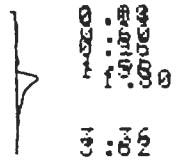
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

11

MBLN 39

RAW DATA STORAGE NO. 14

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:02



D-2500 02/22/93 14:02

METHOD: MERCURY TAG: 15 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
7	1.80	141	0.065		HG
TOTAL		141	0.065		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

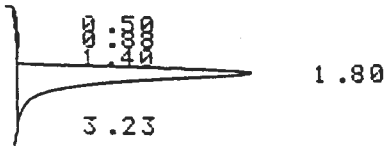
12

MBLN 40

RAW DATA STORAGE NO. 15

9613492.6618

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:07



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D-2500 02/22/93 14:07

METHOD: MERCURY TAG: 16 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.80	1575	1.005		HG
TOTAL					
		1575	1.005		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 16

13
MBLN 41

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:11

D-2500 02/22/93 14:11

METHOD: MERCURY TAG: 17 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.80	2303	1.482		HG
TOTAL					
		2303	1.482		

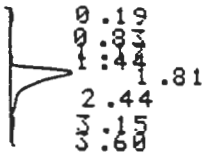
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 17

14
MBLN 42

9613492.6619

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:15



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Original is filed in CSF 19419/MABM05

D-2500 02/22/93 14:15

METHOD: MERCURY TAG: 18 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.81	410	0.242		HG
TOTAL		410	0.242		

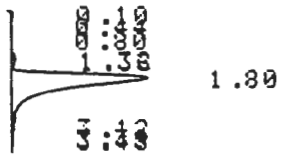
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 18

15

MBLN 43

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:20



D-2500 02/22/93 14:20

METHOD: MERCURY TAG: 19 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.80	907	0.567		HG
TOTAL		907	0.567		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 19

16

MBLN 44

9613492.6620

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:24

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D-2500 02/22/93 14:24

METHOD: MERCURY TAG: 20 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

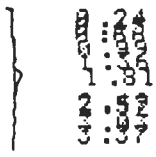
NO.	RT	HEIGHT	UG/L	BC	NAME
7	1.80	3091	1.998		HG
TOTAL					
		3091	1.998		

CCV

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 20

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:28



D-2500 02/22/93 14:28

METHOD: MERCURY TAG: 21 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.81	46	0.003		HG
TOTAL					
		46	0.003		

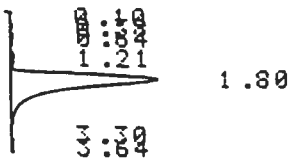
CCB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 21

9613492.6621

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:33



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Original is filed in CSF

D-2500 02/22/93 14:33

METHOD: MERCURY TAG: 22 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

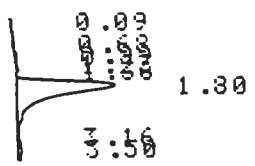
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	980	0.615		HG
TOTAL		980	0.615		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

17
MBLN 45

RAW DATA STORAGE NO. 22

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:37



D-2500 02/22/93 14:37

METHOD: MERCURY TAG: 23 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.30	651	0.400		HG
TOTAL		651	0.400		

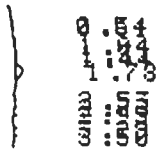
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

18
MBLN 48

RAW DATA STORAGE NO. 23

9613492.6622

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:41



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Original is filed in CSF _____

D-2500 02/22/93 14:41

METHOD: MERCURY TAG: 24 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.78	50	0.006		HG
TOTAL		50	0.006		

PB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 24

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:46

D-2500 02/22/93 14:46

METHOD: MERCURY TAG: 25 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
7	1.80	4287	2.782		HG
TOTAL		4287	2.782		

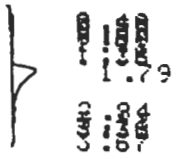
LCSS

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 25

9613492.6623

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:50



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Original is filed in CSF 19419/MABM05

D-2500 02/22/93 14:50

METHOD: MERCURY TAG: 26 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

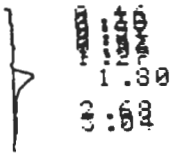
NO.	RT	HEIGHT	UG/L	BC	NAME
9	1.79	160	0.078		HG
TOTAL		160	0.078		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 26

5302128-01
MESP56

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:54



D-2500 02/22/93 14:54

METHOD: MERCURY TAG: 27 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
9	1.80	133	0.060		HG
TOTAL		133	0.060		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

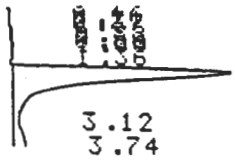
RAW DATA STORAGE NO. 27

OID
MESP56D

127

9613492.6624

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 14:59



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Original is filed in CSF _____

D-2500 02/22/93 14:59

METHOD: MERCURY TAG: 28 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

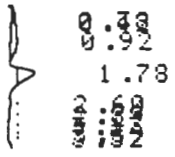
NO.	RT	HEIGHT	UG/L	BC	NAME
8	1.80	1486	0.947		HG
TOTAL		1486	0.947		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 28

01S
MESP56S

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:03



D-2500 02/22/93 15:03

METHOD: MERCURY TAG: 29 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.78	116	0.049		HG
TOTAL		116	0.049		

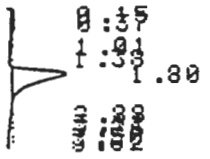
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 29

02
MESP57

9613492.6625

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:07



Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 15:07

METHOD: MERCURY TAG: 30 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	365	0.212		HG
TOTAL		365	0.212		

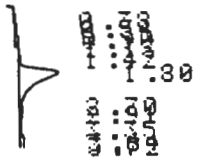
03

MESP58

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 30

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:12



D-2500 02/22/93 15:12

METHOD: MERCURY TAG: 31 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.80	259	0.143		HG
TOTAL		259	0.143		

04

MESP59

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 31

9613492.6626

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:16

Copy
Original is filed in CSF 19419/MABMO

D-2500 02/22/93 15:16

METHOD: MERCURY TAG: 32 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.80	3016	1.949		HG
TOTAL					
		3016	1.949		

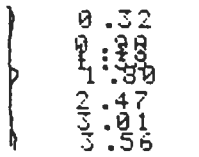
CCV

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 32

OKKR

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:20



D-2500 02/22/93 15:20

METHOD: MERCURY TAG: 33 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	56	0.010		HG
TOTAL					
		56	0.010		

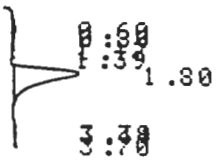
CCB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 33

9613492.6627

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:24



Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 15:24

METHOD: MERCURY TAG: 34 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	444	0.264		HG
TOTAL		444	0.264		

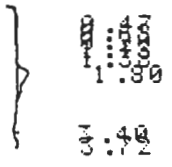
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 34

05

MESP 60

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:29



D-2500 02/22/93 15:29

METHOD: MERCURY TAG: 35 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.80	79	0.025		HG
TOTAL		79	0.025		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

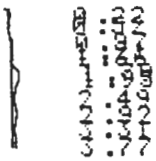
RAW DATA STORAGE NO. 35

06

MESP 61

9613492.6628

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:33



Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 15:33

METHOD: MERCURY TAG: 36 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.79	48	0.005		HG
TOTAL		48	0.005		

PB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 36

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:37

D-2500 02/22/93 15:37

METHOD: MERCURY TAG: 37 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.80	4296	2.788		HG
TOTAL		4296	2.788		

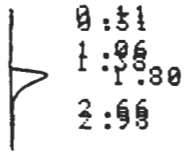
LCSS 10X 132

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 37

9613492.6629

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:42



Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 15:42

METHOD: MERCURY TAG: 38 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

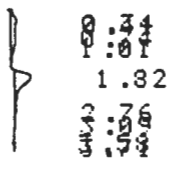
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	238	0.129		HG
TOTAL					
		238	0.129		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 38

5302108-01
MABM05

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:46



D-2500 02/22/93 15:46

METHOD: MERCURY TAG: 39 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.82	109	0.044		HG
TOTAL					
		109	0.044		

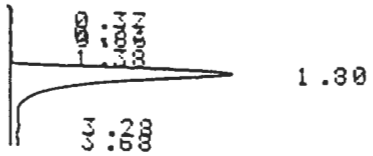
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 39

OID
MABM05D

9613492.6630

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:50



Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 15:50

METHOD: MERCURY TAG: 40 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

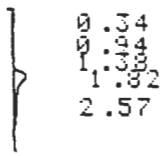
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	1505	0.959		HG
TOTAL		1505	0.959		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

01 S
MABM 05S

RAW DATA STORAGE NO. 40

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:55



D-2500 02/22/93 15:55

METHOD: MERCURY TAG: 41 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.82	82	0.027		HG
TOTAL		82	0.027		

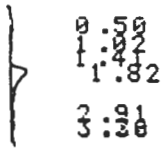
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

02
MABM 06

RAW DATA STORAGE NO. 41

9613492.6631

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 15:59



Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 15:59

METHOD: MERCURY TAG: 42 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

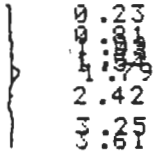
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.82	102	0.040		HG
TOTAL					
		102	0.040		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 42

03
MABM07

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:03



D-2500 02/22/93 16:03

METHOD: MERCURY TAG: 43 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.79	47	0.004		HG
TOTAL					
		47	0.004		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 43

04
MABM08

9613492.6632

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:08

Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 16:08

METHOD: MERCURY TAG: 44 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

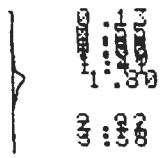
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	3131	2.025		HG
TOTAL		3131	2.025		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

CCV 4

RAW DATA STORAGE NO. 44

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:12



D-2500 02/22/93 16:12

METHOD: MERCURY TAG: 45 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
8	1.80	76	0.023		HG
TOTAL		76	0.023		

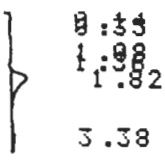
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

CCB

RAW DATA STORAGE NO. 45

9613492.6633

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:16



Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 16:16

METHOD: MERCURY TAG: 46 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

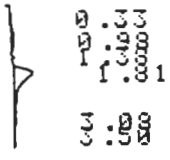
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.82	102	0.040		HG
TOTAL					
		102	0.040		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

05
MABM09

RAW DATA STORAGE NO. 46

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:21



D-2500 02/22/93 16:21

METHOD: MERCURY TAG: 47 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.81	124	0.054		HG
TOTAL					
		124	0.054		

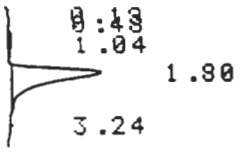
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

06
MABM 10

RAW DATA STORAGE NO. 47

9613492.6634

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:25



Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 16:25

METHOD: MERCURY TAG: 48 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.80	603	0.368		HG
TOTAL					
		603	0.368		

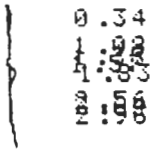
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 48

07

MABM 11

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:29



D-2500 02/22/93 16:29

METHOD: MERCURY TAG: 49 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.83	45	0.003		HG
TOTAL					
		45	0.003		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 49

PB

9613492.6635

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:33

Copy 19419/MABMC
Original is filed in CSF

D-2500 02/22/93 16:33

METHOD: MERCURY TAG: 50 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

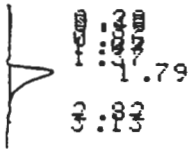
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	5054	3.285		HG
TOTAL		5054	3.285		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

LCSS 10X

RAW DATA STORAGE NO. 50

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:38



D-2500 02/22/93 16:38

METHOD: MERCURY TAG: 51 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.79	293	0.165		HG
TOTAL		293	0.165		

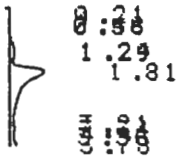
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

S302097-01
MABM20

RAW DATA STORAGE NO. 51

9613492.6636

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:42



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Original is filed in CSF 19419/MABM05

D-2500 02/22/93 16:42

METHOD: MERCURY TAG: 52 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

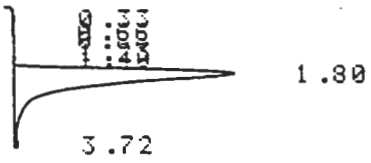
NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.81	234	0.126		HG
TOTAL		234	0.126		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 52

01D
MABM20D

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:46



D-2500 02/22/93 16:46

METHOD: MERCURY TAG: 53 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.80	1492	0.951		HG
TOTAL		1492	0.951		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 53

01S
MABM20S

9613492.6637

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:51

Copy 19419/MABM05
Original is filed in CSF _____

D-2500 02/22/93 16:51

METHOD: MERCURY TAG: 54 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.82	120	0.052		HG
TOTAL					
		120	0.052		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

02
MABM21

RAW DATA STORAGE NO. 54

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:55

D-2500 02/22/93 16:55

METHOD: MERCURY TAG: 55 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.81	116	0.049		HG
TOTAL					
		116	0.049		

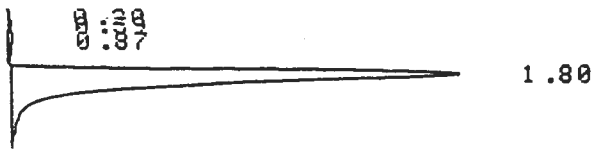
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

03
MABM22

RAW DATA STORAGE NO. 55

9613492.6638

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 16:59



Copy 19419/MABM05
Original is filed in CSF _____

D-2500 02/22/93 16:59

METHOD: MERCURY TAG: 56 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

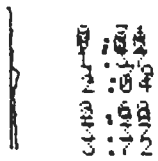
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.80	3024	1.955		HG
TOTAL		3024	1.955		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 56

CCV

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 17:04



D-2500 02/22/93 17:04

METHOD: MERCURY TAG: 57 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.79	56	0.010		HG
TOTAL		56	0.010		

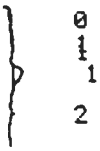
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 57

CCB

9613492.6659

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 17:08



Copy 19419/MABM05
Original is filed in CSF

D-2500 02/22/93 17:08

METHOD: MERCURY TAG: 58 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.80	62	0.014		HG
TOTAL					
		62	0.014		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

PB

RAW DATA STORAGE NO. 58

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 17:12

D-2500 02/22/93 17:12

METHOD: MERCURY TAG: 59 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	3586	2.323		HG
TOTAL					
		3586	2.323		

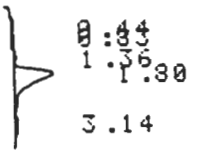
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

CLCSS 10X

RAW DATA STORAGE NO. 59

9613492.6640

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 17:17



Copy 19419/MABM05
Original is filed in CSF _____

D-2500 02/22/93 17:17

METHOD: MERCURY TAG: 60 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

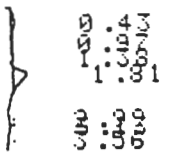
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.80	259	0.143		HG
TOTAL		259	0.143		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 60

S302133-01
B080N1

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 17:21



D-2500 02/22/93 17:21

METHOD: MERCURY TAG: 61 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.81	90	0.032		HG
TOTAL		90	0.032		

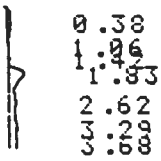
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 61

02
B080N0

9613492.6641

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 17:25



Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 17:25

METHOD: MERCURY TAG: 62 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.83	103	0.041		HG
TOTAL					
		103	0.041		

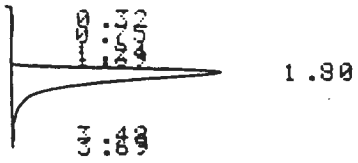
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 62

02D

B080NOD

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 17:30



D-2500 02/22/93 17:30

METHOD: MERCURY TAG: 63 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	1413	0.899		HG
TOTAL					
		1413	0.899		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 63

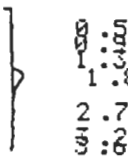
02S

B080NOS

145

9613492.6642

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 17:34



Copy 19419/MABM05
Original is filed in CSF _____

D-2500 02/22/93 17:34

METHOD: MERCURY TAG: 64 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

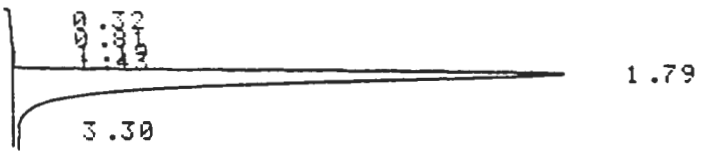
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.83	74	0.022		HG
TOTAL		74	0.022		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

PB

RAW DATA STORAGE NO. 64

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 17:38



D-2500 02/22/93 17:38

METHOD: MERCURY TAG: 65 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.79	3706	2.401		HG
TOTAL		3706	2.401		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

CLCSS 10X

RAW DATA STORAGE NO. 65

146

9613492.6643

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 17:43

Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 17:43

METHOD: MERCURY TAG: 66 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.81	69	0.018		HG
TOTAL		69	0.018		

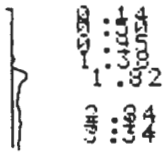
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 66

S302132-01
B07K05

<0.2

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 17:47



D-2500 <0.2 02/22/93 17:47

METHOD: MERCURY TAG: 67 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.82	98	0.037		HG
TOTAL		98	0.037		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 67

GID
B07K05D

9613492.6844

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 17:51

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Original is filed in CSF 19419/MABMOS

D-2500 02/22/93 17:51

METHOD: MERCURY TAG: 68 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

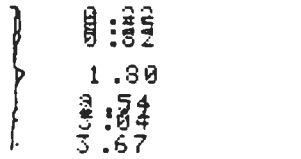
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	3116	2.015		HG
TOTAL		3116	2.015		

CCV

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 68

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 17:55



D-2500 02/22/93 17:55

METHOD: MERCURY TAG: 69 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.80	47	0.004		HG
TOTAL		47	0.004		

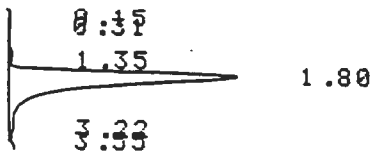
CCB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 69

9613492.6645

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 18:00



Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 18:00

METHOD: MERCURY TAG: 70 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.80	1527	0.974		HG
TOTAL					
		1527	0.974		

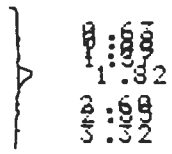
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 70

01 S

B07K05S

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 18:04



D-2500 02/22/93 18:04

METHOD: MERCURY TAG: 71 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.82	92	0.033		HG
TOTAL					
		92	0.033		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 71

PB

9613492.6646

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 18:08

Copy 19419/MABMO
Original is filed in CSF

D-2500 02/22/93 18:08

METHOD: MERCURY TAG: 72 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

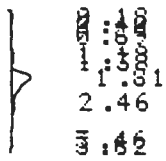
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.80	3879	2.515		HG
TOTAL					
		3879	2.515		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

LCSS

RAW DATA STORAGE NO. 72

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 18:13



D-2500 02/22/93 18:13

METHOD: MERCURY TAG: 73 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.81	127	0.056		HG
TOTAL					
		127	0.056		

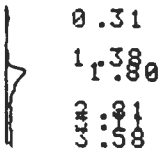
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

5302109-01
MBJW41

RAW DATA STORAGE NO. 73

9613492.6647

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 18:17



Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 18:17

METHOD: MERCURY TAG: 74 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

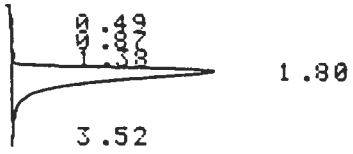
NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.80	125	0.055		HG
TOTAL		125	0.055		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

OID
MBJW41D

RAW DATA STORAGE NO. 74

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 18:21



D-2500 02/22/93 18:21

METHOD: MERCURY TAG: 75 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.80	1364	0.867		HG
TOTAL		1364	0.867		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

OIS
MBJW41S

RAW DATA STORAGE NO. 75

9613492.6648

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 18:26

Copy
Original is filed in CSF 19419/MABM05

D-2500 02/22/93 18:26

METHOD: MERCURY TAG: 76 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

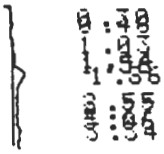
NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.80	3148	2.036		HG
TOTAL					
		3148	2.036		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

CCV

RAW DATA STORAGE NO. 76

CH. 1 C.S 5.00 ATT 3 OFFS 0 02/22/93 18:30



D-2500 02/22/93 18:30

METHOD: MERCURY TAG: 77 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: I CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.86	76	0.023		HG
TOTAL					
		76	0.023		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

CCB

RAW DATA STORAGE NO. 77

9613492.6619

WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: F2 Method: F

Start date: 02/19/93 End date: 02/19/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	BI
S0	1.00	1151													X													
S3	1.00	1155													X													
S50	1.00	1159													X													
S100	1.00	1204													X													
ICV	1.00	1210													X													
ICB	1.00	1214													X													
CRA	1.00	1218													X													
CCV	1.00	1223													X													
CCB	1.00	1227													X													
ZZZZZZ	1.00	1232																										
ZZZZZZ	1.00	1236																										
ZZZZZZ	20.00	1240																										
ZZZZZZ	20.00	1245																										
ZZZZZZ	10.00	1249																										
ZZZZZZ	10.00	1253																										
ZZZZZZ	1.00	1258																										
ZZZZZZ	1.00	1302																										
ZZZZZZ	1.00	1306																										
ZZZZZZ	1.00	1311																										
CCV	1.00	1315													X													
CCB	1.00	1319													X													
ZZZZZZ	1.00	1324																										
ZZZZZZ	1.00	1328																										
ZZZZZZ	1.00	1332																										
ZZZZZZ	1.00	1337																										
ZZZZZZ	1.00	1341																										
ZZZZZZ	1.00	1346																										
ZZZZZZ	1.00	1351																										
ZZZZZZ	1.00	1355																										
ZZZZZZ	20.00	1359																										
ZZZZZZ	20.00	1404																										
CCV	1.00	1408													X													

9613492.6650

WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: F2 Method: F

Start date: 02/19/93 End date: 02/19/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALSB	SBAS	ABAE	BEBD	CDCA	CARO	COCU	CUFE	FEPB	PBMG	MGMN	MNHG	HGNI	NIKE	SEAG	AGNA	NAIL	TLVZ	VZCN	CNBI
CCB	1.00	1412											X										
ZZZZZZ	1.00	1426																					
ZZZZZZ	1.00	1430																					
ZZZZZZ	1.00	1434																					
ZZZZZZ	1.00	1439																					
ZZZZZZ	1.00	1443																					
ZZZZZZ	1.00	1447																					
ZZZZZZ	1.00	1452																					
ZZZZZZ	1.00	1456																					
ZZZZZZ	1.00	1500																					
ZZZZZZ	1.00	1505																					
CCV	1.00	1509											X										
CCB	1.00	1513											X										
PBS	1.00	1535											X										
PBSA	1.00	1540	97.4	✓									X										
ZZZZZZ	20.00	1544																					
ZZZZZZ	20.00	1548																					
LCSS	10.00	1553											X										
LCSSA	10.00	1557	98.6	✓									X										
B07K05	1.00	1602											X										
B07K05A	1.00	1606	88.7										X										
B07K05S	1.00	1610											X										
ZZZZZZ	1.00	1615																					
CCV	1.00	1619											X										
CCB	1.00	1623											X										
B07K05D	1.00	1628											X										
B07K05DA	1.00	1632	99.6	✓									X										
CCV	1.00	1636											X										
CCB	1.00	1641											X										

039

9615492.6651

WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: F2 Method: F

Start date: 02/19/93 End date: 02/19/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALS	SBS	ABA	BBE	CDA	CAR	CCO	CUE	FEB	PBG	MGN	HGI	NIE	KEG	SEA	ANL	TLV	ZNC	CNB	BIS			
S0	1.00	1151																		X						
S10	1.00	1155																		X						
S50	1.00	1159																		X						
S100	1.00	1204																		X						
ICV	1.00	1210																		X						
ICB	1.00	1214																		X						
CRA	1.00	1218																		X						
CCV	1.00	1223																		X						
CCB	1.00	1227																		X						
ZZZZZZ	1.00	1232																								
ZZZZZZ	1.00	1236																								
ZZZZZZ	20.00	1240																								
ZZZZZZ	20.00	1245																								
ZZZZZZ	10.00	1249																								
ZZZZZZ	10.00	1253																								
ZZZZZZ	1.00	1258																								
ZZZZZZ	1.00	1302																								
ZZZZZZ	1.00	1306																								
ZZZZZZ	1.00	1311																								
CCV	1.00	1315																		X						
CCB	1.00	1319																		X						
ZZZZZZ	1.00	1324																								
ZZZZZZ	1.00	1328																								
ZZZZZZ	1.00	1332																								
ZZZZZZ	1.00	1337																								
ZZZZZZ	1.00	1341																								
ZZZZZZ	1.00	1346																								
ZZZZZZ	1.00	1351																								
ZZZZZZ	1.00	1355																								
ZZZZZZ	20.00	1359																								
ZZZZZZ	20.00	1404																								
CCV	1.00	1408																		X						

9613492.6652

WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: F2 Method: F

Start date: 02/19/93 End date: 02/19/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALSB	ASBA	BEBA	CDCA	CRCO	CUFE	PBMG	MNHG	NIK	SEAG	ANTL	VZCN	BI											
CCB	1.00	1412												X													
ZZZZZZ	1.00	1426																									
ZZZZZZ	1.00	1430																									
ZZZZZZ	1.00	1434																									
ZZZZZZ	1.00	1439																									
ZZZZZZ	1.00	1443																									
ZZZZZZ	1.00	1447																									
ZZZZZZ	1.00	1452																									
ZZZZZZ	1.00	1456																									
ZZZZZZ	1.00	1500																									
ZZZZZZ	1.00	1505																									
CCV	1.00	1509												X													
CCB	1.00	1513												X													
PBS	1.00	1535												X													
PBSA	1.00	1540	97.9											X													
LCSS	20.00	1544												X													
LCSSA	20.00	1548	96.2											X													
ZZZZZZ	10.00	1553																									
ZZZZZZ	10.00	1557																									
B07K05	1.00	1602												X													
B07K05A	1.00	1606	88.9											X													
B07K05S	1.00	1610												X													
ZZZZZZ	1.00	1615																									
CCV	1.00	1619												X													
CCB	1.00	1623												X													
B07K05D	1.00	1628												X													
B07K05DA	1.00	1632	101.3											X													
CCV	1.00	1636												X													
CCB	1.00	1641												X													

041

9613492.6653

C L P M E

T A L S 3.03a

S302132-LEAD

Run id: F2 9305003
THERMO JARRELL-ASH VIDEO 22E (#2511)
Analytical method: F
Element: Multi-Element

Acquired: 02/19/93 by KDJ
Crunched: 02/26/93 by KDJ
Time: 2046
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	02/19/93	11:51
2	3 PPB	WS1	F			S3	02/19/93	11:55
3	50 PPB	WS2	F			S50	02/19/93	11:59
4	100 PPB	WS3	F			S100	02/19/93	12:04
5	CICV-2	ICV	F			ICV	02/19/93	12:10
6	CAL BLK	ICB	F			ICB	02/19/93	12:14
7	CRA	CRA0	F			CRA	02/19/93	12:18
8	50 PPB	CCV	F			CCV	02/19/93	12:23
9	CAL BLK	CCB	F			CCB	02/19/93	12:27
10	X	X	F			ZZZZZZ	02/19/93	12:32
11	X	X	F			ZZZZZZ	02/19/93	12:36
12	X	X	F			ZZZZZZ	02/19/93	12:40
13	X	X	F			ZZZZZZ	02/19/93	12:45
14	X	X	F			ZZZZZZ	02/19/93	12:49
15	X	X	F			ZZZZZZ	02/19/93	12:53
16	X	X	F			ZZZZZZ	02/19/93	12:58
17	X	X	F			ZZZZZZ	02/19/93	13:02
18	X	X	F			ZZZZZZ	02/19/93	13:06
19	X	X	F			ZZZZZZ	02/19/93	13:11
20	50 PPB	CCV	F			CCV	02/19/93	13:15
21	CAL BLK	CCB	F			CCB	02/19/93	13:19
22	X	X	F			ZZZZZZ	02/19/93	13:24
23	X	X	F			ZZZZZZ	02/19/93	13:28
24	X	X	F			ZZZZZZ	02/19/93	13:32
25	X	X	F			ZZZZZZ	02/19/93	13:37
26	X	X	F			ZZZZZZ	02/19/93	13:41
27	X	X	F			ZZZZZZ	02/19/93	13:46
28	X	X	F			ZZZZZZ	02/19/93	13:51
29	X	X	F			ZZZZZZ	02/19/93	13:55
30	X	X	F			ZZZZZZ	02/19/93	13:59
31	X	X	F			ZZZZZZ	02/19/93	14:04
32	50 PPB	CCV	F			CCV	02/19/93	14:08
33	CAL BLK	CCB	F			CCB	02/19/93	14:12
34	X	X	F			ZZZZZZ	02/19/93	14:26
35	X	X	F			ZZZZZZ	02/19/93	14:30
36	X	X	F			ZZZZZZ	02/19/93	14:34
37	X	X	F			ZZZZZZ	02/19/93	14:39
38	X	X	F			ZZZZZZ	02/19/93	14:43
39	X	X	F			ZZZZZZ	02/19/93	14:47
40	X	X	F			ZZZZZZ	02/19/93	14:52
41	X	X	F			ZZZZZZ	02/19/93	14:56
42	X	X	F			ZZZZZZ	02/19/93	15:00
43	X	X	F			ZZZZZZ	02/19/93	15:05

9613492.6654

S302132-LEAD

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	02/19/93	15:09
45	CAL BLK	CCB	F			CCB	02/19/93	15:13
46	PB	PBS	F	2621	02/18/93	PBS	02/19/93	15:35
47	PB	ASPBS	F	2621		PBSA	02/19/93	15:40
48	CLCSFS	LCSS	F			LCSS	02/19/93	15:44
49	CLCSFS	ASLCSS	F			LCSSA	02/19/93	15:48
50	CLCSFS	LCSS	F	2621	02/18/93	LCSS	02/19/93	15:53
51	CLCSFS	ASLCSS	F	2621		LCSSA	02/19/93	15:57
52	S302132-01	S	F	2621	02/18/93	B07K05	02/19/93	16:02
53	S302132-01	AS	F	2621		B07K05A	02/19/93	16:06
54	S302132-01	DS	F	2621	02/18/93	B07K05S	02/19/93	16:10
55	X	X	F			ZZZZZZ	02/19/93	16:15
56	50 PPB	CCV	F			CCV	02/19/93	16:19
57	CAL BLK	CCB	F			CCB	02/19/93	16:23
58	S302132-01	SD	F	2621	02/18/93	B07K05D	02/19/93	16:28
59	S302132-01	ASSD	F	2621		B07K05DA	02/19/93	16:32
60	50 PPB	CCV	F			CCV	02/19/93	16:36
61	CAL BLK	CCB	F			CCB	02/19/93	16:41

9613492.6655

C L P M E T A L S 3.03a

S302132-THALLIUM

Run id: F2 9305053
THERMO JARRELL-ASH VIDEO 22E (#2511)
Analytical method: F
Element: Multi-Element

Acquired: 02/19/93 by KDJ
Crunched: 02/26/93 by KDJ
Time: 2048
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	02/19/93	11:51
2	10 PPB	WS1	F			S10	02/19/93	11:55
3	50 PPB	WS2	F			S50	02/19/93	11:59
4	100 PPB	WS3	F			S100	02/19/93	12:04
5	CICV-2	ICV	F			ICV	02/19/93	12:10
6	CAL BLK	ICB	F			ICB	02/19/93	12:14
7	CRA	CRA0	F			CRA	02/19/93	12:18
8	50 PPB	CCV	F			CCV	02/19/93	12:23
9	CAL BLK	CCB	F			CCB	02/19/93	12:27
10	X	X	F			ZZZZZZ	02/19/93	12:32
11	X	X	F			ZZZZZZ	02/19/93	12:36
12	X	X	F			ZZZZZZ	02/19/93	12:40
13	X	X	F			ZZZZZZ	02/19/93	12:45
14	X	X	F			ZZZZZZ	02/19/93	12:49
15	X	X	F			ZZZZZZ	02/19/93	12:53
16	X	X	F			ZZZZZZ	02/19/93	12:58
17	X	X	F			ZZZZZZ	02/19/93	13:02
18	X	X	F			ZZZZZZ	02/19/93	13:06
19	X	X	F			ZZZZZZ	02/19/93	13:11
20	50 PPB	CCV	F			CCV	02/19/93	13:15
21	CAL BLK	CCB	F			CCB	02/19/93	13:19
22	X	X	F			ZZZZZZ	02/19/93	13:24
23	X	X	F			ZZZZZZ	02/19/93	13:28
24	X	X	F			ZZZZZZ	02/19/93	13:32
25	X	X	F			ZZZZZZ	02/19/93	13:37
26	X	X	F			ZZZZZZ	02/19/93	13:41
27	X	X	F			ZZZZZZ	02/19/93	13:46
28	X	X	F			ZZZZZZ	02/19/93	13:51
29	X	X	F			ZZZZZZ	02/19/93	13:55
30	X	X	F			ZZZZZZ	02/19/93	13:59
31	X	X	F			ZZZZZZ	02/19/93	14:04
32	50 PPB	CCV	F			CCV	02/19/93	14:08
33	CAL BLK	CCB	F			CCB	02/19/93	14:12
34	X	X	F			ZZZZZZ	02/19/93	14:26
35	X	X	F			ZZZZZZ	02/19/93	14:30
36	X	X	F			ZZZZZZ	02/19/93	14:34
37	X	X	F			ZZZZZZ	02/19/93	14:39
38	X	X	F			ZZZZZZ	02/19/93	14:43
39	X	X	F			ZZZZZZ	02/19/93	14:47
40	X	X	F			ZZZZZZ	02/19/93	14:52
41	X	X	F			ZZZZZZ	02/19/93	14:56
42	X	X	F			ZZZZZZ	02/19/93	15:00
43	X	X	F			ZZZZZZ	02/19/93	15:05

9613492.6656

S302132-THALLIUM

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	02/19/93	15:09
45	CAL BLK	CCB	F			CCB	02/19/93	15:13
46	PB	PBS	F	2621	02/18/93	PBS	02/19/93	15:35
47	PB	ASPBS	F	2621		PBSA	02/19/93	15:40
48	CLCSFS	LCSS	F	2621	02/18/93	LCSS	02/19/93	15:44
49	CLCSFS	ASLCSS	F	2621		LCSSA	02/19/93	15:48
50	CLCSFS	LCSS	F			LCSS	02/19/93	15:53
51	CLCSFS	ASLCSS	F			LCSSA	02/19/93	15:57
52	S302132-01	S	F	2621	02/18/93	B07K05	02/19/93	16:02
53	S302132-01	AS	F	2621		B07K05A	02/19/93	16:06
54	S302132-01	DS	F	2621	02/18/93	B07K05S	02/19/93	16:10
55	X	X	F			ZZZZZZ	02/19/93	16:15
56	50 PPB	CCV	F			CCV	02/19/93	16:19
57	CAL BLK	CCB	F			CCB	02/19/93	16:23
58	S302132-01	S2	F	2621	02/18/93	B07K05D	02/19/93	16:28
59	S302132-01	ASS2	F	2621		B07K05DA	02/19/93	16:32
60	50 PPB	CCV	F			CCV	02/19/93	16:36
61	CAL BLK	CCB	F			CCB	02/19/93	16:41

9613492.6057

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2293 GFAA ID: F1 (F2) F3 F4 F5 F6 Method: 160

Date: 2/19/93 Reviewed By: _____ Standards Prepared: 8:00 2/19/93
Operator: KH

Disk # 37
Acq _____
SAMIN ✓✓✓

S302132
~~S302137~~
~~S302133~~

Standards Source
1. Calibration: 10 ppm
2. ICV: [X] CICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	9305001~~02~~03		RUN ID:	9305051~~52~~53	
Element:	[] AS	[X] PB	Element:	[] SE	[X] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments			Sample ID	Dilution	Comments
	STD1	1	0 PPB		
	STD2	2	[] 10,5 [X] 3,10		
	STD3	3	50 PPB		
	STD4	4	100 PPB		
		5	CICV 2		
		6	ICB		
		7	CRA		
		8	CCV		
		9	CCB		
Bern		10	~~PBS~~		
		11	PBSA		
Tl		12	CLCSS	1:19	
only		13	CLCSSA		
		14	CICSS	1:9	Pb only
		15	CICSSA		
		16	01		
d:1		17	01A		
RSD		18	~~02~~		
		19	X		
		20 ✓	CCV		
		21	CCB		
		22	~~02~~		
		23	02		
		24	02		
		25	02DA		
		26	~~PBS~~		Pb only
		27	PBSA		
		28	~~01.5~~		
		29	X		
		30	01	1:19	
		31	~~01A~~		
		32	CW		
		33	CB		
		34	PBL		
		35	PBLA		
		36	CLCSL		
		37	CLCSLA		
		38	01		
		39	01A		

097

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2293
Page 2 of 2

	40	~~0x01D~~		
	41	01DA		
	42	01-3		
	43	xL		A New Case
	44	CW		
	45	CLB		
	46	~~PBS~~		
	47	~~PBSA~~		
Ti only	48	CLCSS	1:19	
	49	CLCSSA		
	50	CLCSS	1:9	Pb only
	51	CLCSSA		
	52	5302132-01		
	53	-01A		
	54	013		
	55	x		
	56	CCV		
	57	CCB		
	58	01D		
	59	01DA		
	60	CCV		
	61	CCB		
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	94			098
	95			

3/3/03 SRP

9613492.6659

Jarrell-Ash Video 22
Run: F2 9305003 Analyst: LL Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	02/19/93	11:51

	<-Pb->		<-Tl->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(3,10)	WS1	S	1.00x	02/19/93	11:55

	<-Pb->		<-Tl->	
Burns (Abs)	0.024 A	0.029 A	0.041A	0.049A
Mean	0.0265		0.0450	
CV %	13.34		12.57	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	02/19/93	11:59

	<-Pb->		<-Tl->	
Burns (Abs)	0.451 A	0.487 A	0.202A	0.223A
Mean	0.4690		0.2125	
CV %	5.43		6.99	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	02/19/93	12:04

	<-Pb->		<-Tl->	
Burns (Abs)	0.736 A	0.747 A	0.340A	0.339A
Mean	0.7415		0.3395	
CV %	1.05		0.00	

0.9911

- Calibration coefficients -

	<-Pb->	<-Tl->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.01131004	0.00504693
Coef[2]:	-3.893044e-005	-1.648874e-005
Correl. coef.:	0.9999	0.9998

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	CICV-2	ICV	ICV	1.00x	02/19/93	12:10

	<-Pb->		<-Tl->	
Burns (Conc)	25.490	26.135	50.850	54.475
Mean	25.8125		52.6625	
CV %	1.77		4.87	
Sample value	25.81		52.66	

ARGOS MODEL SA4 Version 1.29

99

9613492.6660

Jarrell-Ash Video 22
Run: F2 9305003 Analyst: LL Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	02/19/93	12:14

	<-Pb->		<-Tl->	
Burns (Conc)	0.000	-0.353	-0.396	-0.593
Mean	-0.1765		-0.4945	
CV %	141.42		28.17	
Sample value	1.20U		2.60U	

7	CRA	CRA	CRA	1.00x	02/19/93	12:18

	<-Pb->		<-Tl->	
Burns (Conc)	1.243	1.065	9.403	8.561
Mean	1.1540		8.9820	
CV %	10.91		6.63	
Sample value	1.20U		8.98	

8	50 PPB	CCV	CCV	1.00x	02/19/93	12:23

	<-Pb->		<-Tl->	
Burns (Conc)	49.037	50.653	51.147	51.744
Mean	49.8450		51.4455	
CV %	2.29		0.82	
Sample value	49.85		51.44	

9	CAL BLK	CCB	CCB	1.00x	02/19/93	12:27

	<-Pb->		<-Tl->	
Burns (Conc)	0.265	-0.530	1.193	-0.791
Mean	-0.1325		0.2010	
CV %	424.26		697.96	
Sample value	1.20U		2.60U	

10	X	X	ZZZZZZ	1.00x	02/19/93	12:32

	<-Pb->		<-Tl->	
Burns (Conc)	-0.177	-0.265	-1.184	-1.184
Mean	-0.2210		-1.1840	
CV %	28.16		0.00	
Sample value	1.20U		2.60U	

11	X	X	ZZZZZZ	1.00x	02/19/93	12:36

	<-Pb->		<-Tl->	
Burns (Conc)	23.892	25.169	20.150	19.922
Mean	24.5305		20.0360	
CV %	3.68		0.81	
Sample value	24.53		20.04	

ARGOS MODEL SA4 Version 1.29

9613492.6661

Jarrell-Ash Video 22
Run: F2 9305003 Analyst: LL Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	X	X	ZZZZZZ	20.00x	02/19/93	12:40

	<-Pb->		<-Tl->	
Burns (Conc)	10.265	11.124	32.850	33.864
Mean	10.6945		33.3570	
CV %	5.68		2.15	
Sample value	213.90		667.14	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
13	X	X	ZZZZZZ	20.00x	02/19/93	12:45

	<-Pb->		<-Tl->	
Burns (Conc)	28.531	29.859	52.948	52.344
Mean	29.1950		52.6460	
CV %	3.22		0.81	
Sample value	583.90		1052.92	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
14	X	X	ZZZZZZ	10.00x	02/19/93	12:49

	<-Pb->		<-Tl->	
Burns (Conc)	21.690	22.524	65.558	67.663
Mean	22.1070		66.6105	
CV %	2.67		2.23	
Sample value	221.07		666.10	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
15	X	X	ZZZZZZ	10.00x	02/19/93	12:53

	<-Pb->		<-Tl->	
Burns (Conc)	41.090	43.333	86.872	91.625
Mean	42.2115		89.2485	
CV %	3.76		3.77	
Sample value	422.12		892.48	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
16	X	X	ZZZZZZ	1.00x	02/19/93	12:58

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	1.193	0.198
Mean	999.9990		0.6955	
CV %	0.02		101.16	
Sample value	1000.00		2.60U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	X	X	ZZZZZZ	1.00x	02/19/93	13:02

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	20.378	21.066
Mean	999.9990		20.7220	
CV %	0.02		2.35	
Sample value	1000.00		20.72	

ARGOS MODEL SA4 Version 1.29

9613492.6662

Jarrell-Ash Video 22
Run: F2 9305003 Analyst: LL Page 4

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
18	X	X	ZZZZZZ	1.00x	02/19/93	13:06

	<-Pb->		<-Tl->	
Burns (Conc)	48.108	34.748	51.445	55.092
Mean	41.4280		53.2685	
CV %	22.80 ***		4.84	
Sample value	41.43		53.27	

19	X	X	ZZZZZZ	1.00x	02/19/93	13:11

	<-Pb->		<-Tl->	
Burns (Conc)	0.177	-0.177	0.397	-0.396
Mean	0.0000		0.0005	
CV %	>9999.99		>9999.99	
Sample value	1.20U		2.60U	

20	50 PPB	CCV 2	CCV	1.00x	02/19/93	13:15

	<-Pb->		<-Tl->	
Burns (Conc)	48.240	51.197	50.258	52.344
Mean	49.7185		51.3010	
CV %	4.21		2.88	
Sample value	49.72		51.30	

21	CAL BLK	CCB 2	CCB	1.00x	02/19/93	13:19

	<-Pb->		<-Tl->	
Burns (Conc)	0.443	-0.353	0.000	-0.396
Mean	0.0450		-0.1980	
CV %	1250.79		141.42	
Sample value	1.20U		2.60U	

22	X	X	ZZZZZZ	1.00x	02/19/93	13:24

	<-Pb->		<-Tl->	
Burns (Conc)	16.698	17.299	0.397	-1.969
Mean	16.9985		-0.7860	
CV %	2.50		212.85	
Sample value	17.00		2.60U	

23	X	X	ZZZZZZ	1.00x	02/19/93	13:28

	<-Pb->		<-Tl->	
Burns (Conc)	35.214	38.412	18.562	21.066
Mean	36.8130		19.8140	
CV %	6.14		8.94	
Sample value	36.81		19.81	

ARGOS MODEL SA4 Version 1.29

9613492.6663

Jarrell-Ash Video 22
Run: F2 9305003 Analyst: LL Page 5

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
24	X	X	ZZZZZZ	1.00x	02/19/93	13:32

	<-Pb->		<-Tl->	
Burns (Conc)	17.098	17.600	-0.396	-0.198
Mean	17.3490		-0.2970	
CV %	2.05		47.14	
Sample value	17.35		2.60U	

25	X	X	ZZZZZZ	1.00x	02/19/93	13:37

	<-Pb->		<-Tl->	
Burns (Conc)	35.917	38.292	19.014	19.694
Mean	37.1045		19.3540	
CV %	4.53		2.48	
Sample value	37.10		19.35	

26	X	X	ZZZZZZ	1.00x	02/19/93	13:41

	<-Pb->		<-Tl->	
Burns (Conc)	0.531	-0.265	-0.198	-0.791
Mean	0.1330		-0.4945	
CV %	423.20		84.80	
Sample value	1.20U		2.60U	

27	X	X	ZZZZZZ	1.00x	02/19/93	13:46

	<-Pb->		<-Tl->	
Burns (Conc)	19.731	21.171	14.782	16.992
Mean	20.4510		15.8875	
CV %	4.98		9.84	
Sample value	20.45		15.89	

28	X	X	ZZZZZZ	1.00x	02/19/93	13:51

	<-Pb->		<-Tl->	
Burns (Conc)	31.654	32.904	48.213	52.646
Mean	32.2790		50.4295	
CV %	2.74		6.22	
Sample value	32.28		50.43	

29	X	X	ZZZZZZ	1.00x	02/19/93	13:55

	<-Pb->		<-Tl->	
Burns (Conc)	0.177	-0.353	0.795	-0.198
Mean	-0.0880		0.2985	
CV %	425.87		235.23	
Sample value	1.20U		2.60U	

ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F2 9305003 Analyst: LL Page 6

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
30	X	X	ZZZZZZ	20.00x	02/19/93	13:59

	<-Pb->		<-Tl->	
Burns (Conc)	45.756	46.925	-0.198	0.000
Mean	46.3405		-0.0990	
CV %	1.78		141.42	
Sample value	926.82		52.00U	

31	X	X	ZZZZZZ	20.00x	02/19/93	14:04

	<-Pb->		<-Tl->	
Burns (Conc)	65.053	69.161	16.770	19.694
Mean	67.1070		18.2320	
CV %	4.33		11.34	
Sample value	1342.14		364.64	

32	50 PPB	CCV 3	CCV	1.00x	02/19/93	14:08

	<-Pb->		<-Tl->	
Burns (Conc)	48.771	49.171	48.503	48.503
Mean	48.9710		48.5030	
CV %	0.58		0.00	
Sample value	48.97		48.50	

33	CAL BLK	CCB 3	CCB	1.00x	02/19/93	14:12

	<-Pb->		<-Tl->	
Burns (Conc)	0.620	-0.088	-0.593	-0.988
Mean	0.2660		-0.7905	
CV %	188.21		35.33	
Sample value	1.20U		2.60U	

34	X	X	ZZZZZZ	1.00x	02/19/93	14:26

	<-Pb->		<-Tl->	
Burns (Conc)	-0.265	-0.530	-0.791	-1.184
Mean	-0.3975		-0.9875	
CV %	47.14		28.14	
Sample value	1.20U		2.60U	

35	X	X	ZZZZZZ	1.00x	02/19/93	14:30

	<-Pb->		<-Tl->	
Burns (Conc)	18.408	18.610	18.562	18.337
Mean	18.5090		18.4495	
CV %	0.77		0.86	
Sample value	18.51		18.45	

ARGOS MODEL SA4 Version 1.29

9613492.6665

Jarrell-Ash Video 22
Run: F2 9305003 Analyst: LL Page 7

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
36	X	X	ZZZZZZ	1.00x	02/19/93	14:34

	<-Pb->		<-Tl->	
Burns (Conc)	27.110	27.218	48.213	49.377
Mean	27.1640		48.7950	
CV %	0.28		1.69	
Sample value	27.16		48.79	

37	X	X	ZZZZZZ	1.00x	02/19/93	14:39

	<-Pb->		<-Tl->	
Burns (Conc)	44.474	46.534	69.458	67.308
Mean	45.5040		68.3830	
CV %	3.20		2.22	
Sample value	45.50		68.38	

38	X	X	ZZZZZZ	1.00x	02/19/93	14:43

	<-Pb->		<-Tl->	
Burns (Conc)	1.600	0.887	0.795	1.193
Mean	1.2435		0.9940	
CV %	40.54		28.31	
Sample value	1.24		2.60U	

39	X	X	ZZZZZZ	1.00x	02/19/93	14:47

	<-Pb->		<-Tl->	
Burns (Conc)	18.915	19.936	19.467	19.922
Mean	19.4255		19.6945	
CV %	3.72		1.63	
Sample value	19.42		19.69	

40	X	X	ZZZZZZ	1.00x	02/19/93	14:52

	<-Pb->		<-Tl->	
Burns (Conc)	0.976	0.798	-0.593	0.594
Mean	0.8870		0.0015	
CV %	14.19		>9999.99	
Sample value	1.20U		2.60U	

41	X	X	ZZZZZZ	1.00x	02/19/93	14:56

	<-Pb->		<-Tl->	
Burns (Conc)	17.802	18.915	16.993	17.663
Mean	18.3585		17.3280	
CV %	4.29		2.73	
Sample value	18.36		17.33	

ARGOS MODEL SA4 Version 1.29

9613492.6666

Jarrell-Ash Video 22
Run: F2 9305003 Analyst: LL Page 8

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
42	X	X	ZZZZZZ	1.00x	02/19/93	15:00

	<-Pb->		<-Tl->	
Burns (Conc)	18.509	18.408	45.078	46.492
Mean	18.4585		45.7850	
CV %	0.39		2.18	
Sample value	18.46		45.78	

43	X	X	ZZZZZZ	1.00x	02/19/93	15:05

	<-Pb->		<-Tl->	
Burns (Conc)	14.224	14.912	13.690	15.441
Mean	14.5680		14.5655	
CV %	3.34		8.50	
Sample value	14.57		14.56	

44	50 PPB	CCV	CCV	1.00x	02/19/93	15:09

	<-Pb->		<-Tl->	
Burns (Conc)	46.664	48.372	44.798	50.553
Mean	47.5180		47.6755	
CV %	2.54		8.54	
Sample value	47.52		47.67	

45	CAL BLK	CCB	CCB	1.00x	02/19/93	15:13

	<-Pb->		<-Tl->	
Burns (Conc)	0.000	-0.530	-0.593	0.596
Mean	-0.2650		0.0015	
CV %	141.42		>9999.99	
Sample value	1.20U		2.60U	

46	PB	PBS	PBS	1.00x	02/19/93	15:35

	<-Pb->		<-Tl->	
Burns (Conc)	0.443	0.620	-1.184	-1.969
Mean	0.5315		-1.5765	
CV %	23.55		35.21	
Sample value	1.20U		2.60U	

47	PB	ASPBS	PBSA	1.00x	02/19/93	15:40

	<-Pb->		<-Tl->	
Burns (Conc)	19.220	19.731	19.467	19.694
Mean	19.4755		19.5805	
CV %	1.86		0.82	
Sample value	19.48		19.58	
Spike added	20.00		20.00	
Spike recovery, %	97.38		97.90	

ARGOS MODEL SA4 Version 1.29

9613492.6667

Jarrell-Ash Video 22
Run: F2 9305003 Analyst: LL Page 9

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
48	CLCSFS	LCSS	LCSS	20.00x	02/19/93	15:44

	<-Pb->		<-Tl->	
Burns (Conc)	10.265	10.837	32.096	33.864
Mean	10.5510		32.9800	
CV %	3.83		3.79	
Sample value	211.02		659.60	

Tl only 2/19/93 SG

49	CLCSFS	ASLCSS	LCSSA	20.00x	02/19/93	15:48

	<-Pb->		<-Tl->	
Burns (Conc)	30.194	29.193	54.475	49.963
Mean	29.6935		52.2190	
CV %	2.38		6.11	
Sample value	593.88		1044.38	
Spike added	20.00		20.00	
Spike recovery, %	95.72		96.20	

50	CLCSFS	LCSS	LCSS	10.00x	02/19/93	15:53

	<-Pb->		<-Tl->	
Burns (Conc)	22.944	21.898	67.663	63.502
Mean	22.4210		65.5825	
CV %	3.30		4.49	
Sample value	224.21		655.83	

Pb only

51	CLCSFS	ASLCSS	LCSSA	10.00x	02/19/93	15:57

	<-Pb->		<-Tl->	
Burns (Conc)	43.082	41.213	90.645	82.868
Mean	42.1475		86.7565	
CV %	3.14		6.34	
Sample value	421.48		867.57	
Spike added	20.00		20.00	
Spike recovery, %	98.63		105.87	

52	S302132-01	S	B07K05	1.00x	02/19/93	16:02

	<-Pb->		<-Tl->	
Burns (Conc)	19.628	20.758	-0.198	0.198
Mean	20.1930		0.0000	
CV %	3.96		>9999.99	
Sample value	20.19		2.60U	

ARGOS MODEL SA4 Version 1.29

9613492.6668

Jarrell-Ash Video 22
Run: F2 9305003 Analyst: LL Page 10

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
53	-01	AS	B07K05A	1.00x	02/19/93	16:06

	<-Pb->		<-Tl->	
Burns (Conc)	37.574	38.292	18.112	17.439
Mean	37.9330		17.7755	
CV %	1.34		2.68	
Sample value	37.93		17.78	
Spike added	20.00		20.00	
Spike recovery, %	88.70		88.88	

54	-01	DS	B07K05S	1.00x	02/19/93	16:10

	<-Pb->		<-Tl->	
Burns (Conc)	38.412	40.231	43.960	45.64[illegible]
Mean	39.3215		44.8005	
CV %	3.27		2.65	
Sample value	39.32		44.80	

55	X	X	ZZZZZZ	1.00x	02/19/93	16:15

	<-Pb->		<-Tl->	
Burns (Conc)	0.265	-0.618	1.193	0.397
Mean	-0.1765		0.7950	
CV %	353.75		70.80	
Sample value	1.20U		2.60U	

56	50 PPB	CCV 5	CCV	1.00x	02/19/93	16:19

	<-Pb->		<-Tl->	
Burns (Conc)	43.712	47.318	47.349	47.6[illegible]
Mean	45.5150		47.4925	
CV %	5.60		0.43	
Sample value	45.51		47.49	

57	CAL BLK	CCB 5	CCB	1.00x	02/19/93	16:23

	<-Pb->		<-Tl->	
Burns (Conc)	-0.088	-0.265	-0.198	-0.376
Mean	-0.1765		-0.2970	
CV %	70.91		47.14	
Sample value	1.20U		2.60U	

58	-01	S2	B07K05D	1.00x	02/19/93	16:28

	<-Pb->		<-Tl->	
Burns (Conc)	20.243	21.482	-0.396	-0.988
Mean	20.8625		-0.6920	
CV %	4.20		60.49	
Sample value	20.86		2.60U	

ARGOS MODEL SA4 Version 1.29

9613492.6669

Jarrell-Ash Video 22
Run: F2 9305003 Analyst: LL Page 11

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
59	-01	ASS2	B07K05DA	1.00x	02/19/93	16:32

	<-Pb->		<-Tl->	
Burns (Conc)	39.986	41.584	19.922	20.607
Mean	40.7850		20.2645	
CV %	2.77		2.39	
Sample value	40.78		20.26	
Spike added	20.00		20.00	
Spike recovery, %	99.61		101.32	

60	50 PPB	CCV 6	CCV	1.00x	02/19/93	16:36

	<-Pb->		<-Tl->	
Burns (Conc)	44.601	47.056	46.492	50.258
Mean	45.8285		48.3750	
CV %	3.79		5.50	
Sample value	45.83		48.38	

61	CAL BLK	CCB 6	CCB	1.00x	02/19/93	16:41

	<-Pb->		<-Tl->	
Burns (Conc)	0.088	-0.706	-0.988	0.198
Mean	-0.3090		-0.3950	
CV %	181.70		212.31	
Sample value	1.20U		2.60U	

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WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: F4 Method: F

Start date: 02/19/93 End date: 02/19/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALSB	ASA	BAE	BCD	CAR	COU	CFE	PB	MGN	HGI	NK	SEA	NAL	TV	ZN	CN	BI
S0	1.00	1538			X															
S10	1.00	1543			X															
S50	1.00	1547			X															
S100	1.00	1552			X															
ICV	1.00	1601			X															
ICB	1.00	1606			X															
CRA	1.00	1610			X															
CCV	1.00	1615			X															
CCB	1.00	1620			X															
PBS	1.00	1625			X															
PBSA	1.00	1629	100.2		X															
LCSS	5.00	1634			X															
LCSSA	5.00	1639	120.9		X															
B07K05	1.00	1644			X															
B07K05A	1.00	1649	97.8		X															
B07K05D	1.00	1653			X															
B07K05DA	1.00	1658	94.2		X															
B07K05S	1.00	1703			X															
ZZZZZZ	1.00	1708																		
CCV	1.00	1713			X															
CCB	1.00	1717			X															
ZZZZZZ	5.00	1729																		
ZZZZZZ	5.00	1734																		
ZZZZZZ	1.00	1739																		
ZZZZZZ	1.00	1744																		
CCV	1.00	1749			X															
CCB	1.00	1753			X															

042

9613492.6671

WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-02-059SAS No.: SDG No.: B07K05

Instrument ID Number: F4 Method: F

Start date: 02/19/93 End date: 02/19/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SB	ASA	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	BI
S0	1.00	1538																			X							
S5	1.00	1543																			X							
S50	1.00	1547																			X							
S100	1.00	1552																			X							
ICV	1.00	1601																			X							
ICB	1.00	1606																			X							
CRA	1.00	1610																			X							
CCV	1.00	1615																			X							
CCB	1.00	1620																			X							
PBS	1.00	1625																			X							
PBSA	1.00	1629	107.3																		X							
LCSS	5.00	1634																			X							
LCSSA	5.00	1639	83.6																		X							
B07K05	1.00	1644																			X							
B07K05A	1.00	1649	47.4																		X							
B07K05D	1.00	1653																										
B07K05DA	1.00	1658	37.5																									
B07K05S	1.00	1703																			X							
ZZZZZZ	1.00	1708																										
CCV	1.00	1713																			X							
CCB	1.00	1717																			X							
B07K05D	5.00	1729																			X							
B07K05DA	5.00	1734	62.9																		X							
ZZZZZZ	1.00	1739																										
ZZZZZZ	1.00	1744																										
CCV	1.00	1749																			X							
CCB	1.00	1753																			X							

9613492.6672

C L P M E T A L S 3.03a

S302132-ARSENIC

Run id: F4 9305004
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 02/19/93 by KDJ
Crunched: 02/26/93 by KDJ
Time: 2050
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	02/19/93	15:38
2	10 PPB	WS1	F			S10	02/19/93	15:43
3	50 PPB	WS2	F			S50	02/19/93	15:47
4	100 PPB	WS3	F			S100	02/19/93	15:52
5	CICV-2	ICV	F			ICV	02/19/93	16:01
6	CAL BLK	ICB	F			ICB	02/19/93	16:06
7	CRA	CRA0	F			CRA	02/19/93	16:10
8	50 PPB	CCV	F			CCV	02/19/93	16:15
9	CAL BLK	CCB	F			CCB	02/19/93	16:20
10	PB	PBS	F	2621	02/18/93	PBS	02/19/93	16:25
11	PB	ASPBS	F	2621		PBSA	02/19/93	16:29
12	CLCSFS	LCSS	F	2621	02/18/93	LCSS	02/19/93	16:34
13	CLCSFS	ASLCSS	F	2621		LCSSA	02/19/93	16:39
14	S302132-01	S	F	2621	02/18/93	B07K05	02/19/93	16:44
15	S302132-01	AS	F	2621		B07K05A	02/19/93	16:49
16	S302132-01	S2	F	2621	02/18/93	B07K05D	02/19/93	16:53
17	S302132-01	ASS2	F	2621		B07K05DA	02/19/93	16:58
18	S302132-01	DS	F	2621	02/18/93	B07K05S	02/19/93	17:03
19	X	X	F			ZZZZZZ	02/19/93	17:08
20	50 PPB	CCV	F			CCV	02/19/93	17:13
21	CAL BLK	CCB	F			CCB	02/19/93	17:17
22	X	X	F			ZZZZZZ	02/19/93	17:29
23	X	X	F			ZZZZZZ	02/19/93	17:34
24	X	X	F			ZZZZZZ	02/19/93	17:39
25	X	X	F			ZZZZZZ	02/19/93	17:44
26	50 PPB	CCV	F			CCV	02/19/93	17:49
27	CAL BLK	CCB	F			CCB	02/19/93	17:53

9613492.6673

C L P M E T A L S 3.03a

S302132-SELENIUM

Run id: F4 9305054
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 02/19/93 by KDJ
Crunched: 02/26/93 by KDJ
Time: 2051
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	02/19/93	15:38
2	5 PPB	WS1	F			S5	02/19/93	15:43
3	50 PPB	WS2	F			S50	02/19/93	15:47
4	100 PPB	WS3	F			S100	02/19/93	15:52
5	CICV-2	ICV	F			ICV	02/19/93	16:01
6	CAL BLK	ICB	F			ICB	02/19/93	16:06
7	CRA	CRA0	F			CRA	02/19/93	16:10
8	50 PPB	CCV	F			CCV	02/19/93	16:15
9	CAL BLK	CCB	F			CCB	02/19/93	16:20
10	PB	PBS	F	2621	02/18/93	PBS	02/19/93	16:25
11	PB	ASPBS	F	2621		PBSA	02/19/93	16:29
12	CLCSFS	LCSS	F	2621	02/18/93	LCSS	02/19/93	16:34
13	CLCSFS	ASLCSS	F	2621		LCSSA	02/19/93	16:39
14	S302132-01	S	F	2621	02/18/93	B07K05	02/19/93	16:44
15	S302132-01	AS	F	2621		B07K05A	02/19/93	16:49
16	S302132-01	S2	F	2621	02/18/93	B07K05D	02/19/93	16:53
17	S302132-01	ASS2	F	2621		B07K05DA	02/19/93	16:58
18	S302132-01	DS	F	2621	02/18/93	B07K05S	02/19/93	17:03
19	X	X	F			ZZZZZZ	02/19/93	17:08
20	50 PPB	CCV	F			CCV	02/19/93	17:13
21	CAL BLK	CCB	F			CCB	02/19/93	17:17
22	S302132-01	S2	F	2621	02/18/93	B07K05D	02/19/93	17:29
23	S302132-01	ASS2	F	2621		B07K05DA	02/19/93	17:34
24	X	X	F			ZZZZZZ	02/19/93	17:39
25	X	X	F			ZZZZZZ	02/19/93	17:44
26	50 PPB	CCV	F			CCV	02/19/93	17:49
27	CAL BLK	CCB	F			CCB	02/19/93	17:53

9613492.6674

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2381 GFAA ID: F1 F2 F3 (F4) F5 F6 Method: 150

Date: 2/19/93 Reviewed By: _____ Standards Prepared: 800 2/19/93
Operator: SG

Disk # 25
Acq
SAMIN ✓ 5302132

Standards Source
1. Calibration: 10 ppm
2. ICV: [✓] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	9305004		RUN ID:	9305054	
Element:	[✓] AS	[] PB	Element:	[✓] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments			Sample ID	Dilution	Comments
	STD1	1	0 PPB		
	STD2	2	[✓] 10,5 [] 3,10		
	STD3	3	50 PPB		
	STD4	4	100 PPB		
		5	ICV-2		
		6	ICB		
		7	CRA		
		8	CCV		
		9	CCB		
		10	PBS		
		11	PBSA		
		12	CLCSS	1:4	
		13	CLCSSA		
		14	01		
		15	01A		
		16	01D		<40%
		17	01DA		
		18	01S		
		19	X		
		20	CCV		
		21	CCB		
		22	01D	1:4	
30 only		23	01DA		
		24	X		
		25	X		
		26	CCV		
		27	CCB		
		28			
		29			
		30			
		31			
		32			
		33			
		34			
		35			
		36			
		37			
		38			
		39			

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Jarrell-Ash Video 22
Run: F4 9305004 Analyst: SGJ Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	SO	1.00x	02/19/93	15:38

	<-As->		<-Se->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(10,5)	WS1	S	1.00x	02/19/93	15:43

	<-As->		<-Se->	
Burns (Abs)	0.038 A	0.040 A	0.014A	0.009A
Mean	0.0390		0.0115	
CV %	0.00		30.74	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	02/19/93	15:47

	<-As->		<-Se->	
Burns (Abs)	0.192 A	0.191 A	0.163A	0.162A
Mean	0.1915		0.1625	
CV %	0.00		0.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	02/19/93	15:52

	<-As->		<-Se->	
Burns (Abs)	0.367 A	0.358 A	0.292A	0.272A
Mean	0.3625		0.2820	
CV %	1.76		5.01	

- Calibration coefficients -

	<-As->	<-Se->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.004022423	0.003628162
Coef[2]:	-3.967604e-006	-8.052639e-006
Correl. coef.:	1.0000	0.9994

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	CICV-2	ICV	ICV	1.00x	02/19/93	16:01

	<-As->		<-Se->	
Burns (Conc)	51.879	52.710	54.203	50.61
Mean	52.2945		52.4075	
CV %	1.12		4.84	
Sample value	52.29		52.41	

ARGOS MODEL SA4 Version 1.29

9613492.6676

Jarrell-Ash Video 22
Run: F4 9305004 Analyst: SGJ Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	02/19/93	16:06

	<-As->		<-Se->	
Burns (Conc)	1.743	-0.249	0.276	0.276
Mean	0.7470		0.2760	
CV %	188.56		0.00	
Sample value	3.70U		3.30U	

7	CRA	CRA	CRA	1.00x	02/19/93	16:10

	<-As->		<-Se->	
Burns (Conc)	9.283	8.272	2.773	4.173
Mean	8.7775		3.4730	
CV %	8.14		28.50	
Sample value	8.78		3.47	

8	50 PPB	CCV	CCV	1.00x	02/19/93	16:15

	<-As->		<-Se->	
Burns (Conc)	49.393	49.393	53.118	52.398
Mean	49.3930		52.7580	
CV %	0.03		0.97	
Sample value	49.39		52.76	

9	CAL BLK	CCB	CCB	1.00x	02/19/93	16:20

	<-As->		<-Se->	
Burns (Conc)	0.000	0.497	1.660	1.938
Mean	0.2485		1.7990	
CV %	141.42		10.93	
Sample value	3.70U		3.30U	

10	PB	PBS	PBS	1.00x	02/19/93	16:25

	<-As->		<-Se->	
Burns (Conc)	0.249	-0.249	1.938	0.276
Mean	-0.0000		1.1070	
CV %	>9999.99		106.16	
Sample value	3.70U		3.30U	

11	PB	ASPBS	PBSA	1.00x	02/19/93	16:29

	<-As->		<-Se->	
Burns (Conc)	20.295	19.777	10.729	10.729
Mean	20.0360		10.7290	
CV %	1.83		0.00	
Sample value	20.04		10.73	
Spike added	20.00		10.00	
Spike recovery, %	100.18		107.29	

089

ARGOS MODEL SA4 Version 1.29

9613492.6677

Jarrell-Ash Video 22
Run: F4 9305004 Analyst: SGJ Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	CLCSFS	LCSS	LCSS	5.00x	02/19/93	16:34

	<-As->		<-Se->	
Burns (Conc)	25.764	25.502	34.960	35.287
Mean	25.6330		35.1235	
CV %	0.72		0.66	
Sample value	128.16		175.62	

13	CLCSFS	ASLCSS	LCSSA	5.00x	02/19/93	16:39

	<-As->		<-Se->	
Burns (Conc)	51.325	48.293	46.050	40.927
Mean	49.8090		43.4885	
CV %	4.30		8.33	
Sample value	249.04		217.44	
Spike added	20.00		10.00	
Spike recovery, %	120.88 ***		83.64 ***	

14	S302132-01	S	B07K05	1.00x	02/19/93	16:44

	<-As->		<-Se->	
Burns (Conc)	11.568	9.537	-0.275	-3.012
Mean	10.5525		-1.6435	
CV %	13.61		117.76	
Sample value	10.55		3.30U	

15	-01	AS	B07K05A	1.00x	02/19/93	16:49

	<-As->		<-Se->	
Burns (Conc)	31.031	29.181	5.299	4.173
Mean	30.1060		4.7360	
CV %	4.35		16.81	
Sample value	30.11		4.74	
Spike added	20.00		10.00	
Spike recovery, %	97.77		47.36 ***	

16	-01	S2	B07K05D	1.00x	02/19/93	16:53

	<-As->		<-Se->	
Burns (Conc)	13.097	11.822	-4.908	-4.368
Mean	12.4595		-4.6380	
CV %	7.24		8.23	
Sample value	12.46		3.30U	

ARGOS MODEL SA4 Version 1.29

9613492.6678

Jarrell-Ash
Run: F4 9305004 Analyst: SGJ Page 4

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	-01	ASS2	B07K05DA	1.00x	02/19/93	16:58

	<-As->		<-Se->	
Burns (Conc)	32.623	29.973	3.612	3.892
Mean	31.2980		3.7520	
CV %	5.99		5.28	
Sample value	31.30		3.75	
Spike added	20.00		10.00	
Spike recovery, %	94.19		37.52 ***	

18	-01	DS	B07K05S	1.00x	02/19/93	17:03

	<-As->		<-Se->	
Burns (Conc)	46.373	48.842	1.382	1.660
Mean	47.6075		1.5210	
CV %	3.67		12.92	
Sample value	47.61		3.30U	

19	X	X	ZZZZZZ	1.00x	02/19/93	17:08

	<-As->		<-Se->	
Burns (Conc)	-0.497	0.995	-2.740	-1.100
Mean	0.2490		-1.9200	
CV %	423.70		60.40	
Sample value	3.70U		3.30U	

20	50 PPB	CCV 2	CCV	1.00x	02/19/93	17:13

	<-As->		<-Se->	
Burns (Conc)	47.195	46.373	47.092	48.141
Mean	46.7840		47.6165	
CV %	~~1.24~~		1.56	
Sample value	46.78		47.62	

21	CAL BLK	CCB 2	CCB	1.00x	02/19/93	17:17

	<-As->		<-Se->	
Burns (Conc)	-0.249	-0.249	1.382	-0.551
Mean	-0.2490		0.4155	
CV %	0.00		328.96	
Sample value	3.70U		3.30U	

22	-01	S2	B07K05D	5.00x	02/19/93	17:29

	<-As->		<-Se->	
Burns (Conc)	0.995	1.743	-2.194	-0.825
Mean	1.3690		-1.5095	
CV %	38.64		64.13	
Sample value	18.50U		16.50U	

Se only 2/19/93 DEG

091

ARGOS MODEL SA4 Version 1.29

9613492.6679

Jarrell-Ash Video 22
Run: F4 9305004 Analyst: SGJ Page 5

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
23	-01	ASS2	B07K05DA	5.00x	02/19/93	17:34

	<-As->		<-Se->	
Burns (Conc)	20.036	20.295	6.148	6.431
Mean	20.1655		6.2895	
CV %	0.91		3.18	
Sample value	100.83		31.44	
Spike added	20.00		10.00	
Spike recovery, %	100.83		62.89 ***	

24	X	X	ZZZZZZ	1.00x	02/19/93	17:39

Se only 2/19/93 SG

	<-As->		<-Se->	
Burns (Conc)	-0.497	-0.249	-1.921	-1.648
Mean	-0.3730		-1.7845	
CV %	47.01		10.82	
Sample value	3.70U		3.30U	

25	X	X	ZZZZZZ	1.00x	02/19/93	17:44

	<-As->		<-Se->	
Burns (Conc)	-0.745	-1.737	-3.555	-1.921
Mean	-1.2410		-2.7380	
CV %	56.52		42.20	
Sample value	3.70U		3.30U	

26	50 PPB	CCV	3 CCV	1.00x	02/19/93	17:49

	<-As->		<-Se->	
Burns (Conc)	47.195	48.567	47.791	49.548
Mean	47.8810		48.6695	
CV %	2.03		2.55	
Sample value	47.88		48.67	

27	CAL BLK	CCB	3 CCB	1.00x	02/19/93	17:53

	<-As->		<-Se->	
Burns (Conc)	0.000	-0.745	-0.275	-1.374
Mean	-0.3725		-0.8245	
CV %	141.42		94.25	
Sample value	3.70U		3.30U	

9613492.6680

SAMPLE PREPARATION REPORT: SOIL, SEDIMENT, SLUDGE

Prep batch: 2621 Date: 02/25/93

Printed by SRP Approved: JRP

MOISTURE DETERMINATION

Sample ID	Lab code	Cont wt	Cont + wet smpl	Cont + dry smpl	Wet wt, g	Dry wt, g	% solids	% water
S302132-01	S	1.350	10.360	9.950	9.010	8.600	95.4	4.6
S302132-01	S2	1.340	10.350	9.940	9.010	8.600	95.4	4.6

Prep code A (Flame AA)

Client ID	Sample ID	Lab Code	Sample wt, g	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	CLCSPS	LCSS	1.00 W	200	02/18/93 0800	SRP	200.0
	PB	PBS	1.00 W	200	02/18/93 0800	SRP	200.0
B07K05S	S302132-01	DS	1.02 W	200	02/18/93 0800	SRP	200.4
B07K05	S302132-01	S	1.04 W	200	02/18/93 0800	SRP	201.9
B07K05D	S302132-01	S2	1.10 W	200	02/18/93 0800	SRP	190.5

Prep code CA (Midi Cyanide)

Client ID	Sample ID	Lab Code	Sample wt, g	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	CLCSCN	LCSS	1.00 W	50	02/16/93 0800	SRP	50.00
	PB	PBS	1.00 W	50	02/16/93 0800	SRP	50.00
B07K05S	S302132-01	DS	1.07 W	50	02/16/93 0800	SRP	48.94
B07K05	S302132-01	S	1.01 W	50	02/16/93 0800	SRP	51.52
B07K05D	S302132-01	S2	1.05 W	50	02/16/93 0800	SRP	49.[illegible]

Prep code CV (Mercury)

Client ID	Sample ID	Lab Code	Sample wt, g	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	CLCSHG	LCSS	0.20 W	100	02/19/93 0800	SRP	500.0
	PB	PBS	0.20 W	100	02/19/93 0800	SRP	500.0
B07K05S	S302132-01	DS	0.21 W	100	02/19/93 0800	SRP	493.[illegible]
B07K05	S302132-01	S	0.20 W	100	02/19/93 0800	SRP	523.[illegible]
B07K05D	S302132-01	S2	0.21 W	100	02/19/93 0800	SRP	493.[illegible]

9613492.6681

SAMPLE PREPARATION REPORT: SOIL, SEDIMENT, SLUDGE

Prep batch: 2621 Date: 02/25/93

Printed by SRP Approved: SRP

Prep code F (Furnace)

Client ID	Sample ID	Lab Code	Sample wt, g	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	CLCSFS	LCSS	1.00 W	200	02/18/93 0800	SRP	200.0
	PB	PBS	1.00 W	200	02/18/93 0800	SRP	200.0
B07K05S	S302132-01	DS	1.01 W	200	02/18/93 0800	SRP	207.9
B07K05	S302132-01	S	1.00 W	200	02/18/93 0800	SRP	209.5
B07K05D	S302132-01	S2	1.01 W	200	02/18/93 0800	SRP	207.9

Prep code P (ICP)

Client ID	Sample ID	Lab Code	Sample wt, g	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	CLCSPS	LCSS	1.00 W	200	02/18/93 0800	SRP	200.0
	PB	PBS	1.00 W	200	02/18/93 0800	SRP	200.0
B07K05S	S302132-01	DS	1.02 W	200	02/18/93 0800	SRP	205.4
B07K05	S302132-01	S	1.04 W	200	02/18/93 0800	SRP	201.9
B07K05D	S302132-01	S2	1.10 W	200	02/18/93 0800	SRP	190.9

DATE 2/24/93 ANALYST [illegible] FOR GFAA/ICP

DATE _____ ANALYST _____ FOR MERCURY

SOIL PREP LOG

PREP BATCH # 621

REVIEWED BY [illegible] 2/24/93

CLIENT	SAM WORK #	GFAA (HNO3) INITIAL WT. (g)	GFAA (HNO3) FINAL VOL mL	ICP (HNO3/HCL) INITIAL WT (g)	ICP (HNO3/HCL) FINAL VOL mL	MERCURY DIG. INITIAL WT (g)	MERCURY DIG. FINAL VOL mL	SOLIDS ANALYSIS DISH WT G	SOLIDS ANALYSIS + SMPL WT (g)	SOLIDS ANALYSIS + DRY (g) SMPL WT.	SAMPLE DESCRIPTION
B07K05	S302132-01	1.00	200	1.04	200			1.35	10.36	9.95	BROWN, FINE
D	01:Sc	1.01		1.10				1.34	10.35	9.94	
S	01:Ds	1.01		1.02				—	—	—	
C-LCSS		1.00		1.00				1.34	5.00	5.00	
	MB										

Page: 165

Thermo Analytical/SKINNER AND SHERMAN LABORATORIES

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TMA/SKINNER & SHERMAN LABORATORIES
MERCURY PREPARATION LOG

DATE 2/19/93

PREPARED BY JLS

5302132
WORK ORDER

SKINNER & SHERMAN ID	CLIENT ID	INITIAL VOL (ML)	INITIAL WT (GM)	FINAL VOL (ML)	COMMENTS
PB			—	100	
LCSHG	LCSS	XXXX	.20		
01	B07K05		.20		
01:S2	D		.21		
01:DS	S		.21		

REVIEWED BY: CG 2/24/93

PAGE: 062

16

9613492.6684

S302132

Radio

CYANIDE MIDI-DISTILLATION LOG

Case No. Commercial DATE RECEIVED 2-11-93 Analyst(s) RB
SDG No. Hanford Mix DATE DISTILLED 2-16-93 Approval JA

WATER SAMPLE	CLIENT ID (EPA)	VOLUME USED	pH	SOIL/SOLID SAMPLE ID	CLIENT ID (EPA)	WET WT
PREP BLANK	PBW	50 ml	--	PREP BLANK	PBS	1.00 g
				LCSS	LCSS	1.00 g
				S302132-01	B07K05	1.01
				01-D	↓	1.05
				01-S	↓	1.07

NOTE: FINAL DISTILLATE VOLUME IS 50 ml

DISTILLED STANDARD IS 10 UG OR 200 UG/L

ICV-6: EMSL-LV: VOLUME USED 0.5 ml: TRUE VALUE = 94 UG/L

S2 = DUPLICATE SAMPLE DS = MATRIX SPIKE 25 UG CN

INTERFERENCE CHECKS

* SAMPLE EXHIBITS CHLORINE ODOR
DOES POTASSIUM IODIDE-STARCH PAPER TEST BLUE? No
IF YES, ADD ASCORBIC ACID CRYSTALLS AND DISTILL.

** DISTILLATE IS CLOUDY
IS LEAD ACETATE PAPER DISCOLORED (INDICATES SULFIDE)? No
IF YES, TREAT WITH CADMIUM CARBONATE AND ANALYZE.

COMMENTS:

TMA/Skinner & Sherman Labs

9613492.6685

(1)

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: STANDARD B

DATE PREPARED: 2/17/93
PREPARED BY: JST

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___Other

MLS ADDED: 10 HNO3
50 HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
=======	======	====	==========	======	==========

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

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SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(2)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: STANDARD 1

DATE PREPARED: 2/7/93
PREPARED BY: [illegible]

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___Other

MLS ADDED: 10 HNO3
50 HCl
___Other

ELEMENT	SOURCE LOT#	STOCK CONC	VOLUME	FINAL CONC
Sb	MVSb-3	1000 ppm	5 ml	5 ppm
As	HPAS-3	1000 ppm	5 ml	5 ppm
Ba	HPBa-1	1000 ppm	5 ml	5 ppm
Be	HPBe-1	1000 ppm	1 ml	1 ppm
Cd	HPCd-1	1000 ppm	5 ml	5 ppm
Cr	HPCr-1	1000 ppm	5 ml	5 ppm
Co	HPCo-1	1000 ppm	5 ml	5 ppm
Cu	HPCu-1	1000 ppm	5 ml	5 ppm
Pb	HPPb-1	1000 ppm	5 ml	5 ppm
Mn	MVMn-3	1000 ppm	5 ml	5 ppm
Ni	MVNi-3	1000 ppm	5 ml	5 ppm
Se	HPSe-1	1000 ppm	5 ml	5 ppm
Tl	HPTl-1	1000 ppm	5 ml	5 ppm
V	HPV-1	1000 ppm	5 ml	5 ppm
Zn	HPZn-1	1000 ppm	5 ml	5 ppm
Ti	HPTi-1	1000 ppm	5 ml	5 ppm

169

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

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SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(3)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: STANDARD 2

DATE PREPARED: 2/19/93
PREPARED BY: JST

FINAL VOLUME: 1000 ml

MATRIX: 2 %HNO3
___%HCl
___Other

MLS ADDED: 20 HNO3
___HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
Ag			1000 ppm	1 ml	1.0 ppm

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

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SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: CICV-1

DATE PREPARED: 2/11/93
PREPARED BY: SRP

FINAL VOLUME: 500 ml

MATRIX: 2 %HNO3
___%HCl
___Other

MLS ADDED: 10 HNO3
___HCl
___Other

ELEMENT	SOURCE LOT#	STOCK CONC	VOLUME	FINAL CONC
	CICVI-01		5.0 mls	

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

DOCUMENT#_____
(BOOK# - PAGE#)

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SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: Commercial Interferent Checks

DATE PREPARED: 2/11/93
PREPARED BY: SKP

FINAL VOLUME: 500 ml

MATRIX: 2 %HNO3 ___ %HCl ___ Other

MLS ADDED: 10 HNO3 ___ HCl ___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
a) INTA1	INT-A1			50 ml	
b) INTAB1	INT-A1			50 ml	
	INT-B1			5 ml	

173

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

DOCUMENT# _____
(BOOK# - PAGE#)

9613492.6690

7A

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: 2X CONTRACT REQUIRED DETECTION LIMIT SOLUTION P2

DATE PREPARED: 2/9/93
PREPARED BY: JST

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: 10 HNO3
50 HCl
___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
Sb	MVSb-3		1000 PPM	120 ul	120 PPB
As	HPAs-2		1000 PPM	30 ul	30 PPB
Be	HPBe-1		1000 PPM	10 ul	10 PPB
Cd	HPCd-1		1000 PPM	10 ul	10 ppb
Cr	HPCr-1		1000 PPM	20 ul	20 ppb
Co	HPCo-1		1000 PPM	100 ul	100 ppb
Cu	HPCu-1		1000 PPM	50 ul	50 ppb
Pb	HPPb-1		1000 PPM	30 ul	30 PPB
Mn	MVMn-3		1000 PPM	30 ul	30 ppb
Ni	MVNi-3		1000 PPM	80 ul	80 ppb
Se	HPSe-1		1000 PPM	100 ul	100 ppb
V	HPV-1		1000 PPM	100 ul	100 ppb
Tl	HPTl-1		1000 PPM	500 ul	500 ppb
Ag	HPAg-1		1000 PPM	20 ul	20 ppb
Zn	HPZn-1		1000 PPM	40 ul	40 ppb
Ti	HPTi-1		1000 PPM	100 ul	100 ppb
Sr	MVSr-3		1000 PPM	400 ul	400 ppb
Mo	MVMo-3		1000 PPM	400 ul	400 ppb
Sn	MVSn-2		1000 PPM	400 ul	400 ppb
Li	MVLi-3		1000 PPM	200 ul	200 ppb

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

DOCUMENT# _____
(BOOK# - PAGE#)

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7B

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: 2X CONTRACT REQUIRED DETECTION LIMIT SOLUTION P1

DATE PREPARED: 2/9/93
PREPARED BY: JST

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: 10 HNO3
50 HCl
___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
Sb			1000 ppm	120 µl	120 ppb
As			1000 ppm	40 µl	40 ppb
Be			1000 ppm	10 µl	10 ppb
Cd			1000 ppm	10 µl	10 ppb
Cr			1000 ppm	20 µl	20 ppb
Co			1000 ppm	100 µl	100 ppb
Cu			1000 ppm	50 µl	50 ppb
Pb			1000 ppm	30 µl	30 ppb
Mn			1000 ppm	30 µl	30 ppb
Ni			1000 ppm	80 µl	80 ppb
Se			1000 ppm	100 µl	100 ppb
V			1000 ppm	100 µl	100 ppb
Tl			1000 ppm	500 µl	500 ppb
Ag			1000 ppm	20 µl	20 ppb
Zn			1000 ppm	40 µl	40 ppb
Ti			1000 ppm	100 µl	100 ppb
Sr			1000 ppm	400 µl	400 ppb
Mo			1000 ppm	400 µl	400 ppb
Sn			1000 ppm	400 µl	400 ppb
Li			1000 ppm	200 µl	200 ppb

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

DOCUMENT# _____
(BOOK# - PAGE#)

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SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(8)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: Continuing Calibration Verification Solution (HalfSTD)

DATE PREPARED: 2/17/93
PREPARED BY: JST

FINAL VOLUME: 500 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: ___ HNO3
___ HCl
___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
STD1	In House			250 ml	500 ml
STD3	In House			250 ml	
Ag			1000 ppm	250 ul	

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

9613492.6695

TMA/SKINNER & SHERMAN LABORATORIES, INC.
STANDARDS TRACKING LOG BOOK -- SECTION 2
STANDARD PREPARATION LOG

STANDARD IDENTITY Hg Working Standard

DATE PREPARED: PREPARED BY:

FINAL VOLUME: 100 ml

MATRIX: 2 %HNO3 ___ %HCL ___ Other

MLS ADDED: 2 HNO3 ___ HCl ___ Other

ELEMENT	SOURCE/LOT#	STOCK CONC	VOLUME ADDED	FINAL CONC
2/9/93	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
2/10/93	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
2/11/93	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
2/16/93	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
2/17/93	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
2/18/93	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
2/19/93	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
2/22/93	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—

SOURCE: QC=USEPA ICV=USEPA MV=METALS VENTURES S=SPEX OTHER=IDENTIFY

ver 1.1 04/17/91

TMA/SKINNER & SHERMAN LABORATORIES, INC.
STANDARDS TRACKING LOG BOOK

STANDARDIZATIONS AND PREPARATION OF CYANIDE SOLUTIONS

Standization with 0.0192 N AgNO3 (1.0 mL = 1.0 mg CN)

SOURCE: KCN MALLINCKRODT DATE RECEIVED: 5-1-90 DATE OPENED: 5-1-90 LOT#: CG89KD56

Date 1-29-93 By JD

	Volume of Stock Solution Titrated	Volume AgNO3 Required	
	10 ml ≈ 1000 ppm STOCK	8.20	18.20
Calculation	$\frac{8.20}{10} = 0.8200$ $\frac{10}{.82} = 12.195$	0.00	10.00
		8.20	8.20

Volume of stock solution required for 10 mg CN is 12.195 mL.

Calibration Standards: Add 10 mL of 1.25 N NAOH solution to each of the required number of 50 mL volumetric flasks. Add quantities of the 5 ug/mL CN standard solution as listed below and dilute to volume.

Standard Solution in mLs	Micrograms CN	ug/L CN
0	0.0 (blank)	0
0.1	2.5	10
0.2	5.0	20
0.4	10.0	40
1.0	25.0	100
2.0	50.0	200
4.0	100.0	400

Preparation of Dilute Standards

Standard ID	Date	By		Concentration mg/L CN	Preparation Information
INT STD	1-29-93	JD		50 ppm	12.195 ml CN5 STOCK IN 200 ml
WORKING STD	↓	↓		5 ppm	20.00 ~~10.00 ml~~ 50 ppm IN 200 ml
CAL STDS			FOR	5301123, 5301125, JD 1-29-93 5301112	
CAL STDS	2-1-93	JD	FOR	5301102, 5301120	
CAL STDS	2-2-93	JD	FOR	5301137, 5301154, 5301156	
CAL STDS	2-3-93	JD	FOR	5301135, 5301116, 5301176, 5301151	
CAL STDS	2-8-93	JD	FOR	5302001, 5302023, 5302027, 5301150, 5301181, 5302025	
CAL STDS	2-9-93	JD	FOR	5302047, 5302032, 5301182	
CAL STDS	2-10-93	JD	FOR	5302047, 5302032, 5301182	
↓	↓	↓	↓	5302028, 5302026, 5302075, 5302077, 5302052	
CAL STDS	2-11-93	JD	FOR	5302077, 5302080, 5302035, 5302056, 5302059	
CAL STDS	2-16-93	JD	FOR	5302089, 5302095, 5302078, 5302072	
CAL STDS	2-17-93	JD	FOR	5302097, 5302133, 5302132, 5302131, 5302135, 5302121, 5302059	

DOCUMENT # _____ ver 2.1 01/13/92

Book# - Page# 18

9613492.6695

Sampled 2/8/93

TMA/Skinner & Sherman Labs SAMPLE LOG-IN
WORKORDER S302132 CLIENT Hanford Nav No. SAMPLES:
PROTCL CLP TURNARND 33 Days 1 (Soil) (Water) (Specify Other)
COOLER TEMP: 5 oC, or NA
CUSTODIAN D. Prinle SDG/BATCH N/A
CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE N302059
SHIPER & # Fed Ex PO/CONTRACT# ↓
TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT D. SANCHEZ
CHAIN OF CUSTODY: PRESENT/ABSENT/NA,# n/a COMMENTS: none

SAMPLE CONTAINERS-INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO
SAMPLE LABELS AGREE WITH CHAIN OF CUSTODY INFO? YES/NO (COMMENT)
CLIENT PAPERWORK AGREES WITH SAMPLES & COC? YES /NO (COMMENT)

SHIPMENT DATES 2-11-93
LIST ANY DATE WITH PAPERWORK/SHIPMENT PROBLEMS & SPECIFY THE PROBLEM:

N/A

	CLIENT ID	MATRIX	RECEIVED	PH*	TEST(S) & QC	HOLD TIME UP
1	B07K05	Soil	2-11-93	N/A	DS Tm/CN + Bismuth	
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

179

Samples are from site known to have Rad-Contamination: YES ✓ NO
Samples have detectable amounts of Radioactive Material: YES ✓ NO

SUBCONTRACT: YES/NO, TO: DATE:

REVIEWED

2/14/93

* EPA/CLP required Rev 1.6 PAGE: 70 3p

9613492.6696

PAGE 1 TMA/Norcal CHAIN OF CUSTODY ORD # N3-02-059

RCVD: 02/10/93 DUE: 03/12/93 02/10/93 15:50:49 KEEP: 06/10/93 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS for FRACTIONS with work in DEPT: SU and CATEGORY				
01B-W	B07K04	S&S	WH007	WH008	WH010	WH011	WH075A
02B-S	B07K05	S&S	WH001	WH002	WH004	WH005	WH171A
02F-S	B07K05 MS	S&S	WH001	WH002	WH004	WH005	WH171A
02G-S	B07K05 DUP	S&S	WH001	WH002	WH004	WH005	WH171A
02H-S	L C S	S&S	WH001	WH002	WH004	WH005	WH171A
03B-W	B07ML0	S&S	WH007	WH008	WH010	WH011	WH075A
03F-W	B07ML0 MS	S&S	WH007	WH008	WH010	WH011	WH075A
03G-W	B07ML0 DUP	S&S	WH007	WH008	WH010	WH011	WH075A
03H-W	L C S	S&S	WH007	WH008	WH010	WH075A	

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
Eyamamoto	2-10-93	Shironer	2-10-93	[illegible]	2/11/93

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41 of 42

E-93-22/2978-62

WESTINGHOUSE HANFORD COMPANY

241-T-106 DATA VALIDATION

DISTRIBUTION FORM

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Document Title Final QA Record Case #: N3-02-065-7159

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Project Files (1=Administrative; 2=Correspondence; 3=Source Data; 4=Technical Data)

1.1 File Index		1.6.6.3 Plans Doc. Log		3.4 Original Chemical Data	
1.2 Distribution Lists		1.6.6.4 Deliverables Doc. Log		3.5 Original Radiochemical Data	
1.3 Project Procedures		1.7 Budget			
1.4 Project Modifications		1.7.1 Downloads		4.1 Task Plan	
1.5 Staff		1.7.2 M-113s			
1.5.1 Staff Resumes		1.7.3 A-208s		4.2 Data Pkg. Completeness Verif. Checklist	
1.5.2 Staff Training		1.7.4 Budget Status		4.3 Data Valididation Calcs./Annotated DP	X
1.5.3 Auth. Former Site Employee		1.7.5 Invoices		4.4 Prelim. QA Records	
1.6 QA		1.8 Requisitions			
1.6.1 QA Manual		1.9 Meeting Minutes		4.5 Data Valid. & Qual. Summary Rpts.	
1.6.2 QA Implementation		1.10 Record of Telecon		4.5.1 Internal Drafts/Comments/Resol.	
1.6.3.1 QA Audits-Deliverables		1.11 Progress Reports		4.5.2 WHC Review Draft Comments/Resol.	
1.6.3.2 QA Audits-Files		1.12 Subcontractor (HC)		4.5.3 Final Report	
1.6.4.1 Audit Resps. - Deliverables				4.6 Weekly Status Reports	
1.6.4.2 Audit Resps. - Files		2.1 Incoming Correspondence		4.7 Weekly Management Reports	
1.6.5 QA Training		2.2 Outgoing Correspondence			
1.6.6.1 QA Manual Document Log		2.3 Internal Correspondence			
1.6.6.2 Procedure Document Log					
		3.1 Task Order			
		3.2 Sample Lists			
		3.3 Data Validation Procedures			

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THIS APPENDIX CONSISTS OF FIVE ATTACHMENTS

Attachment 1 - Glossary of Data Qualifiers

This attachment provides a glossary explaining all data qualifiers applied as a results of the validation.

Attachment 2 - As Received Laboratory Sample Concentration Reports

This attachment provides a copy of the as-received sample concentration reports. This may be tabular summary to that provided in Attachment 4, or may be a copy of the laboratory reports.

Attachment 3 - Summary of Data Qualifications

This attachment provides a complete summary of all qualifications applied as a result of the validation.

Attachment 4 - As Qualified Data Summary

This attachment provides a copy of the as-received sample concentration reports, with data qualifiers assigned.

Attachment 5 - Data Review Supporting Documentation

This attachment provides copies of the data validation checklists, data summary forms, telephone contact memoranda and other documentation completed as a result of the data validation.

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ATTACHMENT 1

Glossary of Data Qualifiers

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ATTACHMENT 1

Glossary of Data Qualifiers

U - Indicates the compound or analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected. Due to quality control deficiencies identified during data validation the value reported nay not accurately reflect the sample quantitation limit.

J - Indicate the compound or analyte was analyzed for and detected. The associated values is estimated but the data are useable for decision making processes.

R - Indicates the compound or analyte was analyzed for and due to an identified quality control deficiency the data are unusable.

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ATTACHMENT 2

As Received Laboratory Sample Concentration Reports

9613492.6702

N302065-01

TMA NORCAL
REPORTING GROUP 7159

DATA SHEET

B07K04

SDG	7159	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302065-01	Client sample id	B07K04
Dept sample id	7159-001	Matrix	WATER
Received	02/10/93	Collected	02/08/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	Alpha	0.75	1.1	1	3	U	80A
Gross Beta	Beta	-0.33	1.2	2	4	U	80B
Uranium 233/234		0.038	0.038	0.06	0.2	U	U
Uranium 235	15117-96-1	0.008	0.030	0.06	0.2	U	U
Uranium 238	7440-61-1	-0.013	0.013	0.06	0.2	U	U
Total Uranium (ug/L)		U		0.08		U	U_T
Plutonium 238	13981-16-3	-0.003	0.006	0.02	0.05	U	PU
Plutonium 239/240		-0.003	0.006	0.02	0.05	U	PU
Americium 241	14596-10-2	0.004	0.013	0.02	0.05	U	AM
Strontium 90	10098-97-2	0.10	0.20	0.8	2	U	Y
Technetium 99	14133-76-7	2.0	1.2	2	5	J	TC
Carbon 14	14762-75-5	-45	30	50	50	U	C
Neptunium 237	13994-20-2	-0.009	0.036	0.09	1	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		100		U	GAM
Iron 59	14596-12-4	U		30	30	U	GAM
Chromium 51	14392-02-0	U		200		U	GAM
Cobalt 60	10198-40-0	U		10	30	U	GAM
Zinc 65	13982-39-3	U		20		U	GAM
Ruthenium 106	13967-48-1	U		80		U	GAM
Cesium 134	13967-70-9	U		9		U	GAM
Cesium 137	10045-97-3	U		10	20	U	GAM
Cerium 144	14762-78-8	U		50		U	GAM
Europium 152	14683-23-9	U		20	40	U	GAM
Europium 154	15585-10-1	U		10	40	U	GAM
Radium 226	13982-63-3	U		20		U	GAM
Thorium 228	14274-82-9	U		30		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/22/93

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TMA NORCAL
REPORTING GROUP 7159

N302065-01

DATA SHEET, cont

B07K04

SDG	7159	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302065-01	Client sample id	B07K04
Dept sample id	7159-001	Matrix	WATER
Received	02/10/93	Collected	02/08/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		40		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/22/93

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N302065-02

TMA NORCAL
REPORTING GROUP 7159

DATA SHEET

B07ML0

SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302065-02
Dept sample id 7159-002
Received 02/10/93

Client sample id B07ML0
Matrix WATER
Collected 02/08/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	Alpha	0.15	1.2	2	3	U	80A
Gross Beta	Beta	0.34	1.1	2	4	U	80B
Uranium 233/234		0.086	0.070	0.1	0.2	U	U
Uranium 235	15117-96-1	0.042	0.042	0.2	0.2	U	U
Uranium 238	7440-61-1	0.017	0.035	0.1	0.2	U	U
Total Uranium (ug/L)		U		0.08		U	U_T
Plutonium 238	13981-16-3	0.002	0.005	0.02	0.05	U	PU
Plutonium 239/240		0	0.005	0.02	0.05	U	PU
Americium 241	14596-10-2	0.015	0.020	0.03	0.05	U	AM
Strontium 90	10098-97-2	0.051	0.21	0.9	2	U	Y
Technetium 99	14133-76-7	2.5	1.8	3	5	U	TC
Carbon 14	14762-75-5	-46	29	50	50	U	C
Neptunium 237	13994-20-2	0.10	0.070	0.04	1	BJ	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		100		U	GAM
Iron 59	14596-12-4	U		40	30	U	GAM
Chromium 51	14392-02-0	U		200		U	GAM
Cobalt 60	10198-40-0	U		10	30	U	GAM
Zinc 65	13982-39-3	U		20		U	GAM
Ruthenium 106	13967-48-1	U		100		U	GAM
Cesium 134	13967-70-9	U		9		U	GAM
Cesium 137	10045-97-3	U		9	20	U	GAM
Cerium 144	14762-78-8	U		50		U	GAM
Europium 152	14683-23-9	U		20	40	U	GAM
Europium 154	15585-10-1	U		10	40	U	GAM
Radium 226	13982-63-3	U		20		U	GAM
Thorium 228	14274-82-9	U		20		U	GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/22/93

9613492.6705

TMA NORCAL
REPORTING GROUP 7159

N302065-02

DATA SHEET, cont

B07ML0

SDG	7159	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302065-02	Client sample id	B07ML0
Dept sample id	7159-002	Matrix	WATER
Received	02/10/93	Collected	02/08/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		40		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/22/93

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ATTACHMENT 3

Summary of Data Qualifications

241-T-106 Samples

Gross Alpha (CRDL = 3 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	1.201	0.751	0.750	UJ
B07ML0	0.159	0.154	0.150	U

Gross Beta (CRDL = 4 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	-0.332	-0.331	-0.330	UJ
B07ML0	0.343	0.344	0.340	U

Uranium 233/234 (CRDL = 0.2 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	0.041	0.038	0.038	UJ
B07ML0	0.086	0.086	0.086	U

Uranium 235 (CRDL = 0.2 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	0.006	0.008	0.008	UJ
B07ML0	0.038	0.042	0.042	U

Uranium 238 (CRDL = 0.2 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	-0.010	-0.013	-0.013	UJ
B07ML0	0.014	0.017	0.017	U

Total Uranium

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	0.059	0.080	*	UJ
B07ML0	0.080	0.080	*	U

Raw Data Results units are pCi/sample.
Reported Results units are pCi/G.
* - Sample reported as "U" on results reported printout

Plutonium 238 (CRDL = 0.05 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	-0.002	-0.003	-0.003	UJ
B07ML0	0.002	0.002	0.002	U

Plutonium 239 (CRDL = 0.05 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	-0.002	-0.003	-0.003	UJ
B07ML0	0.001	0.000	0.000	U

Americium 241 (CRDL = 0.05 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	0.004	0.004	0.004	UJ
B07ML0	0.014	0.015	0.015	U

Strontium 90 (CRDL = 2 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	0.099	0.100	0.100	UJ
B07ML0	0.051	0.051	0.051	U

Technetium 99 (CRDL = 5 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	2.014	2.015	2.000	J
B07ML0	2.481	2.457	2.500	U

Carbon 14 (CRDL = 50 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	-45.203	-45.140	-45.000	UJ
B07ML0	-46.378	-46.422	-46.000	U

Raw Data Results units are pCi/sample.
Reported Results units are pCi/G.
* - Sample reported as "U" on results reported printout

96519 2.0700

Neptunium 237 (CRDL = 1 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	-0.008	-0.009	-0.009	UJ
B07ML0	0.103	0.105	0.100	

Cesium 137 (CRDL = 20 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	9.438	<10.0	*	UJ
B07ML0	4.556	<9.0	*	U

Cobalt 60 (CRDL = 30 pCi/L)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	13.133	<10.0	*	UJ
B07ML0	47.168	<10.0	*	U

Thorium 228

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K04	11.617	<30.0	*	UJ
B07ML0	8.298	<8.0	*	U

Raw Data Results units are pCi/sample.
Reported Results units are pCi/G.

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ATTACHMENT 4

As Qualified Data Summary

9613492.6711

N302065-01

TMA NORCAL
REPORTING GROUP 7159

DATA SHEET

B07K04

SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302065-01
Dept sample id 7159-001
Received 02/10/93

Client sample id B07K04
Matrix WATER
Collected 02/08/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALIFIERS	TEST
Gross Alpha	Alpha	0.75	1.1	1	3	U U-05	80A
Gross Beta	Beta	-0.33	1.2	2	4	U	80B
Uranium 233/234		0.038	0.038	0.06	0.2	U	U
Uranium 235	15117-96-1	0.008	0.030	0.06	0.2	U	U
Uranium 238	7440-61-1	-0.013	0.013	0.06	0.2	U	U
Total Uranium (ug/L)		U		0.08		U	U_T
Plutonium 238	13981-16-3	-0.003	0.006	0.02	0.05	U	PU
Plutonium 239/240		-0.003	0.006	0.02	0.05	U U	PU
Americium 241	14596-10-2	0.004	0.013	0.02	0.05	~~U~~ R	AM
Strontium 90	10098-97-2	0.10	0.20	0.8	2	U U-05	Y
Technetium 99	14133-76-7	2.0	1.2	2	5	~~U~~ J	TC
Carbon 14	14762-75-5	-45	30	50	50	U U-05	C
Neptunium 237	13994-20-2	-0.009	0.036	0.09	1	U U-05	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		100		U U-05	GAM
Iron 59	14596-12-4	U		30	30	U	GAM
Chromium 51	14392-02-0	U		200		U	GAM
Cobalt 60	10198-40-0	U		10	30	U U	GAM
Zinc 65	13982-39-3	U		20		U	GAM
Ruthenium 106	13967-48-1	U		80		U	GAM
Cesium 134	13967-70-9	U		9		U	GAM
Cesium 137	10045-97-3	U		10	20	U U	GAM
Cerium 144	14762-78-8	U		50		U	GAM
Europium 152	14683-23-9	U		20	40	U	GAM
Europium 154	15585-10-1	U		10	40	U	GAM
Radium 226	13982-63-3	U		20		U	GAM
Thorium 228	14274-82-9	U		30		U U-05	GAM

2-25-94

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/22/93

9613492.6712

TMA NORCAL
REPORTING GROUP 7159

N302065-01

DATA SHEET, cont

B07K04

SDG	7159	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302065-01	Client sample id	B07K04
Dept sample id	7159-001	Matrix	WATER
Received	02/10/93	Collected	02/08/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALIFIERS	TEST
Thorium 232	7440-29-1	U		40		U ~~UJ~~	GAM

Dups - all < MDA (J)

LCS - all ok

Blanks - all ok

Holding Times all ok

Detection Limits - ~~MDA > CRDL all results < - consider acceptable~~ Results (J) MDA>CRDL

Initial Calibration } all sources (ok) all calibration ok

Continuing Calibration }

Yield Am_{241} 53-84% (ok) Tc^{99} 59,65% (ok)

Np 46-59% (ok) Sr^{90} 74-80% (ok) All ok

Pu 55-71% (ok)

U230 62-67% (ok)

Notes

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/22/93

9613492.6713

N302065-02

TMA NORCAL
REPORTING GROUP 7159

DATA SHEET

B07ML0

SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302065-02
Dept sample id 7159-002
Received 02/10/93

Client sample id B07ML0
Matrix WATER
Collected 02/08/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALIFIERS	TEST
Gross Alpha	Alpha	0.15	1.2	2	3	U	80A
Gross Beta	Beta	0.34	1.1	2	4	U	80B
Uranium 233/234		0.086	0.070	0.1	0.2	U	U
Uranium 235	15117-96-1	0.042	0.042	0.2	0.2	U	U
Uranium 238	7440-61-1	0.017	0.035	0.1	0.2	U	U
Total Uranium (ug/L)		U		0.08		U	U_T
Plutonium 238	13981-16-3	0.002	0.005	0.02	0.05	U	PU
Plutonium 239/240		0	0.005	0.02	0.05	U	PU
Americium 241	14596-10-2	0.015	0.020	0.03	0.05	U R	AM
Strontium 90	10098-97-2	0.051	0.21	0.9	2	U	Y
Technetium 99	14133-76-7	2.5	1.8	3	5	U	TC
Carbon 14	14762-75-5	-46	29	50	50	U	C
Neptunium 237	13994-20-2	0.10	0.070	0.04	1	~~BJ~~ J	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		100		U	GAM
Iron 59	14596-12-4	U		40	30	U ~~BJ~~	GAM
Chromium 51	14392-02-0	U		200		U	GAM
Cobalt 60	10198-40-0	U		10	30	U	GAM
Zinc 65	13982-39-3	U		20		U	GAM
Ruthenium 106	13967-48-1	U		100		U	GAM
Cesium 134	13967-70-9	U		9		U	GAM
Cesium 137	10045-97-3	U		9	20	U	GAM
Cerium 144	14762-78-8	U		50		U	GAM
Europium 152	14683-23-9	U		20	40	U	GAM
Europium 154	15585-10-1	U		10	40	U	GAM
Radium 226	13982-63-3	U		20		U	GAM
Thorium 228	14274-82-9	U		20		U	GAM

JP 2-22-94

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/22/93

9613492.6714

TMA NORCAL
REPORTING GROUP 7159

N302065-02

DATA SHEET, cont

B07ML0

SDG	7159	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302065-02	Client sample id	B07ML0
Dept sample id	7159-002	Matrix	WATER
Received	02/10/93	Collected	02/08/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		40		U	GAM

Date

See summary section Page 16

DATA SHEETS
Page 4
SUMMARY DATA SECTION
Page 18

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/22/93

9613492.6715

ATTACHMENT 5

Data Review Supporting Documentation

9613492.6716

Transmittal Number _____

T00244

Transmittal Form to Validator

1 To Validator (BCA) _____

Project/OU 241-T-106

2 Data Packages Attached (list and attach)

B07K04-TMA-440

3 The attached data packages have been verified and (check one)

X All required checklist items are included

___ Checklist items circled on attached verification checklist forms cannot be provided and the decision has been made to proceed with validation anyway

NCR # _____

4 Certified by Verifier

Signature

4/28/93 9:15 am

Date

5 Received by Validator

Stacy W. Collison

Signature

10/5/93

Date

MRAMM12:33AT

Verification No. T-00137-93 **RADIOCHEMICAL DATA PACKAGE VERIFICATION COVER SHEET** Page 1 of 1

Project: 241-T-106	Reviewer: S. Lindberg	Date: 4/28/93
Laboratory: TMA	Case: N3-02-065-7159	SDG:
HASM Data Package ID: B07K04-TMA-440		

	Beta and Gas Proportional Counting			Alpha Spectroscopy									
	GAB	Sr90	Tc99	Iso U	Iso Pu	Iso Am	GEA	Ra-226	LSC C14	Total U	Np 237		
Analyses Performed:	X	X	X	X	X	X	X		X	X	X		
Case Narrative: Yes	X	X	X	X	X	X	X		X	X	X		
Batch Sheet: Yes													

HEIS NO.	Sample Matrix	WHC COC	WHC SAR													
B07K04	Water	X	X	X	X	X	X	X	X	X		X	X	X		
B07M10	↓	X	X	X	X	X	X	X	X	X		X	X	X		

Date: 4 / 28 / 93

RADIOCHEMICAL INITIAL CALIBRATION DATA VERIFICATION CHECKLIST

Laboratory: TMA

HASM Calibration Data Package ID: B07K04-TMA-440

Required Information	GAB		Sr90		Tc99		GEA		ASp		Ra226											
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Date of Initial Calibration:	3/90		3/91		See		3/89		N/A													
Detector ID:	X		X		attached		X															
Detector Efficiency:	X		X		letter		X															
Lucas Cell ID:																						
Lucas Cell Efficiency:																						
Calibration Standard ID:	X		X				X															
NIST Certificates:	X		X				X															
Initial Calibration Data:	X		X				X															
High Voltage Plateau Determination:																						
Self-absorption curve:	X		X																			
Preparation weight:	X		X																			
Carrier Standardization:			X																			
Alpha crosstalk:	X																					
Beta crosstalk:	X																					
FWHM Values:							X															
Sample Geometry:							X															

Comments:

9613492.6719

Westinghouse Hanford Company — **Internal Memo**

From: Technical And Quality Oversite — 12520-93-020
Phone: 2-2557 H4-23
Date: April 22, 1993
Subject: THERMO ANALYTICAL, INCORPORATED TC-99 PRIMARY CALIBRATION DOCUMENTATION

To: J. G. Paetel H4-19

cc: B. M. Colley H4-19
J. M. Duncan H4-23
D. G. Farwick H4-16
J. H. Kessner H4-23
KNP File/LB

The primary calibration documentation required by the environmental radiochemical validation procedure currently in use by WHC and WHC-contracted validators can not be provided by the Thermo Analytical, Incorporated (TMA) laboratory. TMA has notified WHC Hanford Analytical Services Management that the primary calibration documentation generated in 1983 for Tc-99 can not be regenerated. TMA has provided the enclosed certificate of calibration for the detector systems for Tc-99 analysis. The certificate of calibration documents the fact that TMA can not regenerate the calibration documentation. A new calibration for Tc-99 is currently in progress and the documentation for this calibration will be provided to WHC when complete. TMA feels confident that the calibration currently in use is valid and correct in light of historical recoveries on laboratory Quality Control check samples and inter-laboratory exchange sample results that have been obtained during the effective period of this calibration.

A copy of this letter, along with the enclosed TMA certificate of calibration for Tc-99, shall be placed in each radiochemistry data package received from TMA to date that has Tc-99 results reported. This letter, along with the enclosed TMA certificate of calibration, shall be placed in each radiochemistry data package received from TMA until the new calibration documentation has been received by WHC and has been implemented at TMA.

K. N. Pool
Manager

llr

Enclosure

CONCURRENCE:

D. G. Farwick, Manager
Environmental Services Quality Assurance

9613492.6720

Certificate of Calibration		TMA/*Norcal*
Calibration: ^{99}Tc	Instrument: LBG beta counters	Type: Gas Flow Geiger Counter
Calibration Standard:) (Unknown		

Status	Date	Reference Document
Original Calibration:	1983	Unknown
Verification:		
Summary of Results	Standard Efficiency = 42.7% P-Factor = 2.34	

Self Absorption Correction Table

(Samples are mounted as weightless deposits, no self absorption corrections are performed)

Note: The current calibration was performed in 1983 but the documentation for this calibration is unavailable. A confirming calibration is in process as of 4/1/93.

Date: 4 / 28 / 93

RADIOCHEMICAL CONTINUING CALIBRATION DATA VERIFICATION CHECKLIST

Laboratory: TMA

HASM Data Package ID: ~~4/28/93~~ B07K04-TMA-440

Required Information	GAB		Sr90		Tc99		GEA		ASp		Ra226									
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Calibration Time Period, From/To	Cont.		Cont.		Cont.		Cont.		X											
Detector ID:	X		X		X		X		X											
Detector Efficiency:	X		X		X		X		X											
Lucas Cell ID:																				
Lucas Cell Efficiency:																				
Check Standard ID:	X		X		X		X		Background											
Check Standard Activity:	X		X		X		X													
Check Standard Traceability:	X		X		X		X		Efficiency											
Check Standard Raw Data:	X		X		X		X													
Control Charts:																				
Background Data, CPM:	X		X		X		X													
Background Count Time:	X		X		X		X													
Background Control Charts:	X		X		X		X													
Preparation Weights:	X		X		X															
Carrier Recovery Checks:			X		X															
Alpha/Beta Cross Talk:	X																			
FWHM Control Charts:							X													
Sample Geometry:							X													

Comments:

96 1342 672

9613492.6722

Package ID: B07K04-TMA-440

VERIFICATION CHECKLIST FOR BETA AND GAS PROPORTIONAL COUNTING

Analysis: Gross Alpha/Beta

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Gravimetric/Chemical Yields			☒
Results Report for Chemical Yields	☐	☐	
Raw Data (Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Sample Identifications	☐	☐	
Chemical Yield Source Identification, Traceability and Dilution Log	☐	☐	
Calculated Recoveries	☐	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6723

Package ID: B07K04-TMA-440

VERIFICATION CHECKLIST FOR BETA AND GAS PROPORTIONAL COUNTING

Analysis: Sr 90

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Gravimetric/Chemical Yields			☐
Results Report for Chemical Yields	☒	☐	
Raw Data (Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Chemical Yield Source Identification, Traceability and Dilution Log	☒	☐	
Calculated Recoveries	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6724

Package ID: 807K04-TMA-440

VERIFICATION CHECKLIST FOR BETA AND GAS PROPORTIONAL COUNTING

Analysis: Tc99

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Gravimetric/Chemical Yields			☐
Results Report for Chemical Yields	☒	☐	
Raw Data (Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Chemical Yield Source Identification, Traceability and Dilution Log	☒	☐	
Calculated Recoveries	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6725

Package ID: B07K04-TMA-440

VERIFICATION CHECKLIST FOR ALPHA SPECTROSCOPY

Analysis: Iso U

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheet	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Tracer Recovery			
Results Report for Tracer Analyses	☒	☐	
Raw Data (Spectra and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Tracer Identification, Traceability and Dilution Log	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6726

Package ID: 807K04-TMA-440

VERIFICATION CHECKLIST FOR ALPHA SPECTROSCOPY

Analysis: Iso Pu

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheet	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Tracer Recovery			
Results Report for Tracer Analyses	☒	☐	
Raw Data (Spectra and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Tracer Identification, Traceability and Dilution Log	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6727

Package ID: BOK04-TMA-440

VERIFICATION CHECKLIST FOR ALPHA SPECTROSCOPY

Analysis: Am241

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheet	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Tracer Recovery			
Results Report for Tracer Analyses	☒	☐	
Raw Data (Spectra and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Tracer Identification, Traceability and Dilution Log	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6728

Package ID: 807604-TMA-440

VERIFICATION CHECKLIST FOR ALPHA SPECTROSCOPY

Analysis: Neptunium

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheet	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Tracer Recovery			
Results Report for Tracer Analyses	☒	☐	
Raw Data (Spectra and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Tracer Identification, Traceability and Dilution Log	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

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Package ID: B07K04-TMA-440

VERIFICATION CHECKLIST FOR GAMMA SPECTROSCOPY

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Geometry and Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

Comments:

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Package ID: 807K04-TMA-440

VERIFICATION CHECKLIST FOR LIQUID SCINTILLATION COUNTING

C14

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Internal Standard or Quench Monitoring Results, Activity and Traceability	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Instrument Identifications	☒	☐	
Dates of Analysis	☒	☐	
Continuing Calibration			
Instrument Identification	☒	☐	
Continuing Calibration Results Report, Control Charts and Control Limits	☒	☐	
Calibration Standard Identification, Traceability, Activity, Dilution Log and Expiration Date	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Counting Efficiency Determination Method and Results	☒	☐	
Internal Standard or Quench Monitoring Values	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Instrument Identifications	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Instrument Identifications	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

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Package ID: 807K04-TMA-440

VERIFICATION CHECKLIST FOR TOTAL URANIUM ANALYSIS BY KINETIC PHOSPHORIMETRY

	Yes	No	NA
Analysis Results			
Results Report			
for Sample Analyses, Reruns, and Reanalyses	☒	☐	
for Blank Analyses, Reruns, and Reanalyses	☒	☐	
for Duplicate Analyses, Reruns and Reanalyses	☒	☐	
Raw Data (Phosphorimeter Readings and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Instrument Identifications	☒	☐	
Dates of Analysis	☒	☐	
Initial and Continuing Calibration			
Instrument Identifications	☒	☐	
Initial Calibration Results and Linearity	☒	☐	
Initial and Continuing Calibration Verification	☒	☐	
Calibration Standard Concentration, Traceability and Dilution Logs	☒	☐	
Raw Data (Phosphorimeter Readings and Printouts or Notebook Pages	☒	☐	
Sample Preparation Data	☒	☐	
Detection Limit Verification	☒	☐	
Matrix Spike Recovery			☒ 4/28/93
Results Reports for Matrix Spike Analyses, Reruns and Reanalyses	☒	☐	
Raw Data (Phosphorimeter Readings and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Matrix Spike Sample Identifications	☒	☐	
Matrix Spike Source Traceability and Dilution Log	☒	☐	
Instrument Identifications	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	
Laboratory Control Samples (LCS)			
Results Reports for LCS Analyses, Reruns and Reanalyses	☒	☐	
Raw Data (Phosphorimeter Readings and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Concentration and Traceability	☒	☐	
Instrument Identifications	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6732

TMA
Thermo Analytical Inc.

TMA/Norcal
2030 Wright Avenue
P. O. Box 4040
Richmond, CA 94804-0040
(510) 235-2633 Fax No. (510) 235-0438

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APR 1993
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April 22, 1993

SENT BY FEDERAL EXPRESS

Ref. TMA/Norcal N3-02-065-7159

Ms. Briana Colley
Westinghouse Hanford Company
2355 Stevens Drive
MSIN H4-23
345 Hills Street/3000 Area
Richland, WA 99352

Dear Ms. Colley:

Enclosed in the Summary Data Section, are the gross alpha, gross beta, ^{14}C, ^{90}Sr, ^{99}Tc, total uranium, isotopic uranium, isotopic plutonium, ^{237}Np, ^{241}Am, and gamma scan results for the water samples from 241-T-106 Location we received 10 February 1993. The QA/QC results are also given in the Summary Data Section. The Summary Data Section is numbered pages 1 to 54, and the appendices are numbered pages 53A, 54A, and pages 55 through 373.

Please call if you have any questions concerning this data.

Sincerely,

D. P. Kharkar

Dinkar P. Kharkar, Ph.D.
Manager, Nuclear Programs

DPK/ss

Enclosures: Section 1 and 2
Appendices

9613492.6733

SECTION 1 Case Narrative

SDG	7159		Client	Westinghouse Hanford
Contact	Dinkar P. Kharkar		Contract	MBH-SVV-069262

CASE NARRATIVE

1.0 GENERAL

Water sample results from 241-T-106 Location (TMA/Norcal Group 7159) are provided in this report. TMA/Norcal Group 7159 is comprised of the two samples listed on the Chain-of-Custody documents below which are identified as samples 1 through 2.

1.1 CHAINS-OF-CUSTODY

This report includes data from samples delivered under Chain-of-Custody documents Field Logbook No. EFL-1053.

1.2 SAMPLE VOLUME

Four L, 2 L, 1 L plastic bottles, and 250 mL glass bottles containing the samples were received for the analyses.

1.3 MISSING SAMPLES

All samples were accounted for in an undamaged condition.

1.4 HOLDING TIMES

Samples were collected on 2/08/93 and sample processing was initiated within 180 days of collection.

2.0 QUALITY CONTROL

The internal quality control consisted of one sample each of a laboratory control, a blank, and a replicate. All original analyses were performed with QC samples 7159-3 through 7159-9.

The QC samples were prepared and labelled by the quality control officer. Copies of The QC notebook pages are included in the data package.

2.1 LABORATORY CONTROL SAMPLES

LCS recoveries for all nuclides were satisfactory. The MDA of the result for ^{14}C was higher than the RDL due to low counting efficiency. The residue on the planchet was higher than the nominal residue weight of 5-150 mgm.

2.2 BLANKS

The MDA's of the results for all analyses except ^{14}C met RDL requirements. The higher MDA for ^{14}C was due to a low chemical yield. The ^{14}C result is underlined because the negative result is less than the negative of its 2 σ counting error.

SDG	7159	Client	Westinghouse Hanford
Contact	Dinkar P. Kharkar	Contract	MBH-SVV-069262

CASE NARRATIVE

2.3 REPLICATES

Results were satisfactory for all replicate analyses. The 2 σ error of the gross alapha for the original sample number B07K04 and the 2 σ error of ^{90}Sr for the replicate of sampale number B07ML0 were underlined because the errors were larger than both the MDA's and the results implying that the MDA's may not be a good estimate of the "real" minimum detectable activity. The negative result of ^{14}C for the original sample number B07K04 was underlined because it was less than the negative of its 2 σ counting error.

3.0 ANALYTICAL NOTES

3.1 Gross Alpha Analyses: The average MDA for gross alpha was (2 ± 2) pCi/L. Gross alpha activity above the RDL was not found in the samples.

3.2 Gross Beta Analyses: The average MDA for gross beta was (2 ± 0) pCi/L. Gross beta activity above the RDL was not found in the samples.

3.3 Carbon-14 Analyses: The average MDA for five analyses was (60 ± 20) pCi/L. ^{14}C activity above the RDL was not found in the samples.

3.4 Strontium-90 Analyses: The average yield for five analyses was (81 ± 10)%. The lowest yield was 74% and the highest was 87%. The average MDA was (0.8 ± 0.2) pCi/L. ^{90}Sr activity above the RDL was not found in the samples.

3.5 Technicium-99 Analyses: The average yield for five analyses was (62 ± 11)%. The lowest yield was 58% and the highest was 70%. The average MDA was (3 ± 0.9) pCi/L. ^{99}Tc activity above the RDL was not found in the samples.

3.6 Total Uranium Analyses: The average MDA for total uranium was (2 ± 4) μg/L. Uranium was not found in the samples.

3.7 Uranium-233, 234, 238 Analyses: The average yield for five analyses was (68 ± 17)%. The lowest yield was 62% and the highest was 82%. The average MDA was (0.2 ± 0.1) pCi/L. $^{233/234}U$ and ^{238}U activity above the RDL was not found in the samples.

3.8 Plutonium-238, 239/240 Analyses: The average yield for five analyses was (54 ± 23)%. The lowest yield was 40% and the highest was 71%. The average MDA was (0.02 ± 0.01) pCi/L. Plutonium activity above the RDL was not found in the samples.

SDG	7159	Client	Westinghouse Hanford
Contact	Dinkar P. Kharkar	Contract	MBH-SVV-069262

CASE NARRATIVE

3.9 Americium-241 Analyses: The average yield for five analyses was (71 ± 23)%. The lowest yield was 53% and the highest yield was 84%. The average MDA was (0.03 ± 0.02) pCi/L. Americium activity above the RDL was not found in the samples. The samples were counted for less than the nominal count time of 700 minutes.

3.10 Neptunium-237 Analyses: The average yield for six analyses was (50 ± 9)%. The lowest yield was 46% and the highest yield was 59%. The average MDA was (0.1 ± 0.1) pCi/L. Neptunium-237 activity above the RDL was not found in the samples.

3.11 Gamma Scan Analyses: Gamma scan analysis did not find positive concentration of gamma nuclides in the samples.

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SECTION 2 Summary Data Including QC's

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TMA NORCAL
REPORTING GROUP 7159

SDG	7159
Contact	Dinkar Kharkar

Client	Westinghouse Hanford
Contract	MBH-SVV-069262

SUMMARY DATA SECTION

TABLE OF CONTENTS

About this section	1
Sample Summaries	3
Prep Batch Summary	5
Work Summary	6
Reagent Blanks	9
Lab Control Samples	11
Replicates	13
Data Sheets	15
Result Summaries	19
Method Summaries	30
Report Guides	41

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-TOC
Version	2.23
Report date	04/22/93

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

REPORT GUIDE

Client Westinghouse Hanford
Contract MBH-SVV-069262

ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample Summary Reports (variously titled LAB, SAMPLE, DEPARTMENT and QC SUMMARY to reflect the sort order) show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

REAGENT BLANKS

The Reagent Blank Reports, one for each Reagent Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

ABOUT THE DATA SUMMARY SECTION

REPLICATES

The Replicate Reports, one for each Replicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

RESULT SUMMARIES

The Result Summary Reports, one for each test used in the SDG, show all results and QC for one parameter on one page. (A test is a short code for the method used to do certain work to the client's specification.)

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show performance data for each method on one page.

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

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TMA NORCAL

REPORTING GROUP 7159

SAMPLE SUMMARY

SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID	MATRIX	CHAIN OF CUSTODY	COLLECTED	RECEIVED	SAMPLE WT/VOL	BASIS WT/VOL	% MOIST	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
B07K04	WATER	EFL-1053	02/08/93	02/10/93				N302065-01	7159-001
B07ML0	WATER	EFL-1053	02/08/93	02/10/93				N302065-02	7159-002
Reagent Blank	WATER							N302065-04	7159-004
Reagent Blank	WATER							N302065-08	7159-008
Lab Control Sample	WATER							N302065-03	7159-003
Lab Control Sample	WATER							N302065-07	7159-007
Replicate (N302065-01)	WATER		02/08/93					N302065-05	7159-005
Replicate (N302065-02)	WATER		02/08/93					N302065-06	7159-006

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CS
Version 2.23
Report date 04/22/93

9613492.6742

TMA NORCAL

REPORTING GROUP 7159

QC SUMMARY

SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	LEVEL	COLLECTED	RECEIVED	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7159	EFL-1053	B07K04	WATER		02/08/93	02/10/93	N302065-01	7159-001
		B07ML0	WATER		02/08/93	02/10/93	N302065-02	7159-002
		Reagent Blank	WATER				N302065-04	7159-004
		Reagent Blank	WATER				N302065-08	7159-008
		Lab Control Sample	WATER				N302065-03	7159-003
		Lab Control Sample	WATER				N302065-07	7159-007
		Replicate (N302065-01)	WATER		02/08/93		N302065-05	7159-005
		Replicate (N302065-02)	WATER		02/08/93		N302065-06	7159-006

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-QS
Version 2.23
Report date 04/22/93

9613492.6745

TMA NORCAL

REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

PREP BATCH SUMMARY

Client Westinghouse Hanford
Contract MBH-SVV-069262

TEST	MATRIX	METHOD	PREPARATION BATCH	PREP ERROR	PLANCHETS ANALYZED CLIENT	RE	BLANK	LCS	REP/ORIG	MS/ORIG	QUALIFIERS
Alpha Spectroscopy											
AM	WATER	Americium 241 in Water	2436-034	5.0	2		1	1	1/1		
NP	WATER	Neptunium in Water	2436-034	5.0	2		2	1	1/1		
PU	WATER	Plutonium, Isotopic in Water	2436-034	5.0	2		1	1	1/1		
U	WATER	Uranium, Isotopic in Water	2436-034	5.0	2		1	1	1/1		
Beta Counting											
TC	WATER	Technetium 99 in Water	2436-034	10.0	2		1	1	1/1		
Y	WATER	Strontium 90 in Water	2436-034	10.0	2		1	1	1/1		
Gas Proportional Counting											
80A	WATER	Gross Alpha in Water	2436-034	20.0	2		1	1	1/1		
80B	WATER	Gross Beta in Water	2436-034	15.0	2		1	1	1/1		
Gamma Scan											
GAM	WATER	Gamma Emitters	2436-034	15.0	2		1	1	1/1		
Kinetic Phosphorimetry											
U_T	WATER	Uranium, Total in Water	2436-034	9.0	2		1	1	1/1		
Liquid Scintillation											
C	WATER	Carbon 14 in Water	2436-034	10.0	2		1	1	1/1		

Replicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.
Blank and LCS planchets are those in the same preparation batch as some Client, Replicate or Spike sample.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-PBS
Version 2.23
Report date 04/22/93

9613492.6744

TMA NORCAL

REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

WORK SUMMARY

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / MATRIX / CUSTODY	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	PREPARED	ANALYZED	METHOD
B07K04	N302065-01	7159-001	80A/80		03/15/93	03/16/93	Gross Alpha in Water
WATER	02/08/93	7159-001	80B/80		03/15/93	03/16/93	Gross Beta in Water
EFL-1053	02/10/93	7159-001	AM		03/23/93	04/12/93	Americium 241 in Water
		7159-001	C		03/27/93	03/27/93	Carbon 14 in Water
		7159-001	GAM		03/26/93	03/26/93	Gamma Emitters
		7159-001	NP		04/03/93	04/03/93	Neptunium in Water
		7159-001	PU		03/23/93	04/12/93	Plutonium, Isotopic in Water
		7159-001	TC	A1	03/24/93	03/31/93	Technetium 99 in Water
		7159-001	U		03/23/93	04/09/93	Uranium, Isotopic in Water
		7159-001	U_T		03/18/93	03/18/93	Uranium, Total in Water
		7159-001	Y		03/17/93	03/17/93	Strontium 90 in Water
B07ML0	N302065-02	7159-002	80A/80		03/15/93	03/16/93	Gross Alpha in Water
WATER	02/08/93	7159-002	80B/80		03/15/93	03/16/93	Gross Beta in Water
EFL-1053	02/10/93	7159-002	AM		03/23/93	04/12/93	Americium 241 in Water
		7159-002	C		03/27/93	03/27/93	Carbon 14 in Water
		7159-002	GAM		03/26/93	03/26/93	Gamma Emitters
		7159-002	NP		04/03/93	04/03/93	Neptunium in Water
		7159-002	PU		03/23/93	04/12/93	Plutonium, Isotopic in Water
		7159-002	TC	A1	03/24/93	03/29/93	Technetium 99 in Water
		7159-002	U		03/23/93	04/02/93	Uranium, Isotopic in Water
		7159-002	U_T		03/18/93	03/18/93	Uranium, Total in Water
		7159-002	Y		03/17/93	03/17/93	Strontium 90 in Water
Reagent Blank	N302065-04	7159-004	80A/80		03/15/93	03/16/93	Gross Alpha in Water
WATER		7159-004	80B/80		03/15/93	03/16/93	Gross Beta in Water
		7159-004	AM		03/23/93	04/12/93	Americium 241 in Water
		7159-004	C		03/27/93	03/27/93	Carbon 14 in Water
		7159-004	GAM		03/27/93	03/27/93	Gamma Emitters
		7159-004	NP		04/03/93	04/03/93	Neptunium in Water
		7159-004	PU		03/23/93	04/12/93	Plutonium, Isotopic in Water
		7159-004	U		03/23/93	04/02/93	Uranium, Isotopic in Water
		7159-004	U_T		03/18/93	03/18/93	Uranium, Total in Water
		7159-004	Y		03/17/93	03/27/93	Strontium 90 in Water
Reagent Blank	N302065-08	7159-008	NP		04/03/93	04/03/93	Neptunium in Water
WATER		7159-008	TC		03/24/93	03/29/93	Technetium 99 in Water

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CWS
Version 2.23
Report date 04/22/93

TMA NORCAL

REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

WORK SUMMARY, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / MATRIX / CUSTODY	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	PREPARED	ANALYZED	METHOD
Lab Control Sample	N302065-03	7159-003	80A/80		03/15/93	03/16/93	Gross Alpha in Water
WATER		7159-003	80B/80		03/15/93	03/16/93	Gross Beta in Water
		7159-003	AM		03/23/93	04/12/93	Americium 241 in Water
		7159-003	C		03/27/93	03/27/93	Carbon 14 in Water
		7159-003	GAM		03/27/93	03/27/93	Gamma Emitters
		7159-003	NP		04/03/93	04/03/93	Neptunium in Water
		7159-003	PU		03/23/93	04/12/93	Plutonium, Isotopic in Water
		7159-003	U		03/23/93	04/02/93	Uranium, Isotopic in Water
		7159-003	U_T		03/18/93	03/18/93	Uranium, Total in Water
		7159-003	Y		03/17/93	03/17/93	Strontium 90 in Water
Lab Control Sample	N302065-07	7159-007	TC		03/24/93	03/28/93	Technetium 99 in Water
WATER							
Replicate (N302065-01)	N302065-05	7159-005	80A/80		03/15/93	03/16/93	Gross Alpha in Water
WATER	02/08/93	7159-005	80B/80		03/15/93	03/16/93	Gross Beta in Water
EFL-1053	02/10/93	7159-005	AM		03/23/93	04/12/93	Americium 241 in Water
		7159-005	C		03/27/93	03/28/93	Carbon 14 in Water
		7159-005	GAM		03/27/93	03/27/93	Gamma Emitters
		7159-005	NP		04/03/93	04/03/93	Neptunium in Water
		7159-005	PU		03/23/93	04/12/93	Plutonium, Isotopic in Water
		7159-005	U_T		03/18/93	03/18/93	Uranium, Total in Water
Replicate (N302065-02)	N302065-06	7159-006	TC		03/24/93	03/29/93	Technetium 99 in Water
WATER	02/08/93	7159-006	U		03/23/93	04/02/93	Uranium, Isotopic in Water
EFL-1053	02/10/93	7159-006	Y		03/17/93	03/17/93	Strontium 90 in Water

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CWS
Version 2.23
Report date 04/22/93

9613492.6746

TMA NORCAL

REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

WORK SUMMARY, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / MATRIX / CUSTODY	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	PREPARED	ANALYZED	METHOD

COUNTS OF TESTS BY SAMPLE TYPE

TEST	METHOD	REFERENCE	CLIENT	RE	BLANK	LCS	REP SPIKE	TOTALS
80A/80	Gross Alpha in Water	ASTM 1943-90; EPA 900	2		1	1	1	5
80B/80	Gross Beta in Water	ASTM 1943-90; EPA 900	2		1	1	1	5
AM	Americium 241 in Water	HASL 300/AM-03	2		1	1	1	5
C	Carbon 14 in Water		2		1	1	1	5
GAM	Gamma Emitters	ASTM 3649-85; EPA 901.1	2		1	1	1	5
NP	Neptunium in Water		2		2	1	1	6
PU	Plutonium, Isotopic in Water	ASTM 3865-90	2		1	1	1	5
TC	Technetium 99 in Water	HASL 300/TC-01	2		1	1	1	5
U	Uranium, Isotopic in Water	ASTM 3972-90	2		1	1	1	5
U_T	Uranium, Total in Water	ASTM D5174-91	2		1	1	1	5
Y	Strontium 90 in Water	HASL 300/SR-01,-02	2		1	1	1	5
TOTALS			22		12	11	11	56

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CWS
Version 2.23
Report date 04/22/93

9613492.6747

TMA NORCAL
REPORTING GROUP 7159

N302065-04

REAGENT BLANK

Reagent Blank

SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302065-04
Dept sample id 7159-004

Matrix WATER
Material

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	Alpha	-0.099	1.0	2	3	U	80A
Gross Beta	Beta	0.40	1.1	2	4	U	80B
Uranium 233/234		0	0.067	0.2	0.2	U	U
Uranium 235	15117-96-1	0	0.041	0.2	0.2	U	U
Uranium 238	7440-61-1	0.017	0.034	0.1	0.2	U	U
Total Uranium (ug/L)		U		4		U	U_T
Plutonium 238	13981-16-3	-0.004	0.009	0.03	0.05	U	PU
Plutonium 239/240		0	0.009	0.03	0.05	U	PU
Americium 241	14596-10-2	0.003	0.020	0.05	0.05	U	AM
Strontium 90	10098-97-2	0.046	0.18	0.7	2	U	Y
Carbon 14	14762-75-5	-49	34	60	50	U	C
Neptunium 237	13994-20-2	0.12	0.090	0.09	1	J	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		200		U	GAM
Iron 59	14596-12-4	U		20	30	U	GAM
Chromium 51	14392-02-0	U		50		U	GAM
Cobalt 60	10198-40-0	U		10	30	U	GAM
Zinc 65	13982-39-3	U		20		U	GAM
Ruthenium 106	13967-48-1	U		80		U	GAM
Cesium 134	13967-70-9	U		9		U	GAM
Cesium 137	10045-97-3	U		9	20	U	GAM
Cerium 144	14762-78-8	U		40		U	GAM
Europium 152	14683-23-9	U		20	40	U	GAM
Europium 154	15585-10-1	U		10	40	U	GAM
Radium 226	13982-63-3	U		20		U	GAM
Thorium 228	14274-82-9	U		10		U	GAM
Thorium 232	7440-29-1	U		40		U	GAM

All Blanks OK except carbon 14 slightly higher than RDL (5)

Both sample results [illegible]

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/22/93

9613492.6748

N302065-08

TMA NORCAL
REPORTING GROUP 7159

REAGENT BLANK

Reagent Blank

SDG	7159	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302065-08	Matrix	WATER
Dept sample id	7159-008	Material	

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Technetium 99	14133-76-7	1.5	1.2	3	5	U	TC
Neptunium 237	13994-20-2	0.051	0.061	0.08	1	U	NP

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/22/93

9613492.6749

N302065-03

TMA NORCAL

REPORTING GROUP 7159

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302065-03
Dept sample id 7159-003

Matrix WATER
Material

PARAMETER	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	56	7.2	3	3		80A	66.0	2.6	85	OK 69-131	
Gross Beta	36	2.6	2	4		80B	39.9	1.6	90	OK 77-123	
Uranium 233/234	4.7	0.70	0.1	0.2		U	4.78	0.19	98	OK 76-124	
Uranium 235	0.24	0.13	0.1	0.2		U	0.219	0.018	110	OK 10-190	
Uranium 238	4.7	0.70	0.1	0.2		U	4.78	0.19	98	OK 76-124	
Total Uranium (ug/L)	25	4.8	4			U_T	24.4	0.98	103	OK 67-133	
Plutonium 238	0	0.006	0.02	0.05	U	PU	0	0			
Plutonium 239/240	1.0	0.13	0.02	0.05		PU	1.08	0.043	93	OK 79-121	
Americium 241	1.4	0.15	0.03	0.05		AM	1.35	0.054	104	OK 80-120	
Strontium 90	12	1.9	0.7	2		Y	12.0	0.48	100	OK 71-129	
Carbon 14	3600	86	70	50		C	3810	150	94	OK 84-116	
Neptunium 237	23	1.2	0.2	1		NP	25.6	1.0	90	OK 89-111	
GAMMA SCAN ANALYTES											
Potassium 40	U		80		U	GAM					
Iron 59	U		20	30	U	GAM					
Chromium 51	U		60		U	GAM					
Cobalt 60	280	22		30		GAM	314	13	89	OK 77-123	
Zinc 65	U		20		U	GAM					
Ruthenium 106	U		70		U	GAM					
Cesium 134	U		10		U	GAM					
Cesium 137	210	15		20		GAM	213	8.5	99	OK 74-126	
Cerium 144	U		40		U	GAM					
Europium 152	U		20	40	U	GAM					
Europium 154	U		10	40	U	GAM					
Radium 226	U		20		U	GAM					
Thorium 228	U		10		U	GAM					
Thorium 232	U		50		U	GAM					

Equation used to check — $\frac{\text{LCS Found}}{\text{LCS True}} \times 100$

~~Sample1 - Sample2 / Sample1 + Sample2 × 100 =~~

All LCS's OK

Pu 239/40 acceptable for Pu 238

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-LCS
Version 2.23
Report date 04/22/93

9613492.6750

N302065-07

TMA NORCAL

REPORTING GROUP 7159

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302065-07
Dept sample id 7159-007

Matrix WATER
Material

PARAMETER	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Technetium 99	160	6.0	3	5		TC	153	6.1	105	OK 81-119	

LAB CONTROL SAMPLES
Page 2
SUMMARY DATA SECTION
Page 12

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-LCS
Version 2.23
Report date 04/22/93

9613492.6751

N302065-05

TMA NORCAL

REPORTING GROUP 7159

REPLICATE

B07K04

SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

REPLICATE
Lab sample id N302065-05
Dept sample id 7159-005

ORIGINAL
Lab sample id N302065-01
Dept sample id 7159-001
Received 02/10/93

Client sample id B07K04
Matrix WATER
Collected 02/08/93
Chain of custody id EFL-1053

PARAMETER	REPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Gross Alpha	-0.14	0.85	1	3	U	80A	0.75	1.1	1	U	-	
Gross Beta	1.1	1.2	2	4	U	80B	-0.33	1.2	2	U	-	
Total Uranium (ug/L)	U		0.08		U	U_T	U		0.08	U	-	
Plutonium 238	0	0.007	0.03	0.05	U	PU	-0.003	0.006	0.02	U	-	
Plutonium 239/240	0.007	0.007	0.03	0.05	U	PU	-0.003	0.006	0.02	U	-	
Americium 241	0.002	0.009	0.02	0.05	U	AM	0.004	0.013	0.02	U	-	
Carbon 14	-11	32	50	50	U	C	-45	30	50	U	-	
Neptunium 237	0.021	0.042	0.08	1	U	NP	-0.009	0.036	0.09	U	-	
GAMMA SCAN ANALYTES												
Potassium 40	U		90		U	GAM	U		100	U	-	
Iron 59	U		30	30	U	GAM	U		30	U	-	
Chromium 51	U		200		U	GAM	U		200	U	-	
Cobalt 60	U		8	30	U	GAM	U		10	U	-	
Zinc 65	U		20		U	GAM	U		20	U	-	
Ruthenium 106	U		60		U	GAM	U		80	U	-	
Cesium 134	U		7		U	GAM	U		9	U	-	
Cesium 137	U		7	20	U	GAM	U		10	U	-	
Cerium 144	U		40		U	GAM	U		50	U	-	
Europium 152	U		10	40	U	GAM	U		20	U	-	
Europium 154	U		9	40	U	GAM	U		10	U	-	
Radium 226	U		10		U	GAM	U		20	U	-	
Thorium 228	U		10		U	GAM	U		30	U	-	
Thorium 232	U		30		U	GAM	U		40	U	-	

All ~~pr~~ Replicates < MDA

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-REP
Version 2.23
Report date 04/22/93

9613492.6752

N302065-06

TMA NORCAL

REPORTING GROUP 7159

REPLICATE

B07ML0

SDG	7159			Client	Westinghouse Hanford
Contact	Dinkar Kharkar			Contract	MBH-SVV-069262
	REPLICATE		ORIGINAL		
Lab sample id	N302065-06	Lab sample id	N302065-02	Client sample id	B07ML0
Dept sample id	7159-006	Dept sample id	7159-002	Matrix	WATER
		Received	02/10/93	Collected	02/08/93
				Chain of custody id	EFL-1053

PARAMETER	REPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
Uranium 233/234	0.036	0.036	0.1	0.2	U	U	0.086	0.070	0.1	U	-		
Uranium 235	0	0.043	0.2	0.2	U	U	0.042	0.042	0.2	U	-		
Uranium 238	0	0.036	0.1	0.2	U	U	0.017	0.035	0.1	U	-		
Strontium 90	-0.28	1.2	0.8	2	U	Y	0.051	0.21	0.9	U	-		
Technetium 99	1.5	1.2	3	5	U	TC	2.5	1.8	3	U	-		

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-REP
Version	2.23
Report date	04/22/93

9613492.6753

TMA NORCAL
REPORTING GROUP 7159

N302065-04

REAGENT BLANK

Reagent Blank

SDG 7159
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302065-04
Dept sample id 7159-004
Matrix WATER
Material

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	Alpha	-0.099	1.0	2	3	U	80A
Gross Beta	Beta	0.40	1.1	2	4	U	80B
Uranium 233/234		0	0.067	0.2	0.2	U	U
Uranium 235	15117-96-1	0	0.041	0.2	0.2	U	U
Uranium 238	7440-61-1	0.017	0.034	0.1	0.2	U	U
Total Uranium (ug/L)		U		4		U	U_T
Plutonium 238	13981-16-3	-0.004	0.009	0.03	0.05	U	PU
Plutonium 239/240		0	0.009	0.03	0.05	U	PU
Americium 241	14596-10-2	0.003	0.020	0.05	0.05	U	AM
Strontium 90	10098-97-2	0.046	0.18	0.7	2	U	Y
Carbon 14	14762-75-5	-49	34	60	50	U	C
Neptunium 237	13994-20-2	0.12	0.090	0.09	1	J	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		200		U	GAM
Iron 59	14596-12-4	U		20	30	U	GAM
Chromium 51	14392-02-0	U		50		U	GAM
Cobalt 60	10198-40-0	U		10	30	U	GAM
Zinc 65	13982-39-3	U		20		U	GAM
Ruthenium 106	13967-48-1	U		80		U	GAM
Cesium 134	13967-70-9	U		9		U	GAM
Cesium 137	10045-97-3	U		9	20	U	GAM
Cerium 144	14762-78-8	U		40		U	GAM
Europium 152	14683-23-9	U		20	40	U	GAM
Europium 154	15585-10-1	U		10	40	U	GAM
Radium 226	13982-63-3	U		20		U	GAM
Thorium 228	14274-82-9	U		10		U	GAM
Thorium 232	7440-29-1	U		40		U	GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/22/93

9613492.6754

N302065-08

TMA NORCAL
REPORTING GROUP 7159

REAGENT BLANK

Reagent Blank

SDG	7159	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302065-08	Matrix	WATER
Dept sample id	7159-008	Material	

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Technetium 99	14133-76-7	1.5	1.2	3	5	U	TC
Neptunium 237	13994-20-2	0.051	0.061	0.08	1	U	NP

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/22/93

9613492.6755

N302065-03

TMA NORCAL

REPORTING GROUP 7159

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302065-03
Dept sample id 7159-003

Matrix WATER
Material

PARAMETER	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	56	7.2	3	3		80A	66.0	2.6	85	69-131	
Gross Beta	36	2.6	2	4		80B	39.9	1.6	90	77-123	
Uranium 233/234	4.7	0.70	0.1	0.2		U	4.78	0.19	98	76-124	
Uranium 235	0.24	0.13	0.1	0.2		U	0.219	0.018	110	10-190	
Uranium 238	4.7	0.70	0.1	0.2		U	4.78	0.19	98	76-124	
Total Uranium (ug/L)	25	4.8	4			U_T	24.4	0.98	103	67-133	
Plutonium 238	0	0.006	0.02	0.05	U	PU	0	0			
Plutonium 239/240	1.0	0.13	0.02	0.05		PU	1.08	0.043	93	79-121	
Americium 241	1.4	0.15	0.03	0.05		AM	1.35	0.054	104	80-120	
Strontium 90	12	1.9	0.7	2		Y	12.0	0.48	100	71-129	
Carbon 14	3600	86	70	50		C	3810	150	94	84-116	
Neptunium 237	23	1.2	0.2	1		NP	25.6	1.0	90	89-111	
GAMMA SCAN ANALYTES											
Potassium 40	U		80		U	GAM					
Iron 59	U		20	30	U	GAM					
Chromium 51	U		60		U	GAM					
Cobalt 60	280	22		30		GAM	314	13	89	77-123	
Zinc 65	U		20		U	GAM					
Ruthenium 106	U		70		U	GAM					
Cesium 134	U		10		U	GAM					
Cesium 137	210	15		20		GAM	213	8.5	99	74-126	
Cerium 144	U		40		U	GAM					
Europium 152	U		20	40	U	GAM					
Europium 154	U		10	40	U	GAM					
Radium 226	U		20		U	GAM					
Thorium 228	U		10		U	GAM					
Thorium 232	U		50		U	GAM					

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-LCS
Version 2.23
Report date 04/22/93

9613492.6756

N302065-07

TMA NORCAL

REPORTING GROUP 7159

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302065-07 -
Dept sample id 7159-007

Matrix WATER
Material

PARAMETER	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Technetium 99	160	6.0	3	5		TC	153	6.1	105	81-119	

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-LCS
Version 2.23
Report date 04/22/93

9613492.6757

N302065-05

TMA NORCAL

REPORTING GROUP 7159

REPLICATE

B07K04

SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

REPLICATE
Lab sample id N302065-05
Dept sample id 7159-005

ORIGINAL
Lab sample id N302065-01
Dept sample id 7159-001
Received 02/10/93

Client sample id B07K04
Matrix WATER
Collected 02/08/93
Chain of custody id EFL-1053

PARAMETER	REPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Gross Alpha	-0.14	0.85	1	3	U	80A	0.75	1.1	1	U	-	
Gross Beta	1.1	1.2	2	4	U	80B	-0.33	1.2	2	U	-	
Total Uranium (ug/L)	U		0.08		U	U_T	U		0.08	U	-	
Plutonium 238	0	0.007	0.03	0.05	U	PU	-0.003	0.006	0.02	U	-	
Plutonium 239/240	0.007	0.007	0.03	0.05	U	PU	-0.003	0.006	0.02	U	-	
Americium 241	0.002	0.009	0.02	0.05	U	AM	0.004	0.013	0.02	U	-	
Carbon 14	-11	32	50	50	U	C	-45	30	50	U	-	
Neptunium 237	0.021	0.042	0.08	1	U	NP	-0.009	0.036	0.09	U	-	
GAMMA SCAN ANALYTES												
Potassium 40	U		90		U	GAM	U		100	U	-	
Iron 59	U		30	30	U	GAM	U		30	U	-	
Chromium 51	U		200		U	GAM	U		200	U	-	
Cobalt 60	U		8	30	U	GAM	U		10	U	-	
Zinc 65	U		20		U	GAM	U		20	U	-	
Ruthenium 106	U		60		U	GAM	U		80	U	-	
Cesium 134	U		7		U	GAM	U		9	U	-	
Cesium 137	U		7	20	U	GAM	U		10	U	-	
Cerium 144	U		40		U	GAM	U		50	U	-	
Europium 152	U		10	40	U	GAM	U		20	U	-	
Europium 154	U		9	40	U	GAM	U		10	U	-	
Radium 226	U		10		U	GAM	U		20	U	-	
Thorium 228	U		10		U	GAM	U		30	U	-	
Thorium 232	U		30		U	GAM	U		40	U	-	

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-REP
Version 2.23
Report date 04/22/93

9613492.6758

N302065-06

TMA NORCAL

REPORTING GROUP 7159

REPLICATE

B07ML0

SDG	7159			Client	Westinghouse Hanford
Contact	Dinkar Kharkar			Contract	MBH-SVV-069262
REPLICATE			ORIGINAL		
Lab sample id	N302065-06	-	Lab sample id N302065-02	Client sample id	B07ML0
Dept sample id	7159-006		Dept sample id 7159-002	Matrix	WATER
			Received 02/10/93	Collected	02/08/93
				Chain of custody id	EFL-1053

PARAMETER	REPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Uranium 233/234	0.036	0.036	0.1	0.2	U	U	0.086	0.070	0.1	U	-	
Uranium 235	0	0.043	0.2	0.2	U	U	0.042	0.042	0.2	U	-	
Uranium 238	0	0.036	0.1	0.2	U	U	0.017	0.035	0.1	U	-	
Strontium 90	-0.28	1.2	0.8	2	U	Y	0.051	0.21	0.9	U	-	
Technetium 99	1.5	1.2	3	5	U	TC	2.5	1.8	3	U	-	

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-REP
Version	2.23
Report date	04/22/93

9613492.6759

N302065-01

TMA NORCAL
REPORTING GROUP 7159

DATA SHEET

B07K04

SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302065-01
Dept sample id 7159-001
Received 02/10/93

Client sample id B07K04
Matrix WATER
Collected 02/08/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	Alpha	0.75	1.1	1	3	U	80A
Gross Beta	Beta	-0.33	1.2	2	4	U	80B
Uranium 233/234		0.038	0.038	0.06	0.2	U	U
Uranium 235	15117-96-1	0.008	0.030	0.06	0.2	U	U
Uranium 238	7440-61-1	-0.013	0.013	0.06	0.2	U	U
Total Uranium (ug/L)		U		0.08		U	U_T
Plutonium 238	13981-16-3	-0.003	0.006	0.02	0.05	U	PU
Plutonium 239/240		-0.003	0.006	0.02	0.05	U	PU
Americium 241	14596-10-2	0.004	0.013	0.02	0.05	U	AM
Strontium 90	10098-97-2	0.10	0.20	0.8	2	U	Y
Technetium 99	14133-76-7	2.0	1.2	2	5	J	TC
Carbon 14	14762-75-5	-45	30	50	50	U	C
Neptunium 237	13994-20-2	-0.009	0.036	0.09	1	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		100		U	GAM
Iron 59	14596-12-4	U		30	30	U	GAM
Chromium 51	14392-02-0	U		200		U	GAM
Cobalt 60	10198-40-0	U		10	30	U	GAM
Zinc 65	13982-39-3	U		20		U	GAM
Ruthenium 106	13967-48-1	U		80		U	GAM
Cesium 134	13967-70-9	U		9		U	GAM
Cesium 137	10045-97-3	U		10	20	U	GAM
Cerium 144	14762-78-8	U		50		U	GAM
Europium 152	14683-23-9	U		20	40	U	GAM
Europium 154	15585-10-1	U		10	40	U	GAM
Radium 226	13982-63-3	U		20		U	GAM
Thorium 228	14274-82-9	U		30		U	GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/22/93

9613492.6760

TMA NORCAL
REPORTING GROUP 7159

N302065-01

DATA SHEET, cont

B07K04

SDG	7159	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302065-01	Client sample id	B07K04
Dept sample id	7159-001	Matrix	WATER
Received	02/10/93	Collected	02/08/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		40		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/22/93

9613492.6761

N302065-02

TMA NORCAL
REPORTING GROUP 7159

DATA SHEET

B07ML0

SDG 7159
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302065-02
Dept sample id 7159-002
Received 02/10/93
Client sample id B07ML0
Matrix WATER
Collected 02/08/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	Alpha	0.15	1.2	2	3	U	80A
Gross Beta	Beta	0.34	1.1	2	4	U	80B
Uranium 233/234		0.086	0.070	0.1	0.2	U	U
Uranium 235	15117-96-1	0.042	0.042	0.2	0.2	U	U
Uranium 238	7440-61-1	0.017	0.035	0.1	0.2	U	U
Total Uranium (ug/L)		U		0.08		U	U_T
Plutonium 238	13981-16-3	0.002	0.005	0.02	0.05	U	PU
Plutonium 239/240		0	0.005	0.02	0.05	U	PU
Americium 241	14596-10-2	0.015	0.020	0.03	0.05	U	AM
Strontium 90	10098-97-2	0.051	0.21	0.9	2	U	Y
Technetium 99	14133-76-7	2.5	1.8	3	5	U	TC
Carbon 14	14762-75-5	-46	29	50	50	U	C
Neptunium 237	13994-20-2	0.10	0.070	0.04	1	BJ	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		100		U	GAM
Iron 59	14596-12-4	U		40	30	U	GAM
Chromium 51	14392-02-0	U		200		U	GAM
Cobalt 60	10198-40-0	U		10	30	U	GAM
Zinc 65	13982-39-3	U		20		U	GAM
Ruthenium 106	13967-48-1	U		100		U	GAM
Cesium 134	13967-70-9	U		9		U	GAM
Cesium 137	10045-97-3	U		9	20	U	GAM
Cerium 144	14762-78-8	U		50		U	GAM
Europium 152	14683-23-9	U		20	40	U	GAM
Europium 154	15585-10-1	U		10	40	U	GAM
Radium 226	13982-63-3	U		20		U	GAM
Thorium 228	14274-82-9	U		20		U	GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/22/93

9613492.6762

TMA NORCAL
REPORTING GROUP 7159

N302065-02

DATA SHEET, cont

B07ML0

SDG	7159	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302065-02	Client sample id	B07ML0
Dept sample id	7159-002	Matrix	WATER
Received	02/10/93	Collected	02/08/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		40		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/22/93

9613492.6763

TMA NORCAL

REPORTING GROUP 7159

Test AM Matrix WATER
SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

RESULT SUMMARY

AMERICIUM 241 IN WATER

ALPHA SPECTROSCOPY

CLIENT SAMPLE ID	LAB SAMPLE ID	SUF-FIX	PLANCHET	Americium 241
Preparation batch 2436-034 Prep error 5.0 %				
B07K04	N302065-01		7159-001	U
B07ML0	N302065-02		7159-002	U
Reagent Blank	N302065-04		7159-004	U
Lab Control Sample	N302065-03		7159-003	ok
Replicate (N302065-01)	N302065-05		7159-005	- U

Nominal values and limits from method RDLs (pCi/L) 0.05

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CRS
Version 2.23
Report date 04/22/93

9613492.6764

TMA NORCAL

REPORTING GROUP 7159

Test NP Matrix WATER
SDG 7159
Contact Dinkar Kharkar

RESULT SUMMARY

NEPTUNIUM IN WATER
ALPHA SPECTROSCOPY

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID	LAB SAMPLE ID	SUF-FIX	PLANCHET	Neptunium 237	
Preparation batch 2436-034 Prep error 5.0 %					
B07K04	N302065-01		7159-001	U	
B07ML0	N302065-02		7159-002	0.10	J
Reagent Blank	N302065-04		7159-004	0.12	J
Reagent Blank	N302065-08		7159-008	U	
Lab Control Sample	N302065-03		7159-003	ok	
Replicate (N302065-01)	N302065-05		7159-005	-	U

Nominal values and limits from method RDLs (pCi/L) 1

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CRS
Version 2.23
Report date 04/22/93

9613492.6765

TMA NORCAL

REPORTING GROUP 7159

Test PU Matrix WATER
SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

RESULT SUMMARY

PLUTONIUM, ISOTOPIC IN WATER
ALPHA SPECTROSCOPY

CLIENT SAMPLE ID	LAB SAMPLE ID	SUF-FIX	PLANCHET	Plutonium 238		Plutonium 239/240	
Preparation batch 2436-034 Prep error 5.0 %							
B07K04	N302065-01		7159-001	U		U	
B07ML0	N302065-02		7159-002	U		U	
Reagent Blank	N302065-04		7159-004	U		U	
Lab Control Sample	N302065-03		7159-003	ok	U	ok	
Replicate (N302065-01)	N302065-05		7159-005	-	U	-	U
Nominal values and limits from method			RDLs (pCi/L)	0.05		0.05	

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CRS
Version 2.23
Report date 04/22/93

9613492.6766

TMA NORCAL

REPORTING GROUP 7159

Test U Matrix WATER
SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

RESULT SUMMARY

URANIUM, ISOTOPIC IN WATER
ALPHA SPECTROSCOPY

CLIENT SAMPLE ID	LAB SAMPLE ID	SUF-FIX	PLANCHET	1: Uranium 233/234	2: Uranium 235	3: Uranium 238	RESULT RATIOS (%) 1÷3	2σ	2÷3	2σ
Preparation batch 2436-034 Prep error 5.0 %										
B07K04	N302065-01		7159-001	U	U	U				
B07ML0	N302065-02		7159-002	U	U	U				
Reagent Blank	N302065-04		7159-004	U	U	U				
Lab Control Sample	N302065-03		7159-003	ok	ok	ok	100	22	5	3
Replicate (N302065-02)	N302065-06		7159-006	- U	- U	- U				
Nominal values and limits from method			RDLs (pCi/L)	0.2	0.2	0.2	100		4	
						Averages				

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CRS
Version 2.23
Report date 04/22/93

9613492.6767

TMA NORCAL

REPORTING GROUP 7159

Test TC Matrix WATER
SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

RESULT SUMMARY

TECHNETIUM 99 IN WATER

BETA COUNTING

CLIENT SAMPLE ID	LAB SAMPLE ID	SUF-FIX	PLANCHET	Technetium 99	
Preparation batch 2436-034	Prep error 10.0 %				
B07K04	N302065-01	A1	7159-001	2.0	J
B07ML0	N302065-02	A1	7159-002	U	
Reagent Blank	N302065-08		7159-008	U	
Lab Control Sample	N302065-07		7159-007	ok	
Replicate (N302065-02)	N302065-06		7159-006	-	U

Nominal values and limits from method RDLs (pCi/L) 5

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CRS
Version 2.23
Report date 04/22/93

9613492.6768

TMA NORCAL

REPORTING GROUP 7159

Test Y Matrix WATER
SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

RESULT SUMMARY

STRONTIUM 90 IN WATER

BETA COUNTING

CLIENT SAMPLE ID	LAB SAMPLE ID	SUF-FIX	PLANCHET	Strontium 90
Preparation batch 2436-034 Prep error 10.0 %				
B07K04	N302065-01		7159-001	U
B07ML0	N302065-02		7159-002	U
Reagent Blank	N302065-04		7159-004	U
Lab Control Sample	N302065-03		7159-003	ok
Replicate (N302065-02)	N302065-06		7159-006	- U
Nominal values and limits from method			RDLs (pCi/L)	2

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CRS
Version 2.23
Report date 04/22/93

9613492.6769

TMA NORCAL

REPORTING GROUP 7159

Test 80A Matrix WATER
SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

RESULT SUMMARY

GROSS ALPHA IN WATER
GAS PROPORTIONAL COUNTING

CLIENT SAMPLE ID	LAB SAMPLE ID	SUF-FIX	PLANCHET	1: Gross Alpha	2: Sum, Alpha Emitters	RESULT RATIO (%) 2÷1	2σ
Preparation batch 2436-034 Prep error 20.0 %							
B07K04	N302065-01		7159-001	U			
B07ML0	N302065-02		7159-002	U	0.10		
Reagent Blank	N302065-04		7159-004	U			
Lab Control Sample	N302065-03		7159-003	ok			
Replicate (N302065-01)	N302065-05		7159-005	- U			
Nominal values and limits from method			RDLs (pCi/L)	3			
					Average		

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CRS
Version 2.23
Report date 04/22/93

9613492.6770

TMA NORCAL

REPORTING GROUP 7159

Test 80B Matrix WATER
SDG 7159
Contact Dinkar Kharkar

RESULT SUMMARY

GROSS BETA IN WATER
GAS PROPORTIONAL COUNTING

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID	LAB SAMPLE ID	SUF-FIX	PLANCHET	1: Gross Beta	2: Sum, Beta Emitters	RESULT RATIO (%) 2÷1	2σ
Preparation batch 2436-034 Prep error 15.0 %							
B07K04	N302065-01		7159-001	U	1.2		
B07ML0	N302065-02		7159-002	U			
Reagent Blank	N302065-04		7159-004	U			
Lab Control Sample	N302065-03		7159-003	ok			
Replicate (N302065-01)	N302065-05		7159-005	- U			
Nominal values and limits from method			RDLs (pCi/L)	4			
					Average		

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CRS
Version 2.23
Report date 04/22/93

9613492.6771

TMA NORCAL

REPORTING GROUP 7159

Test GAM Matrix WATER
SDG 7159
Contact Dinkar Kharkar

RESULT SUMMARY

GAMMA EMITTERS

GAMMA SCAN

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID	LAB SAMPLE ID	SUF-FIX	PLANCHET	Cobalt 60	Cesium 137
Preparation batch 2436-034 Prep error 15.0 %					
B07K04	N302065-01		7159-001	U	U
B07ML0	N302065-02		7159-002	U	U
Reagent Blank	N302065-04		7159-004	U	U
Lab Control Sample	N302065-03		7159-003	ok	ok
Replicate (N302065-01)	N302065-05		7159-005	- U	- U
Nominal values and limits from method			RDLs (pCi/L)	30	20

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CRS
Version 2.23
Report date 04/22/93

9613492.6772

TMA NORCAL

REPORTING GROUP 7159

Test U T Matrix WATER
SDG 7159
Contact Dinkar Kharkar

RESULT SUMMARY

URANIUM, TOTAL IN WATER
KINETIC PHOSPHORIMETRY

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID	LAB SAMPLE ID	SUF-FIX	PLANCHET	Total Uranium
Preparation batch 2436-034 Prep error 9.0 %				
B07K04	N302065-01		7159-001	U
B07ML0	N302065-02		7159-002	U
Reagent Blank	N302065-04		7159-004	U
Lab Control Sample	N302065-03		7159-003	ok
Replicate (N302065-01)	N302065-05		7159-005	- U

Nominal values and limits from method RDLs (ug/L)

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CRS
Version 2.23
Report date 04/22/93

9613492.6773

TMA NORCAL

REPORTING GROUP 7159

Test C Matrix WATER
SDG 7159
Contact Dinkar Kharkar

RESULT SUMMARY

CARBON 14 IN WATER

LIQUID SCINTILLATION

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID	LAB SAMPLE ID	SUF-FIX	PLANCHET	Carbon 14
Preparation batch 2436-034 Prep error 10.0 %				
B07K04	N302065-01		7159-001	U
B07ML0	N302065-02		7159-002	U
Reagent Blank	N302065-04		7159-004	U
Lab Control Sample	N302065-03		7159-003	ok
Replicate (N302065-01)	N302065-05		7159-005	- U
Nominal values and limits from method			RDLs (pCi/L)	50

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CRS
Version 2.23
Report date 04/22/93

9613492.6774

TMA NORCAL

REPORTING GROUP 7159

Test AM Matrix WATER
SDG 7159
Contact Dinkar Kharkar

METHOD SUMMARY

AMERICIUM 241 IN WATER

ALPHA SPECTROSCOPY

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	MDA pCi/L	ALIQUOT L	RESID mg	YIELD %	COUNT min	FWHM keV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2436-034 Prep error 5.0 %														
B07K04	N302065-01			7159-001	0.02	1.00		77	685		63	03/23/93	04/12	SS-047
B07ML0	N302065-02			7159-002	0.03	1.00		70	685		63	03/23/93	04/12	SS-048
Blank (Stnd=11877)	N302065-04			7159-004	0.05	1.00		53	685			03/23/93	04/12	SS-050
LCS (Stnd=11868)	N302065-03			7159-003	0.03	1.00		71	685			03/23/93	04/12	SS-049
Replicate (N302065-01)	N302065-05			7159-005	0.02	1.00		84	705		63	03/23/93	04/12	SS-051
Nominal values and limits from method					0.05	1.00	-	20-105	700	100	180			

PROCEDURES	REFERENCE	HASL 300/AM-03
	EP-040	Environmental water dissolution
	EP-940	Plutonium Purification
	EP-960	Americium-Curium Purification
	EP-008	Heavy Elements Electroplating

AVERAGES ± 2 SD FOR 5 SAMPLES				
	MDA	0.03	±	0.02
	YIELD	71	±	23
	FWHM		±	

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CMS
Version 2.23
Report date 04/22/93

9613492.6775

TMA NORCAL

REPORTING GROUP 7159

Test NP Matrix WATER
SDG 7159
Contact Dinkar Kharkar

METHOD SUMMARY

NEPTUNIUM IN WATER
ALPHA SPECTROSCOPY

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	MDA pCi/L	ALIQUOT L	RESID mg	YIELD %	COUNT min	FWHM keV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2436-034 Prep error 5.0 %														
B07K04	N302065-01			7159-001	0.09	0.200		59	1145		54	04/03/93	04/03	BETA
B07ML0	N302065-02			7159-002	0.04	0.200		48	1145		54	04/03/93	04/03	BETA
Blank (Stnd=11881)	N302065-04			7159-004	0.09	0.200		49	1146			04/03/93	04/03	BETA
Blank (Stnd=12434)	N302065-08			7159-008	0.08	0.200		46	1146			04/03/93	04/03	BETA
LCS (Stnd=11872)	N302065-03			7159-003	0.2	0.200		49	1146			04/03/93	04/03	BETA
Replicate (N302065-01)	N302065-05			7159-005	0.08	0.200		48	1146		54	04/03/93	04/03	BETA
Nominal values and limits from method					1	0.200	-	20-105	100		180			

PROCEDURES EP-040 Environmental water dissolution
EP-930 Neptunium purification

AVERAGES ± 2 SD FOR 6 SAMPLES
MDA 0.10 ± 0.1
YIELD 50 ± 9
FWHM ____ ± ____

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CMS
Version 2.23
Report date 04/22/93

9613492.6776

TMA NORCAL

REPORTING GROUP 7159

Test PU Matrix WATER
SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN WATER
ALPHA SPECTROSCOPY

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	MAX MDA pCi/L	ALIQUOT L	RESID mg	YIELD %	COUNT min	FWHM keV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2436-034 Prep error 5.0 %														
B07K04	N302065-01			7159-001	0.02	1.00		55	705		63	03/23/93	04/12	SS-052
B07ML0	N302065-02			7159-002	0.02	1.00		71	705		63	03/23/93	04/12	SS-053
Blank (Stnd=11877)	N302065-04			7159-004	0.03	1.00		40	705			03/23/93	04/12	SS-055
LCS (Stnd=11868)	N302065-03			7159-003	0.02	1.00		57	705			03/23/93	04/12	SS-054
Replicate (N302065-01)	N302065-05			7159-005	0.03	1.00		47	705		63	03/23/93	04/12	SS-056
Nominal values and limits from method					0.05	1.00	-	20-105	700	100	180			

PROCEDURES	REFERENCE	ASTM 3865-90
	EP-040	Environmental water dissolution
	EP-940	Plutonium Purification
	EP-008	Heavy Elements Electroplating

AVERAGES ± 2 SD FOR 5 SAMPLES				
	MDA	0.02	±	0.01
	YIELD	54	±	23
	FWHM		±	

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CMS
Version 2.23
Report date 04/22/93

9613492.6777

TMA NORCAL

REPORTING GROUP 7159

Test U Matrix WATER
SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

METHOD SUMMARY

URANIUM, ISOTOPIC IN WATER
ALPHA SPECTROSCOPY

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	MAX MDA pCi/L	ALIQUOT L	RESID mg	YIELD %	COUNT min	FWHM keV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2436-034 Prep error 5.0 %														
B07K04	N302065-01			7159-001	0.06	1.00		67	384		60	03/23/93	04/09	SS-006
B07ML0	N302065-02			7159-002	0.2	1.00		62	150		53	03/23/93	04/02	SS-015
Blank (Stnd=11875)	N302065-04			7159-004	0.2	1.00		65	150			03/23/93	04/02	SS-017
LCS (Stnd=11866)	N302065-03			7159-003	0.1	1.00		82	150			03/23/93	04/02	SS-016
Replicate (N302065-02)	N302065-06			7159-006	0.2	1.00		62	150		53	03/23/93	04/02	SS-018
Nominal values and limits from method					0.2	1.00	-	30-105	150	100	180			

PROCEDURES	REFERENCE	ASTM 3972-90
	EP-040	Environmental water dissolution
	EP-910	Uranium purification
	EP-008	Heavy Elements Electroplating

AVERAGES ± 2 SD FOR 5 SAMPLES				
	MDA	0.2	±	0.1
	YIELD	68	±	17
	FWHM		±	

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CMS
Version 2.23
Report date 04/22/93

9613492.6778

TMA NORCAL

REPORTING GROUP 7159

Test TC Matrix WATER
SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

METHOD SUMMARY

TECHNETIUM 99 IN WATER
BETA COUNTING

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	MDA pCi/L	ALIQUOT L	RESID mg	YIELD %	COUNT min	FWHM keV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2436-034 Prep error 10.0 %														
B07K04	N302065-01		A1	7159-001	2	0.200		65	187		51	03/24/93	03/31	LBG-015
B07ML0	N302065-02		A1	7159-002	3	0.200		59	112		49	03/24/93	03/29	LBG-009
Blank (Stnd=12124)	N302065-08			7159-008	3	0.200		58	112			03/24/93	03/29	LBG-011
LCS (Stnd=12123)	N302065-07			7159-007	3	0.200		70	70			03/24/93	03/28	LBG-011
Replicate (N302065-02)	N302065-06			7159-006	3	0.200		58	112		49	03/24/93	03/29	LBG-010
Nominal values and limits from method					5	0.200	-	-	50		180			

PROCEDURES	REFERENCE	HASL 300/TC-01
	EP-020	Sample leach technique for Technetium-99
	EP-540	Technetium-99 Purification

AVERAGES ± 2 SD FOR 5 SAMPLES				
	MDA	3	±	0.9
	YIELD	62	±	11
	FWHM		±	

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CMS
Version 2.23
Report date 04/22/93

9613492.6779

TMA NORCAL

REPORTING GROUP 7159

Test Y Matrix WATER
SDG 7159
Contact Dinkar Kharkar

METHOD SUMMARY

STRONTIUM 90 IN WATER

BETA COUNTING

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	MDA pCi/L	ALIQUOT L	RESID mg	YIELD %	COUNT min	FWHM keV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2436-034 Prep error 10.0 %														
B07K04	N302065-01			7159-001	0.8	1.00		80	33		37	03/17/93	03/17	BETA
B07ML0	N302065-02			7159-002	0.9	1.00		74	33		37	03/17/93	03/17	BETA
Blank (Stnd=11878)	N302065-04			7159-004	0.7	1.00		87	33			03/17/93	03/27	BETA
LCS (Stnd=11869)	N302065-03			7159-003	0.7	1.00		83	33			03/17/93	03/17	BETA
Replicate (N302065-02)	N302065-06			7159-006	0.8	1.00		80	33		37	03/17/93	03/17	BETA
Nominal values and limits from method					2	1.00	-	20-105	25		180			

PROCEDURES	REFERENCE	HASL 300/SR-01,-02
	EP-040	Environmental water dissolution
	EP-520	Yttrium purification for strontium-90 analysis

AVERAGES ± 2 SD FOR 5 SAMPLES				
	MDA	0.8	±	0.2
	YIELD	81	±	10
	FWHM		±	

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CMS
Version 2.23
Report date 04/22/93

9613492.6780

TMA NORCAL

REPORTING GROUP 7159

Test 80A Matrix WATER
SDG 7159
Contact Dinkar Kharkar

METHOD SUMMARY

GROSS ALPHA IN WATER
GAS PROPORTIONAL COUNTING

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	MDA pCi/L	ALIQUOT L	RESID mg	YIELD %	COUNT min	FWHM keV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2436-034 Prep error 20.0 %														
B07K04	N302065-01	80		7159-001	1	0.300	63		100		36	03/15/93	03/16	GRB-102
B07ML0	N302065-02	80		7159-002	2	0.300	85		100		36	03/15/93	03/16	GRB-103
Blank (Stnd=11873)	N302065-04	80		7159-004	2	0.300	116		100			03/15/93	03/16	GRB-109
LCS (Stnd=11864)	N302065-03	80		7159-003	3	0.300	155		100			03/15/93	03/16	GRB-104
Replicate (N302065-01)	N302065-05	80		7159-005	1	0.300	67		100		36	03/15/93	03/16	GRB-110
Nominal values and limits from method					3	0.300	5-150	-	100		180			

PROCEDURES REFERENCE ASTM 1943-90; EPA 900
EP-120 Gross Alpha and Gross Beta in environmenal water

AVERAGES ± 2 SD FOR 5 SAMPLES
MDA 2 ± 2
YIELD ____ ± ____
FWHM ____ ± ____

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CMS
Version 2.23
Report date 04/22/93

9613492.6781

TMA NORCAL

REPORTING GROUP 7159

Test 80B Matrix WATER
SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

METHOD SUMMARY

GROSS BETA IN WATER

GAS PROPORTIONAL COUNTING

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	MDA pCi/L	ALIQUOT L	RESID mg	YIELD %	COUNT min	FWHM keV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2436-034 Prep error 15.0 %														
B07K04	N302065-01	80		7159-001	2	0.300	63		100		36	03/15/93	03/16	GRB-102
B07ML0	N302065-02	80		7159-002	2	0.300	85		100		36	03/15/93	03/16	GRB-103
Blank (Stnd=11873)	N302065-04	80		7159-004	2	0.300	116		100			03/15/93	03/16	GRB-109
LCS (Stnd=11864)	N302065-03	80		7159-003	2	0.300	155		100			03/15/93	03/16	GRB-104
Replicate (N302065-01)	N302065-05	80		7159-005	2	0.300	67		100		36	03/15/93	03/16	GRB-110
Nominal values and limits from method					4	0.300	5-150	-	100		180			

PROCEDURES REFERENCE ASTM 1943-90; EPA 900
EP-120 Gross Alpha and Gross Beta in environmenal water

AVERAGES ± 2 SD FOR 5 SAMPLES
MDA 2 ± 0
YIELD ____ ± ____
FWHM ____ ± ____

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CMS
Version 2.23
Report date 04/22/93

9613492.6782

TMA NORCAL

REPORTING GROUP 7159

Test GAM Matrix WATER
SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

METHOD SUMMARY

GAMMA EMITTERS

GAMMA SCAN

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	MDA pCi/L	ALIQUOT L	RESID mg	YIELD %	COUNT min	FWHM keV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2436-034 Prep error 15.0 %														
B07K04	N302065-01			7159-001	10	0.500			642		46	03/26/93	03/26	MB,02,00
B07ML0	N302065-02			7159-002	9	0.500			642		46	03/26/93	03/26	MB,05,00
Blank (Stnd=11874)	N302065-04			7159-004	9	0.500			1043			03/27/93	03/27	MB,03,00
LCS (Stnd=11865)	N302065-03			7159-003		0.500			1042			03/27/93	03/27	MB,02,00
Replicate (N302065-01)	N302065-05			7159-005	7	0.500			1043		47	03/27/93	03/27	MB,05,00
Nominal values and limits from method					20	0.500	-	-	400		180			

PROCEDURES REFERENCE ASTM 3649-85; EPA 901.1
EP-100 Preparation

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 9 ± 3
YIELD ____ ± ____
FWHM ____ ± ____

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CMS
Version 2.23
Report date 04/22/93

9613492.6785

TMA NORCAL

REPORTING GROUP 7159

Test U T Matrix WATER
SDG 7159
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

METHOD SUMMARY

URANIUM, TOTAL IN WATER
KINETIC PHOSPHORIMETRY

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	MDA ug/L	ALIQUOT L	RESID mg	YIELD %	COUNT min	FWHM keV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2436-034 Prep error 9.0 %														
B07K04	N302065-01			7159-001	0.08	0.0200					38	03/18/93	03/18	KPA
B07ML0	N302065-02			7159-002	0.08	0.0200					38	03/18/93	03/18	KPA
Blank (Stnd=11876)	N302065-04			7159-004	4	0.0200			22			03/18/93	03/18	KPA
LCS (Stnd=11867)	N302065-03			7159-003	4	0.0200			75			03/18/93	03/18	KPA
Replicate (N302065-01)	N302065-05			7159-005	0.08	0.0200			22		38	03/18/93	03/18	KPA
Nominal values and limits from method						0.0200	-	-			180			

PROCEDURES	REFERENCE	ASTM D5174-91
	EP-040	Environmental water dissolution
	EP-044	Total uranium by kinetic phosphorimetry
	EP-928	Total Uranium by Kinetic Phosphorimetry

AVERAGES ± 2 SD FOR 5 SAMPLES				
	MDA	2	±	4
	YIELD		±	
	FWHM		±	

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CMS
Version 2.23
Report date 04/22/93

9613492.6784

TMA NORCAL

REPORTING GROUP 7159

Test C Matrix WATER
SDG 7159
Contact Dinkar Kharkar

METHOD SUMMARY

CARBON 14 IN WATER
LIQUID SCINTILLATION

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	MDA pCi/L	ALIQUOT L	RESID mg	YIELD %	COUNT min	FWHM keV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2436-034 Prep error 10.0 %														
B07K04	N302065-01			7159-001	50	0.0300			150		47	03/27/93	03/27	LSC-004
B07ML0	N302065-02			7159-002	50	0.0300			150		47	03/27/93	03/27	LSC-004
Blank (Stnd=11880)	N302065-04			7159-004	60	0.0300			150			03/27/93	03/27	LSC-004
LCS (Stnd=11871)	N302065-03			7159-003	70	0.0300			150			03/27/93	03/27	LSC-004
Replicate (N302065-01)	N302065-05			7159-005	50	0.0300			150		48	03/27/93	03/28	LSC-004
Nominal values and limits from method					50	0.0300	-	-	150		180			

PROCEDURES EP-240 Carbon-14 in aqueous solutions

AVERAGES ± 2 SD FOR 5 SAMPLES
MDA 60 ± 20
YIELD ____ ± ____
FWHM ____ ± ____

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CMS
Version 2.23
Report date 04/22/93

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

REPORT GUIDE

Client Westinghouse Hanford
Contract MBH-SVV-069262

SAMPLE SUMMARY

The Sample Summary Reports (variously titled LAB, SAMPLE, DEPARTMENT and QC SUMMARY to reflect the sort order) show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The following notes apply to this report:

* LAB SAMPLE ID is the lab's primary identification for a sample.

* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.

* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.

* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

  QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

* All Lab Control Samples, Reagent Blanks, Replicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Reagent Blank, Replicate, Matrix Spike and Result Summary Reports detail these relationships.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

REPORT GUIDE

Client Westinghouse Hanford
Contract MBH-SVV-069262

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

* The preparation batches are shown in the same order as the Report and Method Summary Reports are printed.

* Only analyses of planchets relevant to the SDG are counted.

* Each preparation batch should have at least one Reagent Blank and LCS in it to validate other results.

* The QUALIFIERS shown are all qualifiers other than U, J and B that occur on any analysis in the preparation batch. The Result Summary Report has these qualifiers on a per sample basis.

  These qualifiers should be reviewed as follows:

  X — Some data has been manually entered or modified. Transcription errors are possible.

  P — One or more results are 'preliminary'. The data is not ready for final reporting.

  2 — There were two or more results for one parameter on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

  Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

REPORT GUIDE

Client Westinghouse Hanford
Contract MBH-SVV-069262

WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG).

The following notes apply to this report:

* TEST is a code for the method used to measure related parameters. Results and related information for each parameter are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.

* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.

* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.

* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.

* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Reagent Blank, Replicate, Matrix Spike and Result Summary Reports detail these relationships.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

REPORT GUIDE

Client Westinghouse Hanford
Contract MBH-SVV-069262

DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Reagent Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

* TEST is a code for the method used to measure a parameter. If the TEST is empty, no data is available; the parameter was not analyzed for.

* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

  The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

* ERRORs can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added (as sum of squares) to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.

* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.

* When reporting a Reagent Blank a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Reagent Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity). If the MDA is blank, the ERROR is used as the limit.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

GUIDE, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

DATA SHEET

J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.

B Some Reagent Blank that QC's this sample had a non-U result and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

For each sample result, all Reagent Blank results in the same preparation batch are compared. The Result Summary Report documents this and other QC relationships.

L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.

H Similar to 'L' except the recovery was high.

P The RESULT is 'preliminary'.

X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.

2 There were two or more results available for this parameter. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

* An MDA is underlined if it is bigger than its RDL.

* An ERROR is underlined if the 2 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.

* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

REPORT GUIDE

Client Westinghouse Hanford
Contract MBH-SVV-069262

LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.

* Amounts ADDED are the lab's estimate of the actual amount spiked into this sample with their ERROR an estimate of the error of this amount.

  An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The error of RESULT, including that introduced by rounding the result prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per parameter bias. The bias changes the center of the computed limit range.

* The second limits are protocol defined upper and lower QC limits for the recovery.

* The recovery is underlined (out of spec) if it is outside either of these ranges.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

REPORT GUIDE

Client Westinghouse Hanford
Contract MBH-SVV-069262

REPLICATE

The Replicate Report shows all results, differences and primary supporting information for one Replicate and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Replicate and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Replicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTs divided by their average expressed as a percent.

  If both RESULTs are less than their MDAs, no RPD is computed and a '-' is printed.

  For a parameter, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

* The first, computed limit is the (quadratic) sum of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors including that introduced by rounding the RESULTs prior to printing.

  If this limit is labeled TOT, it includes the preparation error in the RESULTs. If labeled CNT, it does not.

  This value reported for this limit is at most 999.

* The second limit for the RPD is the larger of:

  1. A fixed percentage specified in the protocol.

  2. A protocol factor (typically 2) times the average MDA as

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

GUIDE, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

REPLICATE

~ a percent of the average result. This limit applies when the results are close to the MDAs.

* The RPD is underlined (out of spec) if it is greater than either limit.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

REPORT GUIDE

Client Westinghouse Hanford
Contract MBH-SVV-069262

MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* Amounts ADDED are the lab's estimate of the actual amount spiked into the Spike sample with their ERROR an estimate of the error of this amount.

  An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The errors of the RESULTs, including that introduced by rounding them prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per parameter bias. The bias changes the center of the computed limit range.

* The second limits are protocol defined upper and lower QC limits for the recovery.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

GUIDE, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

MATRIX SPIKE

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

* The recovery is underlined (out of spec) if it is outside either of these ranges.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

REPORT GUIDE

Client Westinghouse Hanford
Contract MBH-SVV-069262

RESULT SUMMARY

The Result Summary Report shows up to four results measured using one method. There is one report for each TEST, as used on the Data Sheet Report. The corresponding Method Summary Report has method performance data.

The following notes apply to this report:

* Each per method report is subdivided into sections, one for each preparation batch. A preparation batch should be work done over a restricted period of time by a small group of people in a defined area of the lab.

  There should be Lab Control Sample and Reagent Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab polcy, Replicates need not occur in each batch since they QC sample dependencies such as matrix effects.

* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

  The J and X flags are as on the data sheet.

* Non-U results for Reagent Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Reagent Blank Report has supporting data.

* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data' means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See it for supporting data.

* Replicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this replicate. 'OUT' corresponds to when the RPD is underlined on the Replicate Report. See it for supporting data.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

RESULT SUMMARY

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1÷3' means the ratio of the first result column and the third result column.

The error estimate for a ratio reflects the errors of RESULTs, including errors introduced by rounding the RESULTs prior to printing and the preparation error if one is shown for the preparation batch.

> The preparation error is included once, not once for each result, since preparation errors for the results should be highly correlated.

The ratio is underlined (out of spec) if the absolute value of its difference from a nominal value is greater than its error estimate.

Average ratios are computed. These do not include ratios from Lab Control Sample, Reagent Blank or Matrix Spike results since their matrices are not necessarily similar to normal sample's.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant parameter. Results less than their MDA are not included. No sums are computed for QC Samples since their various planchets may not be physically related.

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

REPORT GUIDE

Client Westinghouse Hanford
Contract MBH-SVV-069262

METHOD SUMMARY

The Method Summary Report shows performance data for one method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

* Each per method report is subdivided into sections, one for each preparation batch. A preparation batch should be work done over a restricted period of time by a small group of people in a defined area of the lab.

  There should be Lab Control Sample and Reagent Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Replicates need not occur in each batch since they QC sample dependencies such as matrix effects.

* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

  The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

  MDAs are underlined if greater than the RDL; the smallest RDL if there is more than one.

* Aliquots are underlined if less than a nominal value specified for the method.

* Residues are underlined if outside a range specified for the method.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

TMA NORCAL
REPORTING GROUP 7159

SDG 7159
Contact Dinkar Kharkar

GUIDE, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

METHOD SUMMARY

* Yields, which may be a gravimetric yield, chemical recovery or detector efficiency depending on the method, are underlined if outside a range specified for the method.

* Count times are underlined if less than a nominal value specified for the method.

* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than a method specified limit.

* Days Held are underlined if greater than a holding time specified in the protocol.

* Analysis dates are underlined if before their sample's preparation date.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/22/93

9613492.6799

APPENDIX 1: COPIES OF CHAINS-OF-CUSTODY

9613492.6800

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator Wendy S. Thompson

PROJECT NUMBER 92-336

Company Contact Wendy S. Thompson

Telephone (509) 376-2153

Project Designation/Sampling Locations 241-T-106

Borehole Number: 299-W10-196

Collection Date 2-8-93

Time 1300

Ice Chest No. SML 283.

Field Logbook No. EFL-1053

Bill of Lading/Airbill No. 2536953034

Offsite Property No. WA3-0-0190#3

Method of Shipment AIR (Emery)

Shipped to TMA-Norcal

Possible Sample Hazards/Remarks Keep samples chilled. All analysis per lab statement of work.

Sample Identification

B07K04

3 x 40 ml., amber glass, water, CLP-VOA

3 x 1000 ml., amber glass, water, CLP- Semi-VOA, IC Anions, SO_4, PO_4, NO_2-NO_3, pH, Cl, F

1 x 1000 ml.,plastic, water (HNO_3), ICP/AA metals, Bi, Hg

1 x 1000 ml., plastic, water (NaOH, ascorbic acid), CLP-CN

1 x 250 ml., amber glass, water (H_2SO_4), TOC

1 x 4000 ml., plastic, water ((HNO_3)) gross alpha, gross beta, GEA including Co-60, Ru-106,
1 x 2000 ml., plastic, water (HNO_3) } Ce-144, Cs-137,isotopic U, total U, Am-241, Np-237, Pu-238,-239,-240, Sr-90.

1 x 1000 ml., plastic, water (HCL), Tc-99

2 x 250 ml., amber glass, water, C-14

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
W.S. Thompson Wendy S Thompson 2-9-93 1100	Al. Gobalez A Alfonso Gobalez	2-10-93 1140
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

54-A

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/90)

9615492.6801

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector W. S. Thompson Date 2-8-93

Company Contact Wendy S. Thompson Telephone (509) 376-2153

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07K04	W	2-8-93	1300	✓ 3 x 40 ml., amber glass, water, CLP-VOA
				✓ 3 x 1000 ml., amber glass, water, CLP- Semi-VOA, IC Anions
				SO_4, PO_4, NO_2-NO_3, pH.
				✓ 1 x 1000 ml., plastic, water (HNO_3), ICP/AA metals, Bi, Hg
				✓ 1 x 1000 ml., plastic, water (NaOH, ascorbic acid), CLP-
				CN
				✓ 1 x 250 ml., amber glass, water (H_2SO_4), TOC
				✓ 1 x 4000 ml., plastic, water (HNO_3)
				✓ 1 x 2000 ml., plastic, water (HNO_3)
				gross alpha, gross beta, GEA including Co-60,
				Ru-106, Ce-144, Cs-137, isotopic U, total U,
				Am-241, Np-237, Pu-238,-239,-240, Sr-90.
				✓ 1 x 1000 ml., plastic, water (HCL), Tc-99
				✓ 2 x 250 ml., amber glass, water, C-14

2-8-93

*Type of Sample: A = Air; DL = Drum Liquids; DS = Drum Solids; L = Liquid; O = Oil; S = Soil; SE = Sediment; SL = Sludge; SO = Solid; T = Tissue; W = Water; WI = Wipe; X = Other

Field Information: Samples support the 241-T-106 soil investigation. All analysis per lab statement of work.

Special Handling and/or Storage: Keep samples chilled.

55

Possible Sample Hazards: None indicated with field instruments

A-6000-406 (06/91)

9613492.6002

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: Wendy S. Thompson

PROJECT NUMBER 92-336

Company Contact: Wendy S. Thompson

Telephone (509) 376-2153

Project Designation/Sampling Locations: 241-T-106

Collection Date: 2-8-93

Time: 1000

Borehole Number: 299-W10-196

Ice Chest No.: SML ~~283~~ 284 WSK 2-9-93

Field Logbook No. EFL-1053

Bill of Lading/Airbill No.: 2536953034

Offsite Property No. W93-0-0190#3

Method of Shipment: AIR (Emery)

Shipped to: TMA-Norcal

Possible Sample Hazards/Remarks: Keep samples chilled. All analysis per lab statement of work. Sample is nonhazardous/nonradioactive

Sample Identification

B07ML0

3 x 40 ml., amber glass, water, CLP-VOA

3 x 1000 ml., amber glass, water, CLP- Semi-VOA, IC Anions, SO_4, PO_4, NO_2-NO_3, pH, Cl, F

1 x 1000 ml.,plastic, water (HNO_3), ICP/AA metals, Bi, Hg

1 x 1000 ml., plastic, water (NaOH, ascorbic acid), CLP-CN

1 x 250 ml., amber glass, water (H_2SO_4), TOC

1 x 4000 ml., plastic, water ((HNO_3)) } gross alpha, gross beta, GEA including Co-60, Ru-106,
1 x 2000 ml., plastic, water (HNO_3) } Ce-144, Cs-137,isotopic U, total U, Am-241, Np-237, Pu-238,-239,-240, Sr-90.

1 x 1000 ml., plastic, water (HCL), Tc-99

2 x 250 ml., amber glass, water, C-14

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
W.S. Thompson 2-9-93 Wendy S Thompson 1100	Gobaleza Monn Galuf	2-10-93 1145
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

56

A-6000-407 (12/90)

9613492.6005

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector Wendy S. Thompson Date 2-8-93

Company Contact Wendy S. Thompson Telephone (509) 376-2153

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07ML0	W	2-8-93	1000	3 x 40 ml., amber glass, water, CLP-VOA
				3 x 1000 ml., amber glass, water, CLP- Semi-VOA, IC Anions SO_4, PO_4, NO_2-NO_3, pH.
				1 x 1000 ml., plastic, water (HNO_3), ICP/AA metals, Bi,Hg
				1 x 1000 ml., plastic, water (NaOH, ascorbic acid), CLP-CN
				1 x 250 ml., amber glass, water (H_2SO_4), TOC
				1 x 4000 ml., plastic, water (HNO_3)
				1 x 2000 ml., plastic, water (HNO_3) gross alpha, gross beta, GEA including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, total U, Am-241, Np-237, Pu-238,-239,-240, Sr-90.
				1 x 1000 ml., plastic, water (HCL), Tc-99
				2 x 250 ml., amber glass, water, C-14

2-8-93

*Type of Sample: A = Air; DL = Drum Liquids; DS = Drum Solids; L = Liquid; O = Oil; S = Soil; SE = Sediment; SL = Sludge; SO = Solid; T = Tissue; W = Water; WI = Wipe; X = Other

Field Information: Samples support the 241-T-106 soil investigation. All analysis per lab statement of work.

Special Handling and/or Storage: Keep samples chilled.

57

Possible Sample Hazards: None indicated with field instruments

A-6000-406 (06/91)

9613492.6804

Overnight Delivery — Signature Security Services

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT)
Westinghouse Hanford Company		W93-0-0170 #38

PART I – TO BE COMPLETED BY ORIGINATOR

Department	Section	Unit
Environmental	Env Field Services	Env Charac & Sampling

The following items are to be shipped from [X] Contractor [ ] Vendor

Routing Air [X] Contractor [ ] Vendor

Shipped to TMA/NORCAL
2030 Wright Ave.
Richmond, CA 94804

Off-site Custodian

Full Title

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1	SML283 poly cooler. Contains soil + water samples that are double-bagged and packed in wet ice and vermiculite. Samples are nonhazardous ~~B07MLO~~ WST B07K04	N/A
2	SML284 poly cooler contains water 2-8-93 WST samples that are double bagged & packed in wet ice vermiculite. Nonhazardous Sample #: B05K05, B07K07, B07MLO	

[ ] Classified [X] Unclassified [ ] Shipped Under DOE Contract [X] Shipped Under Contractor's Use Permit Contract

Necessity for the Off-Site Use of this Property

To support drilling and sampling of the 241-T-106 soil investigation

Bill of Lading 2536953034

CERTIFICATION OF THE RADIATION MONITORING RELEASE MUST BE SECURED THE SAME DAY THAT MATERIAL IS DELIVERED TO SHIPPING.

RM Clearance for Public Release	RM Survey No.	Date
[illegible]	[illegible]	2-09-93

Location of Property (Area & Bldg.)	Contact	Phone
200W/241-T	W. S. Thompson	(509) 376-2153

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
2-9-93	81710 PP5AG	N/A

Originated By: Relinquished by:	Date	Authorized By	Date
[signature]	2-9-93	[signature]	2-9-93

Signature and Name of Property Control	Custodian Date	Property Management Approval	Date
		[signature]	2-9-93

PART II – TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No.	Date Issued	Purchase Order No.	Date Issued
C. P. Nelson				58
Date 2-9-93				

DISTRIBUTION

By Originator	Shipping Operation – Sign all Copies and Forward to:
White, Green, Yellow, Pink – Property Management Goldenrod – Retain	White – Property Management Yellow – Retain Green – Property Control Custodian (Issuing Office) Pink – Originator

54-3000-479 (09/89)

9613492.6805

98

FORM OF PAYMENT

GBL ☐ FCCOD ☐

X Bill to Consignee ☐ Third Party Billing ☐

EMERY WORLDWIDE — A CF Company

SERVICES **

UNITED STATES / CANADA: Same Day (Extra Charges) ☐ · XX AM ☐ · PM ☐ · Second Day ☐ · Saturday Delivery ☐ · Standard Plus ☐ · Preferred ☐ · Standard ☐

INTERNATIONAL: Express ☐ · Business Documents ☐ · Customs Clearance ☐ · Delivery ☐

Shipper's Account Number: 50281585

Date	Origin	Shipment Number
02-09-93	PSC	2536953034

Tariff Dest. | Gateway

Check to Shipper: $

From:

INGHOUSE SHIPPING DEPT. (509) 376-6665
DEPARTMENT OF ENERGY C/O
INGHOUSE HANFORD
BLDG 1163
STEVENS DRIVE
LAND WA

Canada ☐

Customer's Reference Numbers: 710 PF5AG W93-0-0190#38

Zip: 99352

To:

DEL/ORES/SARCHEZ#
TMA/NORCAL
2030 WRIGHT AVENUE
RICHMOND CA

Hold for Pick Up ☐

Canada ☐

Consignee's Account Number: E

Zip: 94804

EMERY WORLDWIDE will accept Consignee's check with all risks being assumed by Shipper, including but not limited to non-payment, fraud and misrepresentation.

Description	Pcs	L	W	H	Total Pieces	Total Weight (In Lbs.)
OLERS ID: SMU283 *63# 284 74# AND WATER SAMPLES	2	27	16	17	2	137

FOR INFORMATION OR RATES CALL 1-800 44 EMERY (1-800-443-6379)

Declared Value: $

2536953034

Shipment Requirements: IGHT DELIVERY ATURE SECURITY SERVICE

Zip Ship ☐ — For shipments within the 50 United States Shipper has the option to check this box and, by checking, agrees that the Zip Ship conditions, described in the area to the right, apply.

Mark if Emery Packaging is used: Urgent Letter 9X12 ☐ · Urgent Pack 12X15 ☐

International Shipments: Commodity Code

Third Party Account Number: Mandatory for Third Party Billing — E

Third Party Account Number

International Customs Value

International Insurance

Total Transportation Charges

Other Charges/Advance at Origin: OC/AO- $

1-OAK-A

Terms and conditions on

59

241-T-106 Samples

Gross Alpha/Beta

Sample #	7159-1		7159-2		7159-3		7159-4		7159-5	
Cust. I.D. #	B07K04		B07ML0		LCS		BLANK		REPLICATE #1	
Type	Water		Water		Water		Water		Water	
Aliquot (g or l)	0.300		0.300		1.000		1.000		0.300	
Sample Weight (g or l)	63.100		85.000		155.400		115.600		67.200	
Counted Weight (g or l)	63.100		85.000		155.400		115.600		67.200	
[GROSS BETA]										
Gross Counts	132.000		113.000		1151.000		107.000		160.000	
Time (min)	100.000		100.000		100.000		100.000		100.000	
Gross CPM	1.320		1.130		11.510		1.070		1.600	
BKG CPM	1.395		1.032		0.969		0.964		1.291	
Observed CPM	-0.075		0.098		10.541		0.106		0.309	
Alpha to Beta Xtalk	0.271		0.289		0.355		0.317		0.274	
Observed Alpha	0.065		0.012		2.617		-0.005		-0.010	
Beta to Alpha Xtalk	0.006		0.006		0.006		0.006		0.006	
True CPM	-0.093		0.095		9.632		0.108		0.312	
Efficiency (CPM/DPM)	0.419		0.414		0.401		0.407		0.419	
DPM of Aliquot	-0.221		0.229		24.021		0.265		0.745	
Reported Results (pCi/g or pCi/l)	-0.331		0.344		10.800		0.119		1.120	
Calculated Results (pCi/g or pCi/l)	-0.332	OK	0.343	OK	10.820	OK	0.119	OK	1.119	OK
Reported MDA	1.970		1.720		0.515		0.507		1.900	
Calculated MDA	1.972	OK	1.717	OK	0.515	OK	0.506	OK	1.897	OK
Results > MDA?	NO		NO		YES		NO		NO	
[GROSS ALPHA]										
Gross Counts	18.000		10.000		269.000		4.000		6.000	
Time (min)	100.000		100.000		100.000		100.000		100.000	
Gross CPM	0.180		0.100		2.690		0.040		0.060	
BKG CPM	0.075		0.088		0.073		0.045		0.070	
Observed CPM	0.105		0.012		2.617		-0.005		-0.010	
Beta to Alpha Xtalk	0.006		0.006		0.006		0.006		0.006	
True CPM	0.106		0.011		2.559		-0.006		-0.012	
Efficiency (CPM/DPM)	0.132		0.108		0.069		0.087		0.128	
DPM of Aliquot	0.800		0.106		37.090		-0.065		-0.093	
Reported Results (pCi/g or pCi/l)	0.751		0.154		16.700		-0.030		-0.140	
Calculated Results (pCi/g or pCi/l)	1.201	*	0.159	OK	16.707	OK	-0.029	OK	-0.139	OK
Reported MDA	1.450		1.940		0.821		0.511		1.450	
Calculated MDA	1.452	OK	1.922	OK	0.822	OK	0.512	OK	1.446	OK
Results > MDA?	NO		NO		YES		NO		NO	

241-T-106 Samples

Carbon 14

Sample #	7159-1		7159-2		7159-3		7159-4		7159-5	
Cust. I.D. #	B07K04		B07ML0		LCS		BLANK		REPLICATE #1	
Type	Water		Water		Water		Water		Water	
Sample Count 1	1130.000		1121.000		10427.000		1137.000		1241.000	
Sample Count 2	0.000		0.000		0.000		0.000		0.000	
Sample Count 3	0.000		0.000		0.000		0.000		0.000	
Sample Count Time	150.000		150.000		150.000		150.000		150.000	
WsubS1	19.924		20.084		3.245		19.802		18.146	
WsubS2	0.000		0.000		0.000		0.000		0.000	
WsubS3	0.000		0.000		0.000		0.000		0.000	
Blank Count 1	1277.000		1277.000		1277.000		1277.000		1277.000	
Blank Count 2	0.000		0.000		0.000		0.000		0.000	
Blank Count 3	0.000		0.000		0.000		0.000		0.000	
Blank Count time	150.000		150.000		150.000		150.000		150.000	
WsubB1	17.636		17.636		17.636		17.636		17.636	
WsubB2	0.000		0.000		0.000		0.000		0.000	
WsubB3	0.000		0.000		0.000		0.000		0.000	
Blank CPM Average	8.513		8.513		8.513		8.513		8.513	
Sample CPM average	7.533		7.473		69.513		7.580		8.273	
Net CPM	-0.980		-1.040		61.000		-0.933		-0.240	
Decay Correction	1.078		1.093		0.983		0.943		1.014	
Efficiency	0.302		0.308		0.256		0.305		0.311	
DPM of Aliquot	-3.011		-3.089		242.525		-3.248		-0.761	
Aliquot	0.030		0.030		1.000		1.000		0.030	
Reported Results (pCi/l)	-45.140		-46.422		109.050		-1.464		-11.420	
Calculated Results (pCi/l)	-45.203	OK	-46.378	OK	109.246	OK	-1.462	OK	-11.427	OK
Reported MDA	51.026		49.448		1.980		1.738		52.714	
Calculated MDA (method 1)	55.171		54.096		1.953		1.639		53.574	
Calculated MDA (method 2)	55.196		54.121		1.953		1.640		53.599	

241-T-106 Samples

Strontium 90	ET	GROSS COUNTS	COUNT TIME	BKG CPM	SF	NET CPM	X	Ws	Wb	WY	WX	WXY	WX^2
7159-1	0.49700	23.00000	33.00000	0.46540	0.99290	0.22993	0.87726	45.12556	1074.34495	10.37552	39.56886	9.10203	34.72796
B07K04	1.00000	10.00000	33.00000	0.49740	0.99190	-0.19260	0.76976	96.05654	1006.22718	0.09606	75.47963	0.07548	58.10091
Water	2.04900	18.00000	33.00000	0.50310	1.01020	0.04279	0.58607	56.81151	993.83820	2.43077	33.29550	1.42460	19.51348
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	456.47595					SUMS=	199.99361	3073.41003	12.90434	148.36196	10.60211	112.34236

	Y @ MILK	REPORTED	CALCULATED		PRODUCT	NBS CORR.	REPORTED RESULTS	CALCULATED RESULTS		Calculated MDA	Calculated Results > MDA ?
					0.79464	1.00000					
	1 COMP=	0.09500	0.09432	OK			0.09971	0.09945	OK	0.58110	No
	2 COMP=	NA	0.45003	*	P-FACTOR	C-ZERO					
					1.85900	0.11870					

7159-2	0.49700	15.00000	33.00000	0.49740	0.99200	-0.04251	0.87726	67.49737	1006.22718	0.09750	59.21275	0.05921	51.94498
B07ML0	1.00000	17.00000	33.00000	0.40240	1.00810	0.11344	0.76976	60.69743	1242.54473	6.88547	46.72222	5.30014	35.96472
Water	2.04900	10.00000	33.00000	0.43610	1.00240	-0.13339	0.58607	99.24970	1146.52603	0.09925	68.16724	0.05817	34.09006
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	618.63783					SUMS=	227.44449	3394.29794	7.05222	164.10221	5.41752	121.99975

	Y @ MILK	REPORTED	CALCULATED		PRODUCT	NBS CORR.	REPORTED RESULTS	CALCULATED RESULTS		Calculated MDA	Calculated Results > MDA ?
					0.73563	1.00000					
	1 COMP=	0.04500	0.04441	OK			0.05077	0.05059	OK	0.64873	No
	2 COMP=	NA	0.09149	*	P-FACTOR	C-ZERO					
					1.85900	0.06697					

7159-3	0.49700	345.00000	33.00000	0.40240	1.00510	10.10341	0.87726	2.92226	1242.54473	29.52477	2.56358	25.90091	2.24893
LCS	1.00000	313.00000	33.00000	0.51420	1.00240	8.99216	0.76976	3.25950	972.38429	29.13016	2.49983	22.42312	1.91948
Water	2.04900	287.00000	33.00000	0.81200	0.99500	7.64554	0.58607	3.54375	815.78355	27.80265	2.07888	16.29429	1.21720
	3.06500	178.00000	33.00000	0.50310	1.10300	5.39460	0.45006	5.84778	993.83820	31.54639	2.63185	14.19776	1.18449
	5.05900	124.00000	33.00000	0.42480	0.99990	3.33244	0.26804	8.48231	1177.02448	28.26682	2.27361	7.57666	0.60942
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	27.01334					SUMS=	24.03560	5001.55525	146.27079	12.03955	86.39274	7.17952

	Y @ MILK	REPORTED	CALCULATED		PRODUCT	NBS CORR.	REPORTED RESULTS	CALCULATED RESULTS		Calculated MDA	Calculated Results > MDA ?
					0.82761	1.00000					
	1 COMP=	0.18800	12.03922	*			11.69400	12.17539	OK	0.52199	Yes
	2 COMP=	NA	11.42445	*	P-FACTOR	C-ZERO					
					1.85900	14.59074					

9613492.0808

Strontium 90	ET	GROSS COUNTS	COUNT TIME	BKG CPM	SF	NET CPM	X	Ws	Wb	WY	WX	WXY	WX^2
7159-4	0.49700	21.00000	33.00000	0.51420	1.00280	-0.12248	0.87726	49.01177	972.38429	6.00302	42.99807	5.26921	37.71874
BLANK	1.00000	13.00000	33.00000	0.44650	0.99870	-0.05239	0.76976	77.72741	1119.82083	0.07773	59.83115	0.05983	46.06540
Water	2.04900	12.00000	33.00000	0.48770	1.00140	-0.12424	0.58607	83.16399	1025.22042	0.08318	48.73969	0.04874	28.56497
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	607.74426					SUMS=	209.90318	3117.42554	6.16391	151.56711	5.37478	112.33911

				PRODUCT	NBS CORR.	REPORTED RESULTS	CALCULATED RESULTS		Calculated MDA	Calculated Results > MDA ?
Y @ MILK	REPORTED	CALCULATED		0.86936	1.00000					
1 COMP=	0.04800	0.04764	OK			0.04621	0.04608	OK	0.56103	No
2 COMP=	NA	0.31011	*	P-FACTOR	C-ZERO					
				1.85900	0.06609					

7159-6	0.49700	9.00000	33.00000	0.44650	0.99610	-0.17310	0.87726	109.00136	1119.82083	0.10900	95.62253	0.09562	83.88583
REPLICATE #2	1.00000	25.00000	33.00000	0.62650	0.99720	0.13071	0.76976	41.08637	798.08460	5.37035	31.62648	4.13386	24.34486
Water	2.04900	19.00000	33.00000	0.49980	0.99240	0.07536	0.58607	53.09164	1000.40016	4.08991	31.84288	2.38525	18.54492
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	826.81952					SUMS=	204.07936	2918.30559	9.54925	158.89188	6.61473	126.77544

				PRODUCT	NBS CORR.	REPORTED RESULTS	CALCULATED RESULTS		Calculated MDA	Calculated Results > MDA ?
Y @ MILK	REPORTED	CALCULATED		0.80203	1.00000					
1 COMP=	-0.26700	0.05218	*			-0.27897	0.05448	*	0.56484	No
2 COMP=	NA	-0.26753	*	P-FACTOR	C-ZERO					
				1.85900	0.06608					

9613492.6809

241-T-106 Samples

TECHNETIUM 99

Sample #	7159-1		7159-2		7159-6		7159-7		7159-8	
Cust. I.D. #	B07K04		B07ML0		REPLICATE #2		LCS		BLANK	
Type	Water		Water		Water		Water		Water	
Aliquot	0.20000		0.20000		0.20000		1.00000		1.00000	
Average Net CPM	0.25000		0.28000		0.16000		20.88000		0.16000	
P-Factor	2.34000		2.34000		2.34000		2.34000		2.34000	
Yield	0.65430		0.59470		0.58340		0.69820		0.58220	
Reported Results	2.01500		2.45650		1.45210		32.51200		0.29617	
Calculated Results	2.01371	OK	2.48138	OK	1.44539	OK	31.52198	OK	0.28967	OK
Bkg 1	0.54000		0.55000		0.54000		0.55000		0.59000	
Time 1	100.60000		70.80000		70.80000		70.80000		70.80000	
SF 1	0.94300		1.02800		1.03800		0.99100		0.98300	
Reported MDA	2.47280		3.21070		3.27380		0.67407		0.62986	
Calculated MDA 1	2.59329	OK	3.74178	*	3.81619	*	0.61448	OK	0.75706	*
Results > MDA ?	NO		NO		NO		YES		NO	

241-T-106 Samples

Total Uranium

Sample #	7159-1		7159-2		7159-3		7159-4		7159-5	
Cust. I.D. #	B07K04		B07ML0		LCS		BLANK		REPLICATE #1	
Type	Water		Water		Water		Water		Water	
Final Result (ug/l)	0.05900		0.08000		25.48700		0.08000		0.08000	
Prep Volume (l)	0.02000		0.02000		0.02000		0.02000		0.02000	
Aliquot (g or l)	0.02000		0.02000		1.00000		1.00000		0.02000	
Reported Results (ug/unit aliquot)	0.08000		0.08000		0.50974		0.00160		0.08000	
Calclulated Results (ug/unit aliquot)	0.05900	*	0.08000	OK	0.50974	OK	0.00160	OK	0.08000	OK
MDA	0.08000		0.08000				0.08000		0.08000	
Results > MDA ?	NO		NO		YES		NO		NO	

Reported w/ MDA OK

241-T-106 Samples

Isotopic Uranium

Sample #	7159-1		7159-2		7159-3		7159-4		7159-6	
Cust. I.D. #	B07K04		B07ML0		LCS		BLANK		REPLICATE #2	
Type	Water		Water		Water		Water		Water	
U232 Tracer Added (DPM)	10.540		10.540		10.540		10.540		10.540	
Sample Size (g or l)	1.000		1.000		1.000		1.000		1.000	
Tracer BKG (CPM)	0.022		0.005		0.001		0.016		0.005	
Tracer Counts	768.000		276.000		362.000		286.000		268.000	
Counting Time (min)	384.050		150.820		150.820		150.820		150.820	
Detector Efficiency	0.280		0.277		0.278		0.273		0.272	
Reported Yield	0.670		0.625		0.818		0.652		0.617	
Calculated Yield	0.670	OK	0.625	OK	0.818	OK	0.653	OK	0.618	OK
[U233/234]										
BKG (CPM)	0.004		0.000		0.004		0.017		0.002	
Gross Counts	9.000		5.000		361.000		3.000		2.000	
U235 Counts	0.000		0.000		2.000		0.000		0.000	
Branch Ratio	1.000		1.000		1.000		1.000		1.000	
Tracer Counts	1.000		0.000		1.000		0.000		0.000	
Reported Results (pCi/g or pCi/l)	0.038		0.086		4.683		0.000		0.036	
Calculated Results (pCi/g or pCi/l)	0.041	OK	0.086	OK	4.690	OK	0.008	*	0.029	*
MDA Reported	0.060		0.132		0.298		0.185		0.136	
MDA Calculated	0.046	*	0.000	ERR	0.145	*	0.125	*	0.050	*
Results > MDA?	NO		NO		YES		NO		NO	
[U235]										
BKG (CPM)	0.003		0.001		0.001		0.004		0.002	
Gross Counts	2.000		2.000		15.000		1.000		0.000	
U235 Counts	0.000		0.000		0.000		0.000		0.000	
Branch Ratio	0.826		0.826		0.826		0.826		0.826	
Tracer Counts	0.000		0.000		0.000		0.000		0.000	
Table Counts	0.000		0.000		0.000		0.000		0.000	
Reported Results (pCi/g or pCi/l)	0.008		0.042		0.238		0.000		0.000	
Calculated Results (pCi/g or pCi/l)	0.006	*	0.038	*	0.235	OK	0.009	*	-0.008	*
MDA Reported	0.058		0.206		0.121		0.155		0.165	
MDA Calculated	0.039	*	0.160	*	0.031	*	0.070	*	0.060	*
Results > MDA?	NO		NO		YES		NO		NO	
[U238]										
BKG (CPM)	0.004		0.001		0.000		0.001		0.000	
Gross Counts	0.000		1.000		361.000		1.000		0.000	
U235 Counts	0.000		0.000		2.000		0.000		0.000	
Branch Ratio	1.000		1.000		1.000		1.000		1.000	
Tracer Counts	0.000		0.000		0.000		0.000		0.000	
Reported Results (pCi/g or pCi/l)	-0.013		0.017		4.709		0.017		0.000	
Calculated Results (pCi/g or pCi/l)	-0.010	*	0.014	*	4.711	OK	0.014	*	0.000	ERR
MDA Reported	0.060		0.132		0.126		0.128		0.136	
MDA Calculated	0.036	*	0.034	*	0.086	*	0.033	*	0.000	ERR
Results > MDA?	NO		NO		YES		NO		NO	

241-T-106 Samples

Isotopic Plutonium

Sample #	7159-1		7159-2		7159-3		7159-4		7159-5	
Cust. I.D. #	B07K04		B07ML0		LCS		BLANK		REPLICATE #1	
Type	Water		Water		Water		Water		Water	
Pu242 Tracer Added (DPM)	4.86000		4.86000		4.86000		4.86000		4.86000	
Sample Size (g or l)	1.00000		1.00000		1.00000		1.00000		1.00000	
Tracer BKG (CPM)	0.00000		0.00238		0.00000		0.00079		0.00000	
Tracer Counts	712.00000		947.00000		748.00000		499.00000		659.00000	
Counting Time (min)	705.48000		705.48000		705.48000		705.48000		705.48000	
Detector Efficiency	0.38040		0.38750		0.38190		0.36000		0.41220	
Reported Yield	0.54630		0.71190		0.57180		0.40380		0.46670	
Calculated Yield	0.54591	OK	0.71152	OK	0.57126	OK	0.40382	OK	0.46629	OK
[Pu238]										
BKG (CPM)	0.00079		0.00000		0.00000		0.00079		0.00079	
Gross Counts	0.00000		1.00000		0.00000		0.00000		1.00000	
Branch Ratio	1.00000		1.00000		1.00000		1.00000		1.00000	
Tracer Counts	0.00000		0.00000		0.00000		0.00000		0.00000	
Reported Results (pCi/g or pCi/l)	-0.00308		0.00232		0.00000		-0.00439		0.00000	
Calculated Results (pCi/g or pCi/l)	-0.00171	*	0.00232	OK	0.00000	ERR	-0.00245	*	0.00147	*
MDA Reported	0.02350		0.01770		0.02240		0.03360		0.02540	
MDA Calculated	0.01069	*	0.00000	ERR	0.00000	ERR	0.01528	*	0.01155	*
Results > MDA?	NO		NO		NO		NO		NO	
[Pu239]										
BKG (CPM)	0.00079		0.00079		0.00000		0.00000		0.00000	
Gross Counts	0.00000		1.00000		346.00000		0.00000		2.00000	
Branch Ratio	1.00000		1.00000		1.00000		1.00000		1.00000	
Tracer Counts	0.00000		0.00000		0.00000		0.00000		0.00000	
Reported Results (pCi/g or pCi/l)	-0.00307		0.00000		1.01200		0.00000		0.00664	
Calculated Results (pCi/g or pCi/l)	-0.00171	*	0.00103	*	1.01265	OK	0.00000	ERR	0.00664	OK
MDA Reported	0.02350		0.01770		0.02240		0.03360		0.02540	
MDA Calculated	0.01069	*	0.00805	*	0.00000	ERR	0.00000	ERR	0.00000	ERR
Results > MDA?	NO		NO		YES		NO		NO	

All OK

241-T-106 Samples

Americium 241

Sample #	7159-1		7159-2		7159-3		7159-4		7159-5	
Cust. I.D. #	B07K04		B07ML0		LCS		BLANK		REPLICATE #1	
Type	Water		Water		Water		Water		Water	
Am243 Tracer Added (DPM)	4.95000		4.95000		4.95000		4.95000		4.95000	
Sample Size (g or l)	1.00000		1.00000		1.00000		1.00000		1.00000	
Tracer BKG (CPM)	0.00173		0.00173		0.00346		0.00087		0.00079	
Tracer Counts	1023.00000		917.00000		905.00000		864.00000		1010.00000	
Counting Time (min)	685.82000		685.82000		685.82000		685.82000		705.48000	
Detector Efficiency	0.38830		0.38410		0.37410		0.36910		0.34500	
Reported Yield	0.77480		0.70200		0.71060		0.52880		0.83700	
Calculated Yield	0.77516	OK	0.70234	OK	0.71073	OK	0.52944	OK	0.83786	OK
[Am241]										
BKG (CPM)	0.00346		0.00779		0.00520		0.00693		0.00000	
Gross Counts	6.00000		13.00000		556.00000		7.00000		3.00000	
Branch Ratio	1.00000		1.00000		1.00000		1.00000		1.00000	
Tracer Counts	2.00000		2.00000		2.00000		1.00000		2.00000	
Reported Results (pCi/g or pCi/l)	0.00437		0.01462		1.35900		0.00337		0.00221	
Calculated Results (pCi/g or pCi/l)	0.00355	*	0.01377	OK	1.35972	OK	0.00419	*	0.00221	OK
MDA Reported	0.02090		0.03260		0.03040		0.04510		0.01690	
MDA Calculated	0.02127	OK	0.03076	OK	0.02716	*	0.03761	*	0.01457	*
Results > MDA?	NO		NO		YES		NO		NO	

OK OK OK

241-T-106 Samples

Neptunium 237

Sample #	7159-1		7159-2		7159-3		7159-4		7159-5		7159-6	
Cust. I.D. #	B07K04		B07ML0		LCS		BLANK		REPLICATE #1		BLANK	
Type	Water		Water		Water		Water		Water		Water	
Count Time (min)	1145.000		1145.000		1146.050		1146.500		1146.050		1146.050	
Gross Alpha (dpm)	-0.002		0.022		5.025		0.027		0.004		0.010	
Bkg CPM	0.002		0.000		0.005		0.001		0.001		0.001	
Tracer Counts	0.000		0.000		0.000		0.000		0.000		0.000	
Yield	0.592		0.479		0.491		0.485		0.477		0.461	
Aliquot (g or l)	0.200		0.200		1.000		1.000		0.200		1.000	
Efficiency	0.374		0.353		0.386		0.359		0.392		0.420	
Reported Results (pCi/g or pCi/l)	-0.009		0.105		4.607		0.025		0.021		0.010	
Calculated Results (pCi/g or pCi/l)	-0.008	*	0.103	OK	4.608	OK	0.025	OK	0.019	*	0.010	OK
MDA Reported	0.085		0.035		0.030		0.017		0.080		0.016	
MDA Calculated	0.087	OK	0.032	*	0.029	OK	0.017	OK	0.081	OK	0.016	OK

241-T-106 Samples

Gamma Spectroscopy

Sample #	7159-1		7159-2		7159-3		7159-4		7159-5	
Cust. I.D. #	B07K04		B07ML0		LCS		BLANK		REPLICATE #1	
Type	Water		Water		Water		Water		Water	
Detector	G-2 MB		G-5 MB		G-2 MB		G-3 MB		G-5 MB	
Aliquot (g or l)	0.50000		1.00000		1.00000		1.00000		0.50000	
Counting Time (min)	641.63000		641.88000		1041.98000		1042.51000		1042.83000	
[Cobalt 60; C0-60]										
Background CTS	32.00000		0.00000		13.00000		0.00000		0.00000	
Background CPM	0.05750		0.02080		0.05750		0.02200		0.02080	
Net CPM	0.05000		0.40000		1.05200		0.04000		0.03500	
Branch Fraction	1.00000		1.00000		1.00000		1.00000		1.00000	
Efficiency	0.00343		0.00382		0.00343		0.00366		0.00382	
Reported Results (pCi/g or pCi/l)	<	*	<	*	138.00000	OK	<	*	<	*
Calculated Results (pCi/g or pCi/l)	13.13267		47.16759		138.15565		4.92296		8.25433	
Reported MDA	13.36000	OK	9.70300	*	NA	*	4.98200	OK	8.41400	OK
Calculated MDA	15.83339		3.12805		5.01516		2.63465		4.90823	
Detect/Non Detect	Non Detect		Non Detect		Detect		Non Detect		Non Detect	
[Cesium 137; Cs-137]										
Background CTS	0.00000		0.00000		0.00000		0.00000		0.00000	
Background CPM	0.02560		0.00000		0.02560		0.02650		0.00000	
Net CPM	0.06000		0.06300		1.36400		0.06100		0.04900	
Branch Fraction	0.85100		0.85100		0.85100		0.85100		0.85100	
Efficiency	0.00673		0.00732		0.00673		0.00734		0.00732	
Reported Results (pCi/g or pCi/l)	<	*	<	*	107.30000	OK	<	*	<	*
Calculated Results (pCi/g or pCi/l)	9.43808		4.55561		107.27951		4.39897		7.08651	
Reported MDA	9.52800	OK	9.15000	*	NA	*	4.38100	OK	7.06900	OK
Calculated MDA	4.63016		0.00000		1.61668		1.69430		0.00000	
Detect/Non Detect	Non Detect		Non Detect		Detect		Non Detect		Non Detect	
[Thorium 228; Th-228]										
Background CTS	0.00000		0.00000		0.00000		0.00000		0.00000	
Background CPM	0.16060		0.26430		0.16060		0.22900		0.26430	
Net CPM	0.10000		0.15400		0.10900		0.12700		0.11800	
Branch Fraction	0.44800		0.44800		0.44800		0.44800		0.44800	
Efficiency	0.01731		0.01866		0.01731		0.02043		0.01866	
Reported Results (pCi/g or pCi/l)	<	*	<	*	<	*	<	*	<	*
Calculated Results (pCi/g or pCi/l)	11.61721		6.29809		6.33138		6.25035		12.71655	
Reported MDA	12.12000	OK	17.43000	*	6.34500	OK	6.23900	OK	13.39000	OK
Calculated MDA	8.56482		5.09524		3.36048		3.39910		7.99494	
Detect/Non Detect	Non Detect		Non Detect		Non Detect		Non Detect		Non Detect	

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42 of 42

E-93-22/2978-62

WESTINGHOUSE HANFORD COMPANY
241-T-106 DATA VALIDATION
DISTRIBUTION FORM

SDG: B071K04

Document Title Final QA Record Case #: N3-02-066-7158

Fraction: RAD

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Project Files (1=Administrative; 2=Correspondence; 3=Source Data; 4=Technical Data)

1.1	File Index		1.6.6.3	Plans Doc. Log		3.4	Original Chemical Data	
1.2	Distribution Lists		1.6.6.4	Deliverables Doc. Log		3.5	Original Radiochemical Data	
1.3	Project Procedures		1.7	Budget				
1.4	Project Modifications		1.7.1	Downloads		4.1	Task Plan	
1.5	Staff		1.7.2	M-113s				
1.5.1	Staff Resumes		1.7.3	A-208s		4.2	Data Pkg. Completeness Verif. Checklist	
1.5.2	Staff Training		1.7.4	Budget Status		4.3	Data Valididation Calcs./Annotated DP	X
1.5.3	Auth. Former Site Employee		1.7.5	Invoices		4.4	Prelim. QA Records	
1.6	QA		1.8	Requisitions				
1.6.1	QA Manual		1.9	Meeting Minutes		4.5	Data Valid. & Qual. Summary Rpts.	
1.6.2	QA Implementation		1.10	Record of Telecon		4.5.1	Internal Drafts/Comments/Resol.	
1.6.3.1	QA Audits-Deliverables		1.11	Progress Reports		4.5.2	WHC Review Draft Comments/Resol.	
1.6.3.2	QA Audits-Files		1.12	Subcontractor (HC)		4.5.3	Final Report	
1.6.4.1	Audit Resps. - Deliverables					4.6	Weekly Status Reports	
1.6.4.2	Audit Resps. - Files		2.1	Incoming Correspondence		4.7	Weekly Management Reports	
1.6.5	QA Training		2.2	Outgoing Correspondence				
1.6.6.1	QA Manual Document Log		2.3	Internal Correspondence				
1.6.6.2	Procedure Document Log							
			3.1	Task Order				
			3.2	Sample Lists				
			3.3	Data Validation Procedures				

9613492.6818

THIS APPENDIX CONSISTS OF FIVE ATTACHMENTS

Attachment 1 - Glossary of Data Qualifiers

This attachment provides a glossary explaining all data qualifiers applied as a results of the validation.

Attachment 2 - As Received Laboratory Sample Concentration Reports

This attachment provides a copy of the as-received sample concentration reports. This may be tabular summary to that provided in Attachment 4, or may be a copy of the laboratory reports.

Attachment 3 - Summary of Data Qualifications

This attachment provides a complete summary of all qualifications applied as a result of the validation.

Attachment 4 - As Qualified Data Summary

This attachment provides a copy of the as-received sample concentration reports, with data qualifiers assigned.

Attachment 5 - Data Review Supporting Documentation

This attachment provides copies of the data validation checklists, data summary forms, telephone contact memoranda and other documentation completed as a result of the data validation.

9613492.6019

Mr. Karl Pool
Westinghouse Hanford Company
P.O. Box 1970 MSIN H4-23
Richland, WA 99352

Subject: WHC Order No. MLW-SVV-037106
Task Order E-93-22
Preliminary Quality Assurance Record- 241-T-106
Data Package B07K04, TMA Case Number N3-02-066-7158

Dear Mr. Pool:

Ebasco and Hart Crowser are pleased to provide you with the results of our review and validation of the subject data from the 241-T-106 sampling activities. The attached results are provided to you in partial fulfillment of Milestone 02 of our task plan dated September 2, 1993. The data packages consisted of seven soil samples submitted for gross alpha, gross beta, isotopic uranium, total uranium, isotopic plutonium, americium 241, strontium 90, technetium 99, carbon 14, neptunium 237, and gamma scan radiochemical analysis. The samples were analyzed by Thermo Analytical, Inc. according to requirements specified in the Analytical Laboratory Statement of Work issued by Westinghouse Hanford Company (WHC). The data packages were verified for completeness by Bovay Northwest as required by WHC. All applicable QA/QC samples were validated using Level IV validation criteria. These results, together with the data qualifiers assigned as a result of our review, are provided in Attachment 4.

DATA QUALITY OBJECTIVES SUMMARY

All data quality objectives were met with the exception of initial and continuing calibration verification for alpha spectroscopy results.

MAJOR DEFICIENCIES (REJECTED DATA)

The alpha spectroscopy results from all samples were rejected (qualified R) because the laboratory did not provide evidence of initial or continuing calibration. Additionally, the National Institute for Standards and Testing (NIST) traceability certificates for americium 243 standard H-E2 and uranium 232 tracer F-H1 were not provided.

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MINOR DEFICIENCIES (OTHER QUALIFIED DATA)

Two minor deficiencies were noted. The package case narrative reported that plutonium and uranium contamination resulted in a significant degree of uncertainty in determining the neptunium 237 detection limit. As a result, the laboratory reported all neptunium 237 results as nondetects (UJ). Due to the large uncertainty these results will be qualified as estimated nondetects, in the event initial and continuing calibration verification information is provided by the laboratory.

The gamma spectroscopy results for all samples except B07K05 were qualified as estimated (UJ or J) since no associated blank sample results were reported.

We trust that these preliminary results meet your needs. Our qualifier assignments will be finalized at the time the summary report for this sampling round is published. The final qualifiers may vary from those presented here, reflecting any trends in data quality or laboratory performance observed over this validation effort, or receipt of additional information from the laboratories. Please contact me if you have questions with regard to our activities.

Sincerely,

HART CROWSER, INC.

D. MARK GERBOTH, P.E.
Project Manager

Attachments

cc: Mark Gerboth (w/o attachments)
Jeff Grover (w/o attachments)
Westinghouse EDMC
Project File (

9615492.6821

THIS APPENDIX CONSISTS OF FIVE ATTACHMENTS

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This attachment provides a glossary explaining all data qualifiers applied as a results of the validation.

Attachment 2 - As Received Laboratory Sample Concentration Reports

This attachment provides a copy of the as-received sample concentration reports. This may be tabular summary similar to that provided in Attachment 4, or may be a copy of the laboratory reports.

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This attachment provides a complete summary of all qualifications applied as a result of the validation.

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This attachment provides a copy of the as-received sample concentration reports, with data qualifiers assigned.

Attachment 5 - Data Review Supporting Documentation

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ATTACHMENT 1

Glossary of Data Qualifiers

9613492.6023

ATTACHMENT 1

Glossary of Data Qualifiers

U - Indicates the compound or analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected. Due to quality control deficiencies identified during data validation the value reported nay not accurately reflect the sample quantitation limit.

J - Indicate the compound or analyte was analyzed for and detected. The associated values is estimated but the data are useable for decision making processes.

R - Indicates the compound or analyte was analyzed for and due to an identified quality control deficiency the data are unusable.

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ATTACHMENT 2

As Received Laboratory Sample Concentration Reports

9613492.0025

N302066-01

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

B07K05

SDG 7158
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-01
Dept sample id 7158-001
Received 02/10/93
Client sample id B07K05
Matrix SOIL
Collected 02/08/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	11	5.6	5	10		80A
Gross Beta	Beta	65	6.1	5	10		80B
Uranium 233/234		4.9	1.2	0.3	0.3		U
Uranium 235	15117-96-1	0.20	0.24	0.3	0.3	U	U
Uranium 238	7440-61-1	1.8	0.55	0.3	0.3		U
Total Uranium (ug/g)		6.7	1.3	0.08		X	U_T
Plutonium 238	13981-16-3	0.017	0.019	0.03	0.05	U	PU
Plutonium 239/240		0.13	0.035	0.02	0.05		PU
Americium 241	14596-10-2	0.49	0.075	0.02	0.05		AM
Strontium 90	10098-97-2	0.53	1.6	0.8	2	U	Y
Technetium 99	14133-76-7	39	1.2	0.4	0.5	B	TC
Carbon 14	14762-75-5	5.1	6.2	10	50	U	C
Neptunium 237	13994-20-2	0	0.49	0.01	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	2.0				GAM
Iron 59	14596-12-4	U		1	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	32	0.87		0.05		GAM
Zinc 65	13982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		3		U	GAM
Cesium 134	13967-70-9	U		0.4		U	GAM
Cesium 137	10045-97-3	U		0.4	0.05	U	GAM
Cerium 144	14762-78-8	U		1		U	GAM
Europium 152	14683-23-9	U		0.6	0.1	U	GAM
Europium 154	15585-10-1	4.5	0.36		0.1		GAM
Radium 226	13982-63-3	1.1	0.63				GAM
Thorium 228	14274-82-9	0.90	0.34				GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6626

TMA NORCAL

REPORTING GROUP 7158

N302066-01

DATA SHEET, cont

B07K05

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-01	Client sample id	B07K05
Dept sample id	7158-001	Matrix	SOIL
Received	02/10/93	Collected	02/08/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		2		U	GAM
Europium 155	14391-16-3	4.4	0.57				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6927

N302066-02

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

B07K11

SDG 7158
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-02
Dept sample id 7158-002
Received 02/16/93
Client sample id B07K11
Matrix SOIL
Collected 02/09/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	5.1	5.6	6	10	U	80A
Gross Beta	Beta	160	9.0	5	10		80B
Uranium 233/234		0.72	0.20	0.1	0.3		U
Uranium 235	15117-96-1	0.013	0.051	0.1	0.3	U	U
Uranium 238	7440-61-1	0.59	0.16	0.08	0.3		U
Total Uranium (ug/g)		2.1	0.52	0.08			U_T
Plutonium 238	13981-16-3	0.002	0.014	0.03	0.05	U	PU
Plutonium 239/240		0.026	0.019	0.02	0.05	J	PU
Americium 241	14596-10-2	0.021	0.018	0.03	0.05	U	AM
Strontium 90	10098-97-2	0.17	0.31	1	2	U	Y
Technetium 99	14133-76-7	350	5.6	0.9	0.5		TC
Carbon 14	14762-75-5	-2.5	4.2	5	50	U	C
Neptunium 237	13994-20-2	0	0.13	0.02	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	10	2.6				GAM
Iron 59	14596-12-4	U		2	0.05	U	GAM
Chromium 51	14392-02-0	U		5		U	GAM
Cobalt 60	10198-40-0	47	1.2		0.05		GAM
Zinc 65	13982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		4		U	GAM
Cesium 134	13967-70-9	U		0.6		U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	U	GAM
Cerium 144	14762-78-8	U		2		U	GAM
Europium 152	14683-23-9	U		0.7	0.1	U	GAM
Europium 154	15585-10-1	U		0.4	0.1	U	GAM
Radium 226	13982-63-3	0.71	0.59				GAM
Thorium 228	14274-82-9	1.3	0.48				GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6828

TMA NORCAL

REPORTING GROUP 7158

N302066-02

DATA SHEET, cont

B07K11

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-02	Client sample id	B07K11
Dept sample id	7158-002	Matrix	SOIL
Received	02/16/93	Collected	02/09/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		3		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6829

N302066-03

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

B07K13

SDG 7158
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-03
Dept sample id 7158-003
Received 02/16/93
Client sample id B07K13
Matrix SOIL
Collected 02/09/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	14	7.2	7	10		80A
Gross Beta	Beta	150	9.0	6	10		80B
Uranium 233/234		0.76	0.19	0.07	0.3		U
Uranium 235	15117-96-1	0.012	0.046	0.09	0.3	U	U
Uranium 238	7440-61-1	0.77	0.19	0.07	0.3		U
Total Uranium (ug/g)		2.1	0.52	0.08			U_T
Plutonium 238	13981-16-3	-0.007	0.014	0.03	0.05	U	PU
Plutonium 239/240		0.014	0.014	0.02	0.05	U	PU
Americium 241	14596-10-2	0.004	0.012	0.02	0.05	U	AM
Strontium 90	10098-97-2	0.29	0.44	2	2	U	Y
Technetium 99	14133-76-7	160	2.5	0.4	0.5	B	TC
Carbon 14	14762-75-5	-0.15	3.9	4	50	U	C
Neptunium 237	13994-20-2	0	0.12	0.004	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	9.6	2.4				GAM
Iron 59	14596-12-4	U		2	0.05	U	GAM
Chromium 51	14392-02-0	U		4		U	GAM
Cobalt 60	10198-40-0	46	1.1		0.05		GAM
Zinc 65	13982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		3		U	GAM
Cesium 134	13967-70-9	U		0.5		U	GAM
Cesium 137	10045-97-3	U		0.4	0.05	U	GAM
Cerium 144	14762-78-8	U		1		U	GAM
Europium 152	14683-23-9	U		0.4	0.1	U	GAM
Europium 154	15585-10-1	U		0.3	0.1	U	GAM
Radium 226	13982-63-3	0.91	0.53				GAM
Thorium 228	14274-82-9	0.89	0.36				GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6030

TMA NORCAL

REPORTING GROUP 7158

N302066-03

DATA SHEET, cont

B07K13

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-03	Client sample id	B07K13
Dept sample id	7158-003	Matrix	SOIL
Received	02/16/93	Collected	02/09/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6651

N302066-04

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

B07K17

SDG 7158
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-04
Dept sample id 7158-004
Received 02/18/93
Client sample id B07K17
Matrix SOIL
Collected 02/12/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	22	13	8	10		80A
Gross Beta	Beta	1200	24	5	10		80B
Uranium 233/234		2.0	0.37	0.08	0.3		U
Uranium 235	15117-96-1	0.13	0.081	0.1	0.3	J	U
Uranium 238	7440-61-1	1.9	0.34	0.08	0.3		U
Total Uranium (ug/g)		5.6	1.4	0.08			U_T
Plutonium 238	13981-16-3	0.032	0.026	0.03	0.05	J	PU
Plutonium 239/240		4.6	0.35	0.02	0.05		PU
Americium 241	14596-10-2	0.62	0.078	0.02	0.05		AM
Strontium 90	10098-97-2	82	2.7	1	2		Y
Technetium 99	14133-76-7	1200	7.9	0.4	0.5	B	TC
Carbon 14	14762-75-5	4.0	4.1	5	50	U	C
Neptunium 237	13994-20-2	0	0.18	0.03	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	5.4	2.5				GAM
Iron 59	14596-12-4	U		3	0.05	U	GAM
Chromium 51	14392-02-0	U		6		U	GAM
Cobalt 60	10198-40-0	140	1.6		0.05		GAM
Zinc 65	13982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		5		U	GAM
Cesium 134	13967-70-9	U		0.8		U	GAM
Cesium 137	10045-97-3	U		0.6	0.05	U	GAM
Cerium 144	14762-78-8	U		1		U	GAM
Europium 152	14683-23-9	U		0.5	0.1	U	GAM
Europium 154	15585-10-1	U		0.4	0.1	U	GAM
Radium 226	13982-63-3	2.6	0.87				GAM
Thorium 228	14274-82-9	U		0.6		U	GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6952

TMA NORCAL

REPORTING GROUP 7158

N302066-04

DATA SHEET, cont

B07K17

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-04	Client sample id	B07K17
Dept sample id	7158-004	Matrix	SOIL
Received	02/18/93	Collected	02/12/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		4		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.4853

N302066-05

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

B07K19

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-05
Dept sample id 7158-005
Received 02/18/93

Client sample id B07K19
Matrix SOIL
Collected 02/12/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	-1.1	9.2	7	10	U	80A
Gross Beta	Beta	1400	35	10	10		80B
Uranium 233/234		1.2	0.17	0.05	0.3		U
Uranium 235	15117-96-1	0.019	0.025	0.05	0.3	U	U
Uranium 238	7440-61-1	0.99	0.16	0.04	0.3		U
Total Uranium (ug/g)		2.9	0.73	0.08			U_T
Plutonium 238	13981-16-3	0.009	0.009	0.02	0.05	U	PU
Plutonium 239/240		2.1	0.20	0.02	0.05		PU
Americium 241	14596-10-2	0.34	0.058	0.02	0.05		AM
Strontium 90	10098-97-2	34	3.5	0.8	2		Y
Technetium 99	14133-76-7	2900	45	0.8	0.5		TC
Carbon 14	14762-75-5	0.47	4.3	5	50	U	C
Neptunium 237	13994-20-2	0	0.13	0.005	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	11	4.4				GAM
Iron 59	14596-12-4	U		4	0.05	U	GAM
Chromium 51	14392-02-0	U		10		U	GAM
Cobalt 60	10198-40-0	210	3.0		0.05		GAM
Zinc 65	13982-39-3	U		3		U	GAM
Ruthenium 106	13967-48-1	U		9		U	GAM
Cesium 134	13967-70-9	U		1		U	GAM
Cesium 137	10045-97-3	U		0.9	0.05	U	GAM
Cerium 144	14762-78-8	U		3		U	GAM
Europium 152	14683-23-9	U		1	0.1	U	GAM
Europium 154	15585-10-1	U		0.8	0.1	U	GAM
Radium 226	13982-63-3	1.2	1.1				GAM
Thorium 228	14274-82-9	0.83	0.62				GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6834

TMA NORCAL

REPORTING GROUP 7158

N302066-05

DATA SHEET, cont

B07K19

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-05	Client sample id	B07K19
Dept sample id	7158-005	Matrix	SOIL
Received	02/18/93	Collected	02/12/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		6		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6855

TMA NORCAL

REPORTING GROUP 7158

DATA SHEET

N302066-06

B07K22

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-06
Dept sample id 7158-006
Received 02/22/93

Client sample id B07K22
Matrix SOIL
Collected 02/16/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	17	9.2	7	10		80A
Gross Beta	Beta	570	23	10	10		80B
Uranium 233/234		2.5	0.41	0.1	0.3		U
Uranium 235	15117-96-1	0.081	0.081	0.1	0.3	U	U
Uranium 238	7440-61-1	1.3	0.28	0.1	0.3		U
Total Uranium (ug/g)		3.9	0.97	0.08			U_T
Plutonium 238	13981-16-3	0.002	0.010	0.02	0.05	U	PU
Plutonium 239/240		0.020	0.015	0.02	0.05	J	PU
Americium 241	14596-10-2	0.015	0.011	0.01	0.05	J	AM
Strontium 90	10098-97-2	-0.10	1.6	0.9	2	U	Y
Technetium 99	14133-76-7	1200	7.6	0.5	0.5	B	TC
Carbon 14	14762-75-5	2.0	4.3	5	50	U	C
Neptunium 237	13994-20-2	0	0.82	0.02	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	7.6	2.1				GAM
Iron 59	14596-12-4	U		2	0.05	U	GAM
Chromium 51	14392-02-0	U		4		U	GAM
Cobalt 60	10198-40-0	75	1.4		0.05		GAM
Zinc 65	13982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		5		U	GAM
Cesium 134	13967-70-9	U		0.7		U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	U	GAM
Cerium 144	14762-78-8	U		1		U	GAM
Europium 152	14683-23-9	U		0.6	0.1	U	GAM
Europium 154	15585-10-1	U		0.4	0.1	U	GAM
Radium 226	13982-63-3	1.2	0.67				GAM
Thorium 228	14274-82-9	U		0.6		U	GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6836

TMA NORCAL

REPORTING GROUP 7158

N302066-06

DATA SHEET, cont

B07K22

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-06	Client sample id	B07K22
Dept sample id	7158-006	Matrix	SOIL
Received	02/22/93	Collected	02/16/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		3		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6857

TMA NORCAL

REPORTING GROUP 7158

N302066-07

B07K25

DATA SHEET

SDG 7158
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-07
Dept sample id 7158-007
Received 02/24/93
Client sample id B07K25
Matrix SOIL
Collected 02/18/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	8.7	11	10	10	U	80A
Gross Beta	Beta	780	27	10	10		80B
Uranium 233/234		3.7	0.44	0.07	0.3		U
Uranium 235	15117-96-1	0.10	0.053	0.07	0.3	J	U
Uranium 238	7440-61-1	3.7	0.44	0.05	0.3		U
Total Uranium (ug/g)		12	3.0	0.08			U_T
Plutonium 238	13981-16-3	0	0.005	0.02	0.05	U	PU
Plutonium 239/240		0.007	0.009	0.02	0.05	U	PU
Americium 241	14596-10-2	0.008	0.012	0.02	0.05	U	AM
Strontium 90	10098-97-2	0.12	0.26	0.9	2	U	Y
Technetium 99	14133-76-7	4500	41	5	0.5		TC
Carbon 14	14762-75-5	-0.54	4.4	5	50	U	C
Neptunium 237	13994-20-2	0	0.46	0.02	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	3.5	1.7				GAM
Iron 59	14596-12-4	U		1	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	19	0.72		0.05		GAM
Zinc 65	13982-39-3	U		0.8		U	GAM
Ruthenium 106	13967-48-1	3.9	1.7				GAM
Cesium 134	13967-70-9	U		0.4		U	GAM
Cesium 137	10045-97-3	U		0.3	0.05	U	GAM
Cerium 144	14762-78-8	U		0.8		U	GAM
Europium 152	14683-23-9	U		0.3	0.1	U	GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-63-3	3.3	0.52				GAM
Thorium 228	14274-82-9	U		0.3		U	GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6058

TMA NORCAL

REPORTING GROUP 7158

N302066-07

DATA SHEET, cont

B07K25

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-07	Client sample id	B07K25
Dept sample id	7158-007	Matrix	SOIL
Received	02/24/93	Collected	02/18/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6839

ATTACHMENT 3

Summary of Data Qualifications

Gross Alpha (CRDL = 10 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	10.917	10.780	11.000	
B07K11	5.128	5.100	5.100	U
B07K13	14.240	14.300	14.000	
B07K17	21.188	22.000	22.000	
B07K19	-0.122	-1.140	-1.100	U
B07K22	17.037	16.700	17.000	
B07K25	9.145	8.680	8.700	U

Gross Beta (CRDL = 10 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	64.799	64.800	65.000	
B07K11	161.971	162.000	160.000	
B07K13	151.481	151.000	150.000	
B07K17	1243.500	1244.000	1200.000	
B07K19	1408.326	1410.000	1400.000	
B07K22	569.484	569.000	570.000	
B07K25	784.060	783.000	780.000	

Uranium 235 (CRDL = 0.3 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.130	0.201	0.200	R
B07K11	0.016	0.013	0.013	R
B07K13	0.016	0.012	0.012	R
B07K17	0.130	0.134	0.130	R
B07K19	0.021	0.019	0.019	R
B07K22	0.087	0.081	0.081	R
B07K25	0.101	0.104	0.100	R

Uranium 238 (CRDL = 0.3 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	1.858	1.760	1.800	R
B07K11	0.585	0.587	0.590	R
B07K13	0.770	0.767	0.770	R
B07K17	1.858	1.859	1.900	R
B07K19	0.992	0.994	0.990	R
B07K22	1.318	1.315	1.300	R
B07K25	3.746	3.744	3.700	R

Raw Data Results units are pCi/sample.
Reported Results units are pCi/G.
* - Sample reported as "U" on results reported printout

Uranium 233/234 (CRDL = 0.3 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	4.960	4.947	4.900	R
B07K11	0.722	0.723	0.720	R
B07K13	0.760	0.758	0.760	R
B07K17	2.023	2.025	2.000	R
B07K19	1.167	1.168	1.200	R
B07K22	2.465	2.463	2.500	R
B07K25	3.738	3.737	3.700	R

Total Uranium

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	5.585	6.650	6.700	
B07K11	2.116	2.116	2.100	
B07K13	2.081	2.081	2.100	
B07K17	5.585	5.585	5.600	
B07K19	2.932	2.932	2.900	
B07K22	3.920	3.920	3.900	
B07K25	12.274	12.274	12.000	

Plutonium 238 (CRDL = 0.05 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.016	0.017	0.017	R
B07K11	0.002	0.002	0.002	R
B07K13	-0.007	-0.007	-0.007	R
B07K17	0.033	0.032	0.032	R
B07K19	0.010	0.009	0.009	R
B07K22	0.004	0.002	0.002	R
B07K25	0.001	0.000	0.000	R

Strontium 90 (CRDL = 2.0 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.984	0.532	0.530	U
B07K11	0.171	0.171	0.170	U
B07K13	0.286	0.286	0.290	U
B07K17	82.276	82.313	82.000	
B07K19	35.885	33.942	34.000	
B07K22	-0.101	-0.105	-0.100	U
B07K25	0.123	0.123	0.120	U

Raw Data Results units are pCi/sample.
Reported Results units are pCi/G.
* - Sample reported as "U" on results reported printout

Plutonium 239 (CRDL = 0.05 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.130	0.130	0.130	R
B07K11	0.026	0.026	0.026	R
B07K13	0.015	0.014	0.014	R
B07K17	4.635	4.634	4.600	R
B07K19	2.113	2.112	2.100	R
B07K22	0.020	0.020	0.020	R
B07K25	0.007	0.007	0.007	R

Technetium 99 (CRDL = 0.5 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	39.097	39.101	39.000	
B07K11	354.208	354.200	350.000	
B07K13	158.530	158.530	160.000	
B07K17	1225.002	1231.500	1200.000	
B07K19	2866.055	2866.100	2900.000	
B07K22	1206.139	1206.100	1200.000	
B07K25	4482.739	4482.700	4500.000	

Americium 241 (CRDL = 0.05 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.493	0.493	0.490	R
B07K11	0.021	0.021	0.021	R
B07K13	0.003	0.004	0.004	R
B07K17	0.619	0.620	0.620	R
B07K19	0.344	0.345	0.340	R
B07K22	0.015	0.015	0.015	R
B07K25	0.007	0.008	0.008	R

Carbon 14 (CRDL = 50 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	5.136	5.139	5.100	U
B07K11	-2.515	-2.515	-2.500	U
B07K13	-0.154	-0.154	-0.150	U
B07K17	3.961	3.962	4.000	U
B07K19	0.465	0.465	0.470	U
B07K22	2.000	2.001	2.000	U
B07K25	-0.541	-0.541	-0.540	U

Raw Data Results units are pCi/sample.
Reported Results units are pCi/G.
* - Sample reported as "U" on results reported printout

Neptunium 237 (CRDL = 0.2 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.244	0.244	0.000	R
B07K11	0.063	0.063	0.000	R
B07K13	0.058	0.058	0.000	R
B07K17	0.092	0.091	0.000	R
B07K19	0.065	0.065	0.000	R
B07K22	0.411	0.411	0.000	R
B07K25	0.230	0.230	0.000	R

Cesium 137 (CRDL = .05 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.363	<0.4	*	UJ
B07K11	0.506	<0.5	*	UJ
B07K13	0.386	<0.4	*	UJ
B07K17	0.622	<0.6	*	UJ
B07K19	0.947	<0.9	*	UJ
B07K22	0.533	<0.5	*	UJ
B07K25	0.272	<0.3	*	UJ

Cobalt 60 (CRDL = 0.05 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	31.246	31.660	32.000	J
B07K11	46.365	46.920	47.000	J
B07K13	45.247	45.850	46.000	J
B07K17	138.165	139.800	140.000	J
B07K19	209.116	211.400	210.000	J
B07K22	73.842	74.610	75.000	J
B07K25	19.061	19.250	19.000	J

Thorium 228

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.872	0.901	0.900	J
B07K11	1.234	1.273	1.300	J
B07K13	0.864	0.894	0.890	J
B07K17	0.589	<0.6	*	UJ
B07K19	0.804	0.828	0.830	J
B07K22	0.274	0.281	*	UJ
B07K25	0.156	0.159	*	UJ

Raw Data Results units are pCi/sample.
Reported Results units are pCi/G.

Gross Alpha (CRDL = 10 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	10.917	10.780	11.000	
B07K11	5.128	5.100	5.100	U
B07K13	14.240	14.300	14.000	
B07K17	21.188	22.000	22.000	
B07K19	-0.122	-1.140	-1.100	U
B07K22	17.037	16.700	17.000	
B07K25	9.145	8.680	8.700	U
QC 7158-8	12.581	12.600	130.000	
QC 7158-9	-0.182	-0.182	-1.800	
QC 7158-10	13.801	13.700	14.000	
QC 7158-11	13.625	13.600	140.000	
QC 7158-12	0.149	0.150	1.500	

MDA

6

Uranium 235 (CRDL = 0.3 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.130	0.201	0.200	R
B07K11	0.016	0.013	0.013	R
B07K13	0.016	0.012	0.012	R
B07K17	0.130	0.134	0.130	R
B07K19	0.021	0.019	0.019	R
B07K22	0.087	0.081	0.081	R
B07K25	0.101	0.104	0.100	R
QC 7158-8	0.229	0.234	0.230	
QC 7158-9	-0.004	0.000	0.000	
QC 7158-10	0.100	0.104	0.100	
QC 7158-11	0.164	0.167	0.170	
QC 7158-12	-0.003	-0.007	-0.007	

Gross Beta (CRDL = 10 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	64.799	64.800	65.000	
B07K11	161.971	162.000	160.000	
B07K13	151.481	151.000	150.000	
B07K17	1243.500	1244.000	1200.000	
B07K19	1408.326	1410.000	1400.000	
B07K22	569.484	569.000	570.000	
B07K25	784.060	783.000	780.000	
QC 7158-8	9.057	9.060	91.000	
QC 7158-9	0.145	0.145	1.500	
QC 7158-10	66.599	66.600	67.000	
QC 7158-11	11.780	11.800	120.000	
QC 7158-12	0.106	0.106	1.100	

Uranium 238 (CRDL = 0.3 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	1.858	1.760	1.800	R
B07K11	0.585	0.587	0.590	R
B07K13	0.770	0.767	0.770	R
B07K17	1.858	1.859	1.900	R
B07K19	0.992	0.994	0.990	R
B07K22	1.318	1.315	1.300	R
B07K25	3.746	3.744	3.700	R
QC 7158-8	4.023	4.030	4.000	
QC 7158-9	-0.004	0.000	0.000	
QC 7158-10	2.305	2.310	2.300	
QC 7158-11	4.797	4.793	4.800	
QC 7158-12	0.004	0.005	0.005	

Raw Data Results units are pCi/sample.
Reported Results units are pCi/G.

Uranium 233/234 (CRDL = 0.3 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	4.960	4.947	4.900	R
B07K11	0.722	0.723	0.720	R
B07K13	0.760	0.758	0.760	R
B07K17	2.023	2.025	2.000	R
B07K19	1.167	1.168	1.200	R
B07K22	2.465	2.463	2.500	R
B07K25	3.738	3.737	3.700	R
QC 7158-8	4.305	4.307	4.300	
QC 7158-9	-0.001	0.000	0.000	
QC 7158-10	5.594	5.582	5.600	
QC 7158-11	4.984	4.977	5.000	
QC 7158-12	0.043	0.044	0.044	

Total Uranium

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	5.585	6.650	6.700	
B07K11	2.116	2.116	2.100	
B07K13	2.081	2.081	2.100	
B07K17	5.585	5.585	5.600	
B07K19	2.932	2.932	2.900	
B07K22	3.920	3.920	3.900	
B07K25	12.274	12.274	12.000	
QC 7158-8	0.315	0.315	1.300	
QC 7158-9	0.002	<0.0016	U	
QC 7158-10	6.568	6.600	6.600	
QC 7158-11	0.429	0.429	1.700	
QC 7158-12	0.002	<0.0016	U	

Plutonium 238 (CRDL = 0.05 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.016	0.017	0.017	R
B07K11	0.002	0.002	0.002	R
B07K13	-0.007	-0.007	-0.007	R
B07K17	0.033	0.032	0.032	R
B07K19	0.010	0.009	0.009	R
B07K22	0.004	0.002	0.002	R
B07K25	0.001	0.000	0.000	R
QC 7158-8	0.004	0.004	0.004	
QC 7158-9	0.009	0.009	0.009	
QC 7158-10	0.025	0.026	0.026	
QC 7158-11	0.003	0.003	0.003	
QC 7158-12	0.000	0.000	0.000	

Strontium 90 (CRDL = 2.0 pCi/G)

MDA

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.984	0.532	0.530	U
B07K11	0.171	0.171	0.170	U
B07K13	0.286	0.286	0.290	U
B07K17	82.276	82.313	82.000	
B07K19	35.885	33.942	34.000	
B07K22	-0.101	-0.105	-0.100	U
B07K25	0.123	0.123	0.120	U
QC 7158-8	12.203	12.217	12.000	
QC 7158-9	-0.000	-0.198	-0.200	
QC 7158-10	-0.994	-0.155	-0.160	
QC 7158-11	12.269	1016.467	12.000	
QC 7158-12	-0.000	-0.167	-0.110	

Raw Data Results units are pCi/sample.
Reported Results units are pCi/G.

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Plutonium 239 (CRDL = 0.05 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.130	0.130	0.130	R
B07K11	0.026	0.026	0.026	R
B07K13	0.015	0.014	0.014	R
B07K17	4.635	4.634	4.600	R
B07K19	2.113	2.112	2.100	R
B07K22	0.020	0.020	0.020	R
B07K25	0.007	0.007	0.007	R
QC 7158-8	0.805	0.805	0.810	
QC 7158-9	0.003	0.003	0.003	
QC 7158-10	0.124	0.124	0.120	
QC 7158-11	1.048	1.048	1.000	
QC 7158-12	0.003	0.002	0.002	

Technetium 99 (CRDL = 0.5 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	39.097	39.101	39.000	
B07K11	354.208	354.200	350.000	
B07K13	158.530	158.530	160.000	
B07K17	1225.002	1231.500	1200.000	
B07K19	2866.055	2866.100	2900.000	
B07K22	1206.139	1206.100	1200.000	
B07K25	4482.739	4482.700	4500.000	
QC 7158-8	31.737	31.731	16.000	
QC 7158-9	2.955	2.966	1.500	
QC 7158-10	40.663	40.665	41.000	
QC 7158-11	44.803	44.804	23.000	
QC 7158-12	1.640	1.637	0.800	

Americium 241 (CRDL = 0.05 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.493	0.493	0.490	R
B07K11	0.021	0.021	0.021	R
B07K13	0.003	0.004	0.004	R
B07K17	0.619	0.620	0.620	R
B07K19	0.344	0.345	0.340	R
B07K22	0.015	0.015	0.015	R
B07K25	0.007	0.008	0.008	R
QC 7158-8	1.086	1.086	1.100	
QC 7158-9	0.001	0.000	0.000	
QC 7158-10	0.509	0.510	0.510	
QC 7158-11	1.136	1.138	1.100	
QC 7158-12	0.005	0.004	0.004	

Carbon 14 (CRDL = 50 pCi/G)

MDA

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	5.136	5.139	5.100	U
B07K11	-2.515	-2.515	-2.500	U
B07K13	-0.154	-0.154	-0.150	U
B07K17	3.961	3.962	4.000	U
B07K19	0.465	0.465	0.470	~~M~~ U
B07K22	2.000	2.001	2.000	U
B07K25	-0.541	-0.541	-0.540	U
QC 7158-8	58.975	58.946	590.000	
QC 7158-9	-0.065	-0.065	-0.650	
QC 7158-10	3.072	3.075	3.100	
QC 7158-11	60.120	1964.500	20000.000	
QC 7158-12	0.738	0.738	7.400	

10

Raw Data Results units are pCi/sample.
Reported Results units are pCi/G.

9488-2643196

Neptunium 237 (CRDL = 0.2 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.244	0.244	0.000	R
B07K11	0.063	0.063	0.000	R
B07K13	0.058	0.058	0.000	R
B07K17	0.092	0.091	0.000	R
B07K19	0.065	0.065	0.000	R
B07K22	0.411	0.411	0.000	R
B07K25	0.230	0.230	0.000	R
QC 7158-8	3.324	3.324	3.300	
QC 7158-9	0.000	0.000	0.000	
QC 7158-10	0.391	0.391	0.000	
QC 7158-11	4.194	4.163	4.200	
QC 7158-12	0.004	0.004	0.004	

Cesium 137 (CRDL = .05 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.363	<.4 <	~~0.000~~ U	U J
B07K11	0.506	<.5 <	~~0.000~~ U	U J
B07K13	0.386	<.4 <	~~0.000~~ U	U J
B07K17	0.622	<.6 <	~~0.000~~ U	U J
B07K19	0.947	<.9 <	~~0.000~~ U	U J
B07K22	0.533	<.5 <	~~0.000~~ U	U J
B07K25	0.272	<.3 <	~~0.000~~ U	U J
QC 7158-8	100.947	100.900	0.130	
QC 7158-9	9.359	<	~~0.000~~ U	U
QC 7158-10	0.279	<	~~0.000~~ U	U

Cobalt 60 (CRDL = 0.05 pCi/G)

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	31.246	31.660	32.000	J
B07K11	46.365	46.920	47.000	J
B07K13	45.247	45.850	46.000	J
B07K17	138.165	139.800	140.000	J
B07K19	209.116	211.400	210.000	J
B07K22	73.842	74.610	75.000	J
B07K25	19.061	19.250	19.000	J
QC 7158-8	135.017	135.000	0.180	
QC 7158-9	14.052	<	~~0.000~~ U	U
QC 7158-10	32.157	32.590	33.000	

Thorium 228

Customer I.D. #	Calculated Results	Raw Data Results	Reported Results	Q
B07K05	0.872	0.901	0.900	
B07K11	1.234	1.273	1.300	J
B07K13	0.864	0.894	0.890	J
B07K17	0.589	<.6 <	~~0.000~~ U	U J
B07K19	0.804	0.828	0.830	J
B07K22	0.274	0.281	[illegible]	[illegible]
B07K25	0.156	<.3 0.159	~~0.000~~ U	U
QC 7158-8	24.786	<	~~0.000~~ U	U
QC 7158-9	14.986	<	~~0.000~~ U	U
QC 7158-10	1.018	1.053	1.100	

Raw Data Results units are pCi/sample.
Reported Results units are pCi/G.

9613492.6848

ATTACHMENT 4

As Qualified Data Summary

9613492.6849

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

N302066-01

B07K05

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-01
Dept sample id 7158-001
Received 02/10/93

Client sample id B07K05
Matrix SOIL
Collected 02/08/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	11	5.6	5	10		80A
Gross Beta	Beta	65	6.1	5	10		80B
Uranium 233/234		4.9	1.2	0.3	0.3	~~R~~ —	U
Uranium 235	15117-96-1	0.20	0.24	0.3	0.3	~~U~~ ~~R~~ —	U
Uranium 238	7440-61-1	1.8	0.55	0.3	0.3	~~R~~ —	U
Total Uranium (ug/g)		6.7	1.3	0.08		~~R~~ —	U_T
Plutonium 238	13981-16-3	0.017	0.019	0.03	0.05	~~U~~ ~~R~~ U	PU
Plutonium 239/240		0.13	0.035	0.02	0.05	~~R~~ —	PU
Americium 241	14596-10-2	0.49	0.075	0.02	0.05	R	AM
Strontium 90	10098-97-2	0.53	1.6	0.8	2	U	Y
Technetium 99	14133-76-7	39	1.2	0.4	0.5	~~U~~ —	TC
Carbon 14	14762-75-5	5.1	6.2	10	50	U	C
Neptunium 237	13994-20-2	0	0.49	0.01	0.2	~~U~~ ~~R~~ U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	2.0				GAM
Iron 59	14596-12-4	U		1	0.05	~~UJ~~ U	GAM
Chromium 51	14392-02-0	U		3		~~UJ~~ U	GAM
Cobalt 60	10198-40-0	32	0.87		0.05	J	GAM
Zinc 65	13982-39-3	U		1		~~UJ~~ U	GAM
Ruthenium 106	13967-48-1	U		3		~~UJ~~ U	GAM
Cesium 134	13967-70-9	U		0.4		~~UJ~~ U	GAM
Cesium 137	10045-97-3	U		0.4	0.05	~~UJ~~ U	GAM
Cerium 144	14762-78-8	U		1		~~UJ~~ U	GAM
Europium 152	14683-23-9	U		0.6	0.1	~~UJ~~ U	GAM
Europium 154	15585-10-1	4.5	0.36		0.1	J	GAM
Radium 226	13982-63-3	1.1	0.63			J	GAM
Thorium 228	14274-82-9	0.90	0.34			J	GAM

J.S. 11/1/93 JP 2-22-94

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6050

TMA NORCAL

REPORTING GROUP 7158

N302066-01

DATA SHEET, cont

B07K05

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-01	Client sample id	B07K05
Dept sample id	7158-001	Matrix	SOIL
Received	02/10/93	Collected	02/08/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		2		U	GAM
Europium 155	14391-16-3	4.4	0.57				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6951

N302066-02

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

B07K11

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-02
Dept sample id 7158-002
Received 02/16/93

Client sample id B07K11
Matrix SOIL
Collected 02/09/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	5.1	5.6	6	10	U	80A
Gross Beta	Beta	160	9.0	5	10	—	80B
Uranium 233/234		0.72	0.20	0.1	0.3	~~R~~ —	U
Uranium 235	15117-96-1	0.013	0.051	0.1	0.3	~~UR~~ —	U
Uranium 238	7440-61-1	0.59	0.16	0.08	0.3	~~R~~ —	U
Total Uranium (ug/g)		2.1	0.52	0.08		—	U_T
Plutonium 238	13981-16-3	0.002	0.014	0.03	0.05	~~UR~~ U	PU
Plutonium 239/240		0.026	0.019	0.02	0.05	~~UR~~ —	PU
Americium 241	14596-10-2	0.021	0.018	0.03	0.05	~~UR~~	AM
Strontium 90	10098-97-2	0.17	0.31	1	2	U	Y
Technetium 99	14133-76-7	350	5.6	0.9	0.5	—	TC
Carbon 14	14762-75-5	-2.5	4.2	5	50	U	C
Neptunium 237	13994-20-2	0	0.13	0.02	0.2	~~UR~~ U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	10	2.6			J	GAM
Iron 59	14596-12-4	U		2	0.05	~~UJ~~ U	GAM
Chromium 51	14392-02-0	U		5		~~UJ~~ U	GAM
Cobalt 60	10198-40-0	47	1.2		0.05	J	GAM
Zinc 65	13982-39-3	U		2		~~UJ~~ U	GAM
Ruthenium 106	13967-48-1	U		4		~~UJ~~ U	GAM
Cesium 134	13967-70-9	U		0.6		~~UJ~~ U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	~~UJ~~ U	GAM
Cerium 144	14762-78-8	U		2		~~UJ~~ U	GAM
Europium 152	14683-23-9	U		0.7	0.1	~~UJ~~ U	GAM
Europium 154	15585-10-1	U		0.4	0.1	~~UJ~~ U	GAM
Radium 226	13982-63-3	0.71	0.59			J	GAM
Thorium 228	14274-82-9	1.3	0.48			J	GAM

9P222-94

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6652

TMA NORCAL

REPORTING GROUP 7158

N302066-02

DATA SHEET, cont

B07K11

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-02
Dept sample id 7158-002
Received 02/16/93

Client sample id B07K11
Matrix SOIL
Collected 02/09/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		3		~~U-I~~ U	GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6853

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

N302066-03

B07K13

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-03
Dept sample id 7158-003
Received 02/16/93

Client sample id B07K13
Matrix SOIL
Collected 02/09/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	14	7.2	7	10	—	80A
Gross Beta	Beta	150	9.0	6	10	—	80B
Uranium 233/234		0.76	0.19	0.07	0.3	~~R~~ —	U
Uranium 235	15117-96-1	0.012	0.046	0.09	0.3	~~UR~~ —	U
Uranium 238	7440-61-1	0.77	0.19	0.07	0.3	~~R~~ —	U
Total Uranium (ug/g)		2.1	0.52	0.08		—	U_T
Plutonium 238	13981-16-3	-0.007	0.014	0.03	0.05	~~UR~~ U	PU
Plutonium 239/240		0.014	0.014	0.02	0.05	~~UR~~ U	PU
Americium 241	14596-10-2	0.004	0.012	0.02	0.05	~~UR~~	AM
Strontium 90	10098-97-2	0.29	0.44	2	2	U	Y
Technetium 99	14133-76-7	160	2.5	0.4	0.5	~~R~~ —	TC
Carbon 14	14762-75-5	-0.15	3.9	4	50	U	C
Neptunium 237	13994-20-2	0	0.12	0.004	0.2	~~UR~~ U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	9.6	2.4			J	GAM
Iron 59	14596-12-4	U		2	0.05	~~UJ~~ U	GAM
Chromium 51	14392-02-0	U		4		~~UJ~~ U	GAM
Cobalt 60	10198-40-0	46	1.1		0.05	J	GAM
Zinc 65	13982-39-3	U		1		~~UJ~~ U	GAM
Ruthenium 106	13967-48-1	U		3		~~UJ~~ U	GAM
Cesium 134	13967-70-9	U		0.5		~~UJ~~ U	GAM
Cesium 137	10045-97-3	U		0.4	0.05	~~UJ~~ U	GAM
Cerium 144	14762-78-8	U		1		~~UJ~~ U	GAM
Europium 152	14683-23-9	U		0.4	0.1	~~UJ~~ U	GAM
Europium 154	15585-10-1	U		0.3	0.1	~~UJ~~ U	GAM
Radium 226	13982-63-3	0.91	0.53			J	GAM
Thorium 228	14274-82-9	0.89	0.36			J	GAM

JP2-22-94

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

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TMA NORCAL

REPORTING GROUP 7158

N302066-03

DATA SHEET, cont

B07K13

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-03	Client sample id	B07K13
Dept sample id	7158-003	Matrix	SOIL
Received	02/16/93	Collected	02/09/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		2		~~U~~ UL	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9615492.6055

N302066-04

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

B07K17

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-04
Dept sample id 7158-004
Received 02/18/93

Client sample id B07K17
Matrix SOIL
Collected 02/12/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	22	13	8	10	—	80A
Gross Beta	Beta	1200	24	5	10	—	80B
Uranium 233/234		2.0	0.37	0.08	0.3	~~R~~ —	U
Uranium 235	15117-96-1	0.13	0.081	0.1	0.3	~~UR~~ —	U
Uranium 238	7440-61-1	1.9	0.34	0.08	0.3	~~R~~ —	U
Total Uranium (ug/g)		5.6	1.4	0.08		—	U_T
Plutonium 238	13981-16-3	0.032	0.026	0.03	0.05	~~UR~~ —	PU
Plutonium 239/240		4.6	0.35	0.02	0.05	~~R~~ —	PU
Americium 241	14596-10-2	0.62	0.078	0.02	0.05	R	AM
Strontium 90	10098-97-2	82	2.7	1	2	J	Y
Technetium 99	14133-76-7	1200	7.9	0.4	0.5	~~B~~ —	TC
Carbon 14	14762-75-5	4.0	4.1	5	50	U	C
Neptunium 237	13994-20-2	0	0.18	0.03	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	5.4	2.5				GAM
Iron 59	14596-12-4	U		3	0.05	~~UJ~~ U	GAM
Chromium 51	14392-02-0	U		6		~~UJ~~ U	GAM
Cobalt 60	10198-40-0	140	1.6		0.05	J	GAM
Zinc 65	13982-39-3	U		2		~~UJ~~ U	GAM
Ruthenium 106	13967-48-1	U		5		~~UJ~~ U	GAM
Cesium 134	13967-70-9	U		0.8		~~UJ~~ U	GAM
Cesium 137	10045-97-3	U		0.6	0.05	~~UJ~~ U	GAM
Cerium 144	14762-78-8	U		1		~~UJ~~ U	GAM
Europium 152	14683-23-9	U		0.5	0.1	~~UJ~~ U	GAM
Europium 154	15585-10-1	U		0.4	0.1	~~UJ~~ U	GAM
Radium 226	13982-63-3	2.6	0.87			J	GAM
Thorium 228	14274-82-9	U		0.6		~~UJ~~ U	GAM

JP 2-22-94

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6856

TMA NORCAL

REPORTING GROUP 7158

N302066-04

DATA SHEET, cont

B07K17

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-04	Client sample id	B07K17
Dept sample id	7158-004	Matrix	SOIL
Received	02/18/93	Collected	02/12/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		4		~~UJ~~ U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6857

N302066-05

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

B07K19

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-05
Dept sample id 7158-005
Received 02/18/93

Client sample id B07K19
Matrix SOIL
Collected 02/12/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	-1.1	9.2	7	10	U	80A
Gross Beta	Beta	1400	35	10	10	—	80B
Uranium 233/234		1.2	0.17	0.05	0.3	~~R~~ —	U
Uranium 235	15117-96-1	0.019	0.025	0.05	0.3	~~UR~~ —	U
Uranium 238	7440-61-1	0.99	0.16	0.04	0.3	~~R~~ —	U
Total Uranium (ug/g)		2.9	0.73	0.08		—	U_T
Plutonium 238	13981-16-3	0.009	0.009	0.02	0.05	~~UR~~ U	PU
Plutonium 239/240		2.1	0.20	0.02	0.05	~~R~~ —	PU
Americium 241	14596-10-2	0.34	0.058	0.02	0.05	R	AM
Strontium 90	10098-97-2	34	3.5	0.8	2	J	Y
Technetium 99	14133-76-7	2900	45	0.8	0.5	—	TC
Carbon 14	14762-75-5	0.47	4.3	5	50	U	C
Neptunium 237	13994-20-2	0	0.13	0.005	0.2	~~UR~~ U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	11	4.4			J	GAM
Iron 59	14596-12-4	U		4	0.05	~~UJ~~ U	GAM
Chromium 51	14392-02-0	U		10		~~UJ~~ U	GAM
Cobalt 60	10198-40-0	210	3.0		0.05	J	GAM
Zinc 65	13982-39-3	U		3		~~UJ~~ U	GAM
Ruthenium 106	13967-48-1	U		9		~~UJ~~ U	GAM
Cesium 134	13967-70-9	U		1		~~UJ~~ U	GAM
Cesium 137	10045-97-3	U		0.9	0.05	~~UJ~~ U	GAM
Cerium 144	14762-78-8	U		3		~~UJ~~ U	GAM
Europium 152	14683-23-9	U		1	0.1	~~UJ~~ U	GAM
Europium 154	15585-10-1	U		0.8	0.1	~~UJ~~ U	GAM
Radium 226	13982-63-3	1.2	1.1			J	GAM
Thorium 228	14274-82-9	0.83	0.62			J	GAM

GP 2-22-94

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6858

TMA NORCAL

REPORTING GROUP 7158

N302066-05

DATA SHEET, cont

B07K19

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-05	Client sample id	B07K19
Dept sample id	7158-005	Matrix	SOIL
Received	02/18/93	Collected	02/12/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		6		~~UJ~~ U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6859

N302066-06

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

B07K22

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-06
Dept sample id 7158-006
Received 02/22/93

Client sample id B07K22
Matrix SOIL
Collected 02/16/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	17	9.2	7	10	—	80A
Gross Beta	Beta	570	23	10	10	—	80B
Uranium 233/234		2.5	0.41	0.1	0.3	R —	U
Uranium 235	15117-96-1	0.081	0.081	0.1	0.3	UR —	U
Uranium 238	7440-61-1	1.3	0.28	0.1	0.3	R —	U
Total Uranium (ug/g)		3.9	0.97	0.08		—	U_T
Plutonium 238	13981-16-3	0.002	0.010	0.02	0.05	UR U	PU
Plutonium 239/240		0.020	0.015	0.02	0.05	UR —	PU
Americium 241	14596-10-2	0.015	0.011	0.01	0.05	UR	AM
Strontium 90	10098-97-2	-0.10	1.6	0.9	2	U	Y
Technetium 99	14133-76-7	1200	7.6	0.5	0.5	R —	TC
Carbon 14	14762-75-5	2.0	4.3	5	50	U	C
Neptunium 237	13994-20-2	0	0.82	0.02	0.2	UR U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	7.6	2.1			J	GAM
Iron 59	14596-12-4	U		2	0.05	UJ U	GAM
Chromium 51	14392-02-0	U		4		UJ U	GAM
Cobalt 60	10198-40-0	75	1.4		0.05	J	GAM
Zinc 65	13982-39-3	U		2		UJ U	GAM
Ruthenium 106	13967-48-1	U		5		UJ U	GAM
Cesium 134	13967-70-9	U		0.7		UJ U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	UJ U	GAM
Cerium 144	14762-78-8	U		1		UJ U	GAM
Europium 152	14683-23-9	U		0.6	0.1	UJ U	GAM
Europium 154	15585-10-1	U		0.4	0.1	UJ U	GAM
Radium 226	13982-63-3	1.2	0.67			J	GAM
Thorium 228	14274-82-9	U		0.6		UJ U	GAM

JP 2-22-94

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6860

TMA NORCAL

REPORTING GROUP 7158

N302066-06

DATA SHEET, cont

B07K22

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-06	Client sample id	B07K22
Dept sample id	7158-006	Matrix	SOIL
Received	02/22/93	Collected	02/16/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		3		~~UJ~~ UL	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6861

TMA NORCAL

REPORTING GROUP 7158

N302066-07

B07K25

DATA SHEET

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-07
Dept sample id 7158-007
Received 02/24/93

Client sample id B07K25
Matrix SOIL
Collected 02/18/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	8.7	11	10	10	U	80A
Gross Beta	Beta	780	27	10	10	—	80B
Uranium 233/234		3.7	0.44	0.07	0.3	R —	U
Uranium 235	15117-96-1	0.10	0.053	0.07	0.3	UR —	U
Uranium 238	7440-61-1	3.7	0.44	0.05	0.3	R —	U
Total Uranium (ug/g)		12	3.0	0.08		—	U_T
Plutonium 238	13981-16-3	0	0.005	0.02	0.05	UR U	PU
Plutonium 239/240		0.007	0.009	0.02	0.05	UR U	PU
Americium 241	14596-10-2	0.008	0.012	0.02	0.05	UR	AM
Strontium 90	10098-97-2	0.12	0.26	0.9	2	U	Y
Technetium 99	14133-76-7	4500	41	5	0.5	—	TC
Carbon 14	14762-75-5	-0.54	4.4	5	50	U	C
Neptunium 237	13994-20-2	0	0.46	0.02	0.2	UR U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	3.5	1.7			J	GAM
Iron 59	14596-12-4	U		1	0.05	UJ U	GAM
Chromium 51	14392-02-0	U		3		UJ U	GAM
Cobalt 60	10198-40-0	19	0.72		0.05	J	GAM
Zinc 65	13982-39-3	U		0.8		UJ U	GAM
Ruthenium 106	13967-48-1	3.9	1.7			J	GAM
Cesium 134	13967-70-9	U		0.4		UJ U	GAM
Cesium 137	10045-97-3	U		0.3	0.05	UJ U	GAM
Cerium 144	14762-78-8	U		0.8		UJ U	GAM
Europium 152	14683-23-9	U		0.3	0.1	UJ U	GAM
Europium 154	15585-10-1	U		0.2	0.1	UJ U	GAM
Radium 226	13982-63-3	3.3	0.52			J	GAM
Thorium 228	14274-82-9	U		0.3		UJ U	GAM

JP 2-22-94

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6862

TMA NORCAL

REPORTING GROUP 7158

N302066-07

DATA SHEET, cont

B07K25

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-07	Client sample id	B07K25
Dept sample id	7158-007	Matrix	SOIL
Received	02/24/93	Collected	02/18/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		2		~~UJ~~ U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6863

ATTACHMENT 5

Data Review Supporting Documentation

9613492.6064

Transmittal Number T00241

Transmittal Form to Validator

1 To Validator (BOA) _____

Project/OU 241-T-106

2 Data Packages Attached (list and attach)

B07K04-TMA -440

3 The attached data packages have been verified and (check one)

X All required checklist items are included

___ Checklist items circled on attached verification checklist forms cannot be provided and the decision has been made to proceed with validation anyway

NCR # _____

4 Certified by Verifier

Signature

4/29/93 9:00 am

Date

5 Received by Validator

Signature

10/5/93

Date

MFA\M01215SAT

Verification No. T-00139-93 **RADIOCHEMICAL DATA PACKAGE VERIFICATION COVER SHEET** Page 1 of 1

Project: 241-T-106	Reviewer: S. Lindberg	Date: 4/28/93
Laboratory: TMA	Case: N3-02-066-7158	SDG:
HASM Data Package ID: B07K04-TMA -440		

	Beta and Gas Proportional Counting			Alpha Spectroscopy									
	GAB	Sr90	Tc99	Iso U	Iso Pu	Iso Am	GEA	Ra-226	LSC C14	Total U	NP		
Analyses Performed:	X	X	X	X	X	X	X		X	X	X		
Case Narrative: Yes	X	X	X	X	X	X	X		X	X	X		
Batch Sheet:	X	X	X	X	X	X	X		X	X	X		

HEIS NO.	Sample Matrix	WHC COC	WHC SAR													
B07K05 ~~B3K0~~	Soil	X	X	X	X	X	X	X	X	X		X	X	X		
B07K11	↓	X	X	↓	↓	↓	↓	↓	↓	↓		↓	↓	↓		
B07K13		X	X													
B07K17		X	X													
B07K19		X	X													
B07K22		X	X													
B07K25	↓	X	X	↓	↓	↓	↓	↓	↓	↓		↓	↓	↓		

9313192.0056

Date: 4 / 28 / 93

RADIOCHEMICAL INITIAL CALIBRATION DATA VERIFICATION CHECKLIST

Laboratory: TMA

HASM Calibration Data Package ID: B07K04-TMA-440

Required Information	GAB		Sr90		Tc99		GEA		ASp		Ra226											
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Date of Initial Calibration:	3/90		1/91		See		3/90		N/A													
Detector ID:	X		X		Attached		X															
Detector Efficiency:	X		X		letter		X															
Lucas Cell ID:																						
Lucas Cell Efficiency:																						
Calibration Standard ID:	X		X				X															
NIST Certificates:	X		X				X															
Initial Calibration Data:	X		X				X															
High Voltage Plateau Determination:																						
Self-absorption curve:	X		X																			
Preparation weight:	X		X																			
Carrier Standardization:			X																			
Alpha crosstalk:	X																					
Beta crosstalk:	X																					
FWHM Values:							X															
Sample Geometry:							X															

Comments:

96 3492 0066

9613492.6067

Westinghouse Hanford Company — **Internal Memo**

From: Technical And Quality Oversite — 12520-93-020
Phone: 2-2557 H4-23
Date: April 22, 1993
Subject: THERMO ANALYTICAL, INCORPORATED TC-99 PRIMARY CALIBRATION DOCUMENTATION

To: J. G. Paetel H4-19

cc: B. M. Colley H4-19
J. M. Duncan H4-23
D. G. Farwick H4-16
J. H. Kessner H4-23
KNP File/LB

The primary calibration documentation required by the environmental radiochemical validation procedure currently in use by WHC and WHC-contracted validators can not be provided by the Thermo Analytical, Incorporated (TMA) laboratory. TMA has notified WHC Hanford Analytical Services Management that the primary calibration documentation generated in 1983 for Tc-99 can not be regenerated. TMA has provided the enclosed certificate of calibration for the detector systems for Tc-99 analysis. The certificate of calibration documents the fact that TMA can not regenerate the calibration documentation. A new calibration for Tc-99 is currently in progress and the documentation for this calibration will be provided to WHC when complete. TMA feels confident that the calibration currently in use is valid and correct in light of historical recoveries on laboratory Quality Control check samples and inter-laboratory exchange sample results that have been obtained during the effective period of this calibration.

A copy of this letter, along with the enclosed TMA certificate of calibration for Tc-99, shall be placed in each radiochemistry data package received from TMA to date that has Tc-99 results reported. This letter, along with the enclosed TMA certificate of calibration, shall be placed in each radiochemistry data package received from TMA until the new calibration documentation has been received by WHC and has been implemented at TMA.

K. N. Pool
Manager

llr

Enclosure

CONCURRENCE:

D. G. Farwick, Manager
Environmental Services Quality Assurance

9613492.6868

Certificate of Calibration		TMA/*Norcal*
Calibration: ^{99}Tc	Instrument: LBG beta counters	Type: Gas Flow Geiger Counter
Calibration Standard:) (Unknown		

Status	Date	Reference Document
Original Calibration:	1983	Unknown
Verification:		
Summary of Results	Standard Efficiency = 42.7% P-Factor = 2.34	

Self Absorption Correction Table

(Samples are mounted as weightless deposits, no self absorption corrections are performed)

Note: The current calibration was performed in 1983 but the documentation for this calibration is unavailable. A confirming calibration is in process as of 4/1/93.

Date: 4 / 28 / 93

RADIOCHEMICAL CONTINUING CALIBRATION DATA VERIFICATION CHECKLIST

Laboratory: TMA

HASM Data Package ID: B07K04-TMA-440

Required Information	GAB		Sr90		Tc99		GEA		ASp		Ra226									
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Calibration Time Period, From/To	Cont.		Cont		Cont.		Cont.		Cont											
Detector ID:	X		X		X		X		X											
Detector Efficiency:	X		X		X		X		X											
Lucas Cell ID:																				
Lucas Cell Efficiency:																				
Check Standard ID:	X		X		X		X		Bkg											
Check Standard Activity:	X		X		X		X		!											
Check Standard Traceability:	X		X		X		X		Efficiency											
Check Standard Raw Data:	X		X		X		X		provided											
Control Charts:	X		X		X		X													
Background Data, CPM:	X		X		X		X													
Background Count Time:	X		X		X		X													
Background Control Charts:	X		X		X		X													
Preparation Weights:	X		X		X															
Carrier Recovery Checks:			X		X															
Alpha/Beta Cross Talk:	X																			
FWHM Control Charts:							X													
Sample Geometry:							X													

Comments: _____

9013092.0469

9613492.6870

Package ID: B07K04-TMA-440

VERIFICATION CHECKLIST FOR BETA AND GAS PROPORTIONAL COUNTING

Analysis: Gross Alpha Beta

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Gravimetric/Chemical Yields			☒
Results Report for Chemical Yields	☐	☐	
Raw Data (Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Sample Identifications	☐	☐	
Chemical Yield Source Identification, Traceability and Dilution Log	☐	☐	
Calculated Recoveries	☐	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6871

Package ID: B07K04-TMA-440

VERIFICATION CHECKLIST FOR BETA AND GAS PROPORTIONAL COUNTING

Analysis: Sr 90

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Gravimetric/Chemical Yields			☐
Results Report for Chemical Yields	☒	☐	
Raw Data (Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Chemical Yield Source Identification, Traceability and Dilution Log	☒	☐	
Calculated Recoveries	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6872

Package ID: B07K04-TMA-440

VERIFICATION CHECKLIST FOR BETA AND GAS PROPORTIONAL COUNTING

Analysis: Tc99

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Gravimetric/Chemical Yields			☐
Results Report for Chemical Yields	☒	☐	
Raw Data (Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Chemical Yield Source Identification, Traceability and Dilution Log	☒	☐	
Calculated Recoveries	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6875

Package ID: B07K04-TMA-440

VERIFICATION CHECKLIST FOR ALPHA SPECTROSCOPY

Analysis: Iso U

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheet	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Tracer Recovery			
Results Report for Tracer Analyses	☒	☐	
Raw Data (Spectra and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Tracer Identification, Traceability and Dilution Log	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6874

Package ID: B07K04-TMA-440

VERIFICATION CHECKLIST FOR ALPHA SPECTROSCOPY

Analysis: Iso Pu

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheet	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Tracer Recovery			
Results Report for Tracer Analyses	☒	☐	
Raw Data (Spectra and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Tracer Identification, Traceability and Dilution Log	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6875

Package ID: 807K04-TMA-440

VERIFICATION CHECKLIST FOR ALPHA SPECTROSCOPY

Analysis: Am 241

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheet	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Tracer Recovery			
Results Report for Tracer Analyses	☒	☐	
Raw Data (Spectra and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Tracer Identification, Traceability and Dilution Log	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6876

Package ID: 807604-TMA-440

VERIFICATION CHECKLIST FOR ALPHA SPECTROSCOPY

Analysis: Np

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheet	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Detector Identifications	☐	☐	
Detector Efficiencies	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Tracer Recovery			
Results Report for Tracer Analyses	☒	☐	
Raw Data (Spectra and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Tracer Identification, Traceability and Dilution Log	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.8877

Package ID: B07K04-TMA-440

VERIFICATION CHECKLIST FOR GAMMA SPECTROSCOPY

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Geometry and Spectra or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Detector Identifications	☒	☐	
Detector Efficiencies	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

Comments:

9613492.6878

Package ID: B07K04-TMA-440

VERIFICATION CHECKLIST FOR LIQUID SCINTILLATION COUNTING

C14

	Yes	No	NA
Analysis Results			
Results and Minimum Detectable Activity (MDA) Report			
for Sample Analyses, Recounts and Reanalyses	☒	☐	
for Blank Analyses, Recounts and Reanalyses	☒	☐	
for Duplicate Analyses, Recounts and Reanalyses	☒	☐	
Internal Standard or Quench Monitoring Results, Activity and Traceability	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Instrument Identifications	☒	☐	
Dates of Analysis	☒	☐	
Continuing Calibration			
Instrument Identification	☒	☐	
Continuing Calibration Results Report, Control Charts and Control Limits	☒	☐	
Calibration Standard Identification, Traceability, Activity, Dilution Log and Expiration Date	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Counting Efficiency Determination Method and Results	☒	☐	
Internal Standard or Quench Monitoring Values	☒	☐	
Matrix Spike Recovery			☒
Results and MDA Reports for Matrix Spike Analyses, Recounts and Reanalyses	☐	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☐	☐	
Sample Preparation Data	☐	☐	
Calculation Sheets	☐	☐	
Matrix Spike Sample Identifications	☐	☐	
Matrix Spike Source Traceability and Dilution Log	☐	☐	
Instrument Identifications	☐	☐	
Dates of Analysis	☐	☐	
Calculated Recoveries	☐	☐	
Laboratory Control Samples (LCS)			
Results and MDA Reports for LCS Analyses, Recounts and Reanalyses	☒	☐	
Raw Data (Counting Logs or Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Activity and Traceability	☒	☐	
Instrument Identifications	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

9613492.6879

Package ID: B07K04-TMA-440

VERIFICATION CHECKLIST FOR TOTAL URANIUM ANALYSIS BY KINETIC PHOSPHORIMETRY

	Yes	No	NA
Analysis Results			
Results Report			
for Sample Analyses, Reruns, and Reanalyses	☒	☐	
for Blank Analyses, Reruns, and Reanalyses	☒	☐	
for Duplicate Analyses, Reruns and Reanalyses	☒	☐	
Raw Data (Phosphorimeter Readings and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Sample Identifications	☒	☐	
Instrument Identifications	☒	☐	
Dates of Analysis	☒	☐	
Initial and Continuing Calibration			
Instrument Identifications	☒	☐	
Initial Calibration Results and Linearity	☒	☐	
Initial and Continuing Calibration Verification	☒	☐	
Calibration Standard Concentration, Traceability and Dilution Logs	☒	☐	
Raw Data (Phosphorimeter Readings and Printouts or Notebook Pages	☒	☐	
Sample Preparation Data	☒	☐	
Detection Limit Verification	☒	☐	
Matrix Spike Recovery			☒ see 4/28/93
Results Reports for Matrix Spike Analyses, Reruns and Reanalyses	☒	☐	
Raw Data (Phosphorimeter Readings and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
Matrix Spike Sample Identifications	☒	☐	
Matrix Spike Source Traceability and Dilution Log	☒	☐	
Instrument Identifications	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	
Laboratory Control Samples (LCS)			
Results Reports for LCS Analyses, Reruns and Reanalyses	☒	☐	
Raw Data (Phosphorimeter Readings and Printouts or Notebook Pages)	☒	☐	
Sample Preparation Data	☒	☐	
Calculation Sheets	☒	☐	
LCS Identification, Concentration and Traceability	☒	☐	
Instrument Identifications	☒	☐	
Dates of Analysis	☒	☐	
Calculated Recoveries	☒	☐	

~~p. 413 & 414 are not legible~~
See 4/29/93

9613492.6880

TMA
Thermo Analytical Inc.

TMA/Norcal
2030 Wright Avenue
P. O. Box 4040
Richmond, CA 94804-0040
(510) 235-2633 Fax No. (510) 235-0438

RECORD COPY

APR 1993 RECEIVED OSM DMO

April 23, 1993

SENT BY FEDERAL EXPRESS

Ref. TMA/Norcal N3-02-066-7158

Ms. Briana Colley
Westinghouse Hanford Company
2355 Stevens Drive
MSIN H4-23
345 Hills Street/3000 Area
Richland, WA 99352

Dear Ms. Colley:

Enclosed in the Summary Data Section, are the gross alpha, gross beta, ^{14}C, ^{90}Sr, ^{99}Tc, total uranium, isotopic uranium, isotopic plutonium, ^{237}Np, ^{241}Am and gamma scan results for the soil sample from 241-T-106 Location we received 10 February 1993. The QA/QC results are also given in the Summary Data Section. The Summary Data Section is numbered pages 1 to 66, and the appendices are numbered pages 67 to 672.

Please call if you have any questions concerning this data.

Sincerely,

D. P. Kharkar

Dinkar P. Kharkar, Ph.D.
Manager, Nuclear Programs

DPK/jw

Enclosures: Section 1 and 2
Appendices

9613492.6881

SECTION 1 Case Narrative

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar P. Kharkar	Contract	MBH-SVV-069262

CASE NARRATIVE

1.0 GENERAL

Soil sample results from 241-T-106 location (TMA/Norcal Group 7158) are provided in this report. TMA/Norcal Group 7158 is comprised of the seven samples listed on the Chain-of-Custody documents below which are identified as samples 1 through 7.

1.1 CHAINS-OF-CUSTODY

This report includes data from the sample delivered under Chain-of-Custody documents Field Logbook No. EFL-1053.

1.2 SAMPLE VOLUME

500-mL glass bottles containing the sample were received for analysis.

1.3 MISSING SAMPLES

All samples were accounted for in an undamaged condition.

1.4 HOLDING TIMES

The samples were collected between 02/08/93 and 02/18/93 and sample processing was initiated within 180 days of collection.

2.0 QUALITY CONTROL

The internal quality control consisted of one sample each of a laboratory control, a blank, and a replicate. Analyses for sample B07K05 were performed with QC samples 7158-08, 09 and 10. All other samples were analyzed with QC samples 7158-11 and 12.

The QC samples were prepared and labelled by the quality control officer. Copies of The QC notebook pages are included in the data package.

2.1 LABORATORY CONTROL SAMPLES

Gross alpha LCS recoveries for QC samples 7158-08 and 11 were low (72% and 59% respectively), and did not pass at the 3σ protocol limits. However, the gross alpha recovery of QC sample 7158-08 was within the control limits when errors were considered. This is also the case with the LCS for ^{237}Np. The MDA of the results for ^{59}Fe was higher than the RDL due to higher background on the counter.

2.2 BLANKS

The MDA's of the results for all analyses met RDL requirements.

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar P. Kharkar	Contract	MBH-SVV-069262

CASE NARRATIVE

2.3 REPLICATES

Results were satisfactory for all replicate analyses. The MDA's of the results for gamma nuclides were higher than the RDL's due to the small aliquots available for analysis. The 2σ counting errors for ^{237}Np and ^{90}Sr were underlined because in each case, the error was bigger than both the MDA and the result implying that the MDA may not be a good estimate of the "real" minimum detectable activity.

3.0 ANALYTICAL NOTES

3.1 Gross Alpha Analyses: The average MDA for gross alpha was (7 ± 3) pCi/g. Gross alpha activity above the RDL was found in samples B07K05, B07K13, B07K17 and B07K22. Smaller aliquots were taken of samples B07K19, B07K22 and B07K25 because of high residues.

3.2 Gross Beta Analyses: The average MDA for gross beta was (6 ± 4) pCi/g. Gross beta activity above the RDL was found in all of the samples. Again, smaller aliquots were taken of samples B07K19, B07K22 and B07K25 because of high residues.

3.3 Carbon-14 Analyses: The average MDA for twelve analyses was (6 ± 5) pCi/g. ^{14}C activity above the RDL was not found in any of the samples.

3.4 Strontium-90 Analyses: The average yield for twelve analyses was (69 ± 23)%. The lowest yield was 38% and the highest was 82%. The average MDA was (1 ± 0.7) pCi/g. ^{90}Sr activity above the RDL was found in samples B07K17 and B07K19.

3.5 Technicium-99 Analyses: The average yield for twelve samples was (58 ± 28)%. The lowest yield was 29% and the highest was 74%. The average MDA was (1 ± 3) pCi/g. ^{99}Tc activity above the RDL was found in all of the samples. The MDA's of the results for samples B07K11 and B07K19 were higher than the RDL due to low chemical recoveries. The MDA of the result for sample B07K25 was higher than the RDL due to the shorter count time. The sample was counted for a shorter time because of the high concentration of ^{99}Tc in the sample.

3.6 Total Uranium Analyses: The average MDA for twelve analyses was (0.08 ± 0) ug/g. Positive concentrations of uranium were found in all of the samples.

3.7 Uranium-233, 234, 238 Analyses: The average yield for twelve analyses was (73 ± 47)%. The lowest yield was 35% and the highest was 94%. The average MDA was (0.1 ± 0.2) pCi/g. $^{233/234}U$ and ^{238}U activity above the RDL was found in all samples.

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar P. Kharkar	Contract	MBH-SVV-069262

CASE NARRATIVE

3.8 Plutonium-238, 239/240 Analyses: The average yield for twelve analyses was (71 ± 24)%. The lowest yield was 53% and the highest was 96%. The average MDA was (0.02 ± 0.01) pCi/g. $^{239/240}$Pu activity above the RDL was found in samples B07K05, B07K17 and B07K19. ^{238}Pu activity above the RDL was not found in any of the samples.

3.9 Neptunium Analyses: The average yield for twelve analyses was (54 ± 18)%. The lowest yield was 39% and the highest was 69%. The average MDA was (0.02 ± 0.02) pCi/g.

The alpha spectrum from these samples showed contamination with both plutonium and uranium. The ^{239}Pu interfered slightly with our ability to verify complete separation of ^{243}Am from the ^{239}Np tracer and thus leading to potential error with the ^{237}Np analyte peak. We cannot report with confidence the positive values obtained. Instead, the best interpretation of this data is to say that the ^{237}Np was undetected with an error equal to the value of the positive peak. The formal report file has zero for the answer, the original value for the error, and the original MDA for the MDA. Even with this conservative estimate of error (assuming that all peak activity was due to contamination) the RDL is still met in one sample and almost met in the other.

Two modified analytical runs were done on these samples in an attempt to achieve better purification. The initial run, using our standard method, gave poor chemical yields. The next two runs were done using a solid phase extraction column procedure adapted from our bioassay department in sequence with a standard anion exchange column. Still, we had contamination. The data set reported is the last and best data obtained. The quality control samples reported with this set were, of course, run through the same procedures. The problem is an inherent limitation of the method being used. It is not a training, technique, or error problem. We believe that there will be a fairly straightforward solution to this problem and continued testing is being done. When we feel that we have a modification that has been validated, a revised procedure will be sent. Until then, the current method will be used. For low alpha activity samples this will be no problem, and for the high alpha samples we will evaluate the purity on a case by case basis.

3.10 Americium-241 Analyses: The average yield for twelve analyses was (77 ± 14)%. The lowest yield was 65% and the highest yield was 87%. The average MDA was (0.03 ± 0.02) pCi/g. Americium activity above the RDL was found in samples B07K05, B07K17 and B07K19.

3.11 Gamma Scan Analyses: Gamma scan analysis found positive ^{60}Co activity above the RDL in all of the samples. ^{154}Eu was found in sample B07K05 and ^{106}Ru was found in sample B07K25.

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SECTION 2 Summary Data Including QC's

9613492.6886

T M A N O R C A L
REPORTING GROUP 7158

SDG 7158	Client Westinghouse Hanford
Contact Dinkar Kharkar	Contract MBH-SVV-069262

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S

About this section	1
Sample Summaries	3
Prep Batch Summary	5
Work Summary	6
Reagent Blanks	11
Lab Control Samples	13
Replicates	15
Data Sheets	17
Result Summaries	31
Method Summaries	42
Report Guides	53

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-TOC
Version	2.23
Report date	04/23/93

TMA NORCAL
REPORTING GROUP 7158

SDG 7158
Contact Dinkar Kharkar

REPORT GUIDE

Client Westinghouse Hanford
Contract MBH-SVV-069262

ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample Summary Reports (variously titled LAB, SAMPLE, DEPARTMENT and QC SUMMARY to reflect the sort order) show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

REAGENT BLANKS

The Reagent Blank Reports, one for each Reagent Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-RG
Version 2.23
Report date 04/23/93

ABOUT THE DATA SUMMARY SECTION

REPLICATES

The Replicate Reports, one for each Replicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

RESULT SUMMARIES

The Result Summary Reports, one for each test used in the SDG, show all results and QC for one parameter on one page. (A test is a short code for the method used to do certain work to the client's specification.)

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show performance data for each method on one page.

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

9613492.6089

TMA NORCAL

REPORTING GROUP 7158

SDG 7158
Contact Dinkar Kharkar

SAMPLE SUMMARY

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID	MATRIX	CHAIN OF CUSTODY	COLLECTED	RECEIVED	SAMPLE WT/VOL	BASIS WT/VOL	% MOIST	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
B07K05	SOIL	EFL-1053	02/08/93	02/10/93				N302066-01	7158-001
B07K11	SOIL	EFL-1053	02/09/93	02/16/93				N302066-02	7158-002
B07K13	SOIL	EFL-1053	02/09/93	02/16/93				N302066-03	7158-003
B07K17	SOIL	EFL-1053	02/12/93	02/18/93				N302066-04	7158-004
B07K19	SOIL	EFL-1053	02/12/93	02/18/93				N302066-05	7158-005
B07K22	SOIL	EFL-1053	02/16/93	02/22/93				N302066-06	7158-006
B07K25	SOIL	EFL-1053	02/18/93	02/24/93				N302066-07	7158-007
Reagent Blank	SOIL							N302066-09	7158-009
Reagent Blank	SOIL							N302066-12	7158-012
Lab Control Sample	SOIL							N302066-08	7158-008
Lab Control Sample	SOIL							N302066-11	7158-011
Replicate (N302066-01)	SOIL		02/08/93					N302066-10	7158-010

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CS
Version 2.23
Report date 04/23/93

9613492.6890

TMA NORCAL

REPORTING GROUP 7158

QC SUMMARY

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	LEVEL	COLLECTED	RECEIVED	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7158	EFL-1053	B07K05 -	SOIL		02/08/93	02/10/93	N302066-01	7158-001
		B07K11	SOIL		02/09/93	02/16/93	N302066-02	7158-002
		B07K13	SOIL		02/09/93	02/16/93	N302066-03	7158-003
		B07K17	SOIL		02/12/93	02/18/93	N302066-04	7158-004
		B07K19	SOIL		02/12/93	02/18/93	N302066-05	7158-005
		B07K22	SOIL		02/16/93	02/22/93	N302066-06	7158-006
		B07K25	SOIL		02/18/93	02/24/93	N302066-07	7158-007
		Reagent Blank	SOIL				N302066-09	7158-009
		Reagent Blank	SOIL				N302066-12	7158-012
		Lab Control Sample	SOIL				N302066-08	7158-008
		Lab Control Sample	SOIL				N302066-11	7158-011
		Replicate (N302066-01)	SOIL		02/08/93		N302066-10	7158-010

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-QS
Version 2.23
Report date 04/23/93

9613492.6891

TMA NORCAL

REPORTING GROUP 7158

SDG 7158
Contact Dinkar Kharkar

PREP BATCH SUMMARY

Client Westinghouse Hanford
Contract MBH-SVV-069262

TEST	MATRIX	METHOD	PREPARATION BATCH	PREP ERROR	PLANCHETS ANALYZED CLIENT	RE	BLANK	LCS	REP/ORIG	MS/ORIG	QUALIFIERS
Alpha Spectroscopy											
AM	SOIL	Americium 241 in Soil	2436-024	5.0	1		1	1	1/1		
			2436-124	5.0	6		1	1			
NP	SOIL	Neptunium in Soil	2436-024	5.0	1		1	1	1/1		
			2436-124	5.0	6		1	1			
PU	SOIL	Plutonium, Isotopic in Soil	2436-024	5.0	1		1	1	1/1		
			2436-124	5.0	6		1	1			
U	SOIL	Uranium, Isotopic in Soil	2436-024	5.0	1		1	1	1/1		
			2436-124	5.0	6		1	1			
Beta Counting											
TC	SOIL	Technetium 99 in Soil	2436-024	10.0	1		1	1	1/1		
			2436-124	10.0	6		1	1			
Y	SOIL	Strontium 90 in Soil	2436-024	10.0	1		1	1	1/1		
			2436-124	10.0	6		1	1			
Gas Proportional Counting											
80A	SOIL	Gross Alpha in Soil	2436-024	20.0	1		1	1	1/1		
			2436-124	20.0	6		1	1			
80B	SOIL	Gross Beta in Soil	2436-024	15.0	1		1	1	1/1		
			2436-124	15.0	6		1	1			
Gamma Spectroscopy											
GAM	SOIL	Gamma Scan	2436-124	15.0	7		1	1	1/1		
Kinetic Phosphorimetry											
U_T	SOIL	Uranium, Total in Soil	2436-024	9.0	1		1	1	1/1		X
			2436-124	9.0	6		1	1			
Liquid Scintillation											
C	SOIL	Carbon 14 in Soil	2436-024	10.0	1		1	1	1/1		
			2436-124	10.0	6		1	1			

Replicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.
Blank and LCS planchets are those in the same preparation batch as some Client, Replicate or Spike sample.

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-PBS
Version 2.23
Report date 04/23/93

9613492.6892

TMA NORCAL

REPORTING GROUP 7158

SDG 7158
Contact Dinkar Kharkar

WORK SUMMARY

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / MATRIX / CUSTODY	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	PREPARED	ANALYZED	METHOD
B07K05	N302066-01	7158-001	80A/80		03/18/93	03/19/93	Gross Alpha in Soil
SOIL	02/08/93	7158-001	80B/80		03/18/93	03/19/93	Gross Beta in Soil
EFL-1053	02/10/93	7158-001	AM		03/24/93	04/09/93	Americium 241 in Soil
		7158-001	C		03/26/93	03/26/93	Carbon 14 in Soil
		7158-001	GAM		03/03/93	03/12/93	Gamma Scan
		7158-001	NP		04/09/93	04/10/93	Neptunium in Soil
		7158-001	PU		03/24/93	04/09/93	Plutonium, Isotopic in Soil
		7158-001	TC		03/25/93	03/29/93	Technetium 99 in Soil
		7158-001	U		03/24/93	04/02/93	Uranium, Isotopic in Soil
		7158-001	U_T		04/05/93	04/05/93	Uranium, Total in Soil
		7158-001	Y		03/23/93	03/23/93	Strontium 90 in Soil
B07K11	N302066-02	7158-002	80A/80		04/06/93	04/06/93	Gross Alpha in Soil
SOIL	02/09/93	7158-002	80B/80		04/06/93	04/06/93	Gross Beta in Soil
EFL-1053	02/16/93	7158-002	AM		04/08/93	04/12/93	Americium 241 in Soil
		7158-002	C		04/08/93	04/13/93	Carbon 14 in Soil
		7158-002	GAM		03/03/93	03/12/93	Gamma Scan
		7158-002	NP		04/09/93	04/10/93	Neptunium in Soil
		7158-002	PU		04/06/93	04/12/93	Plutonium, Isotopic in Soil
		7158-002	TC		04/07/93	04/12/93	Technetium 99 in Soil
		7158-002	U		04/06/93	04/09/93	Uranium, Isotopic in Soil
		7158-002	U_T		04/05/93	04/05/93	Uranium, Total in Soil
		7158-002	Y		04/08/93	04/08/93	Strontium 90 in Soil
B07K13	N302066-03	7158-003	80A/80		04/06/93	04/06/93	Gross Alpha in Soil
SOIL	02/09/93	7158-003	80B/80		04/06/93	04/06/93	Gross Beta in Soil
EFL-1053	02/16/93	7158-003	AM		04/08/93	04/12/93	Americium 241 in Soil
		7158-003	C		04/08/93	04/13/93	Carbon 14 in Soil
		7158-003	GAM		03/03/93	03/15/93	Gamma Scan
		7158-003	NP		04/09/93	04/10/93	Neptunium in Soil
		7158-003	PU		04/06/93	04/12/93	Plutonium, Isotopic in Soil
		7158-003	TC		04/07/93	04/12/93	Technetium 99 in Soil
		7158-003	U		04/06/93	04/09/93	Uranium, Isotopic in Soil
		7158-003	U_T		04/05/93	04/05/93	Uranium, Total in Soil
		7158-003	Y		04/08/93	04/08/93	Strontium 90 in Soil

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CWS
Version 2.23
Report date 04/23/93

9613492.6893

TMA NORCAL

REPORTING GROUP 7158

SDG 7158
Contact Dinkar Kharkar

WORK SUMMARY, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / MATRIX / CUSTODY	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	PREPARED	ANALYZED	METHOD
B07K17	N302066-04	7158-004	80A/80		04/06/93	04/06/93	Gross Alpha in Soil
SOIL	02/12/93	7158-004	80B/80		04/06/93	04/06/93	Gross Beta in Soil
EFL-1053	02/18/93	7158-004	AM		04/08/93	04/12/93	Americium 241 in Soil
		7158-004	C		04/08/93	04/13/93	Carbon 14 in Soil
		7158-004	GAM		03/03/93	03/15/93	Gamma Scan
		7158-004	NP		04/09/93	04/10/93	Neptunium in Soil
		7158-004	PU		04/06/93	04/13/93	Plutonium, Isotopic in Soil
		7158-004	TC		04/07/93	04/12/93	Technetium 99 in Soil
		7158-004	U		04/06/93	04/09/93	Uranium, Isotopic in Soil
		7158-004	U_T		04/05/93	04/05/93	Uranium, Total in Soil
		7158-004	Y		04/08/93	04/08/93	Strontium 90 in Soil
B07K19	N302066-05	7158-005	80A/80		04/06/93	04/06/93	Gross Alpha in Soil
SOIL	02/12/93	7158-005	80B/80		04/06/93	04/06/93	Gross Beta in Soil
EFL-1053	02/18/93	7158-005	AM		04/08/93	04/12/93	Americium 241 in Soil
		7158-005	C		04/08/93	04/13/93	Carbon 14 in Soil
		7158-005	GAM		03/03/93	03/13/93	Gamma Scan
		7158-005	NP		04/09/93	04/10/93	Neptunium in Soil
		7158-005	PU		04/06/93	04/12/93	Plutonium, Isotopic in Soil
		7158-005	TC		04/07/93	04/12/93	Technetium 99 in Soil
		7158-005	U		04/06/93	04/09/93	Uranium, Isotopic in Soil
		7158-005	U_T		04/05/93	04/05/93	Uranium, Total in Soil
		7158-005	Y		04/08/93	04/08/93	Strontium 90 in Soil
B07K22	N302066-06	7158-006	80A/80		04/06/93	04/06/93	Gross Alpha in Soil
SOIL	02/16/93	7158-006	80B/80		04/06/93	04/06/93	Gross Beta in Soil
EFL-1053	02/22/93	7158-006	AM		04/08/93	04/12/93	Americium 241 in Soil
		7158-006	C		04/08/93	04/13/93	Carbon 14 in Soil
		7158-006	GAM		03/03/93	03/13/93	Gamma Scan
		7158-006	NP		04/09/93	04/10/93	Neptunium in Soil
		7158-006	PU		04/06/93	04/12/93	Plutonium, Isotopic in Soil
		7158-006	TC		04/07/93	04/12/93	Technetium 99 in Soil
		7158-006	U		04/06/93	04/13/93	Uranium, Isotopic in Soil
		7158-006	U_T		04/05/93	04/05/93	Uranium, Total in Soil
		7158-006	Y		04/08/93	04/08/93	Strontium 90 in Soil

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CWS
Version 2.23
Report date 04/23/93

9613492.6894

TMA NORCAL

REPORTING GROUP 7158

SDG 7158
Contact Dinkar Kharkar

WORK SUMMARY, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / MATRIX / CUSTODY	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	PREPARED	ANALYZED	METHOD
B07K25	N302066-07	7158-007	80A/80		04/06/93	04/06/93	Gross Alpha in Soil
SOIL	02/18/93	7158-007	80B/80		04/06/93	04/06/93	Gross Beta in Soil
EFL-1053	02/24/93	7158-007	AM		04/08/93	04/12/93	Americium 241 in Soil
		7158-007	C		04/08/93	04/13/93	Carbon 14 in Soil
		7158-007	GAM		03/03/93	03/15/93	Gamma Scan
		7158-007	NP		04/09/93	04/10/93	Neptunium in Soil
		7158-007	PU		04/06/93	04/12/93	Plutonium, Isotopic in Soil
		7158-007	TC		04/07/93	04/15/93	Technetium 99 in Soil
		7158-007	U		04/06/93	04/16/93	Uranium, Isotopic in Soil
		7158-007	U_T		04/05/93	04/05/93	Uranium, Total in Soil
		7158-007	Y		04/08/93	04/08/93	Strontium 90 in Soil
Reagent Blank	N302066-09	7158-009	80A/80		03/18/93	03/19/93	Gross Alpha in Soil
SOIL		7158-009	80B/80		03/18/93	03/19/93	Gross Beta in Soil
		7158-009	AM		03/24/93	04/09/93	Americium 241 in Soil
		7158-009	C		03/26/93	03/26/93	Carbon 14 in Soil
		7158-009	GAM		03/03/93	03/13/93	Gamma Scan
		7158-009	NP		04/09/93	04/10/93	Neptunium in Soil
		7158-009	PU		03/24/93	04/09/93	Plutonium, Isotopic in Soil
		7158-009	TC		03/25/93	03/31/93	Technetium 99 in Soil
		7158-009	U		03/24/93	04/02/93	Uranium, Isotopic in Soil
		7158-009	U_T		04/05/93	04/05/93	Uranium, Total in Soil
		7158-009	Y		03/23/93	03/23/93	Strontium 90 in Soil
Reagent Blank	N302066-12	7158-012	80A/80		04/06/93	04/06/93	Gross Alpha in Soil
SOIL		7158-012	80B/80		04/06/93	04/06/93	Gross Beta in Soil
		7158-012	AM		04/08/93	04/12/93	Americium 241 in Soil
		7158-012	C		04/08/93	04/13/93	Carbon 14 in Soil
		7158-012	NP		04/09/93	04/10/93	Neptunium in Soil
		7158-012	PU		04/06/93	04/12/93	Plutonium, Isotopic in Soil
		7158-012	TC		04/07/93	04/13/93	Technetium 99 in Soil
		7158-012	U		04/06/93	04/09/93	Uranium, Isotopic in Soil
		7158-012	U_T		04/05/93	04/05/93	Uranium, Total in Soil
		7158-012	Y		04/08/93	04/08/93	Strontium 90 in Soil

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CWS
Version 2.23
Report date 04/23/93

TMA NORCAL

REPORTING GROUP 7158

SDG 7158
Contact Dinkar Kharkar

WORK SUMMARY, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / MATRIX / CUSTODY	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	PREPARED	ANALYZED	METHOD
Lab Control Sample	N302066-08	7158-008	80A/80		03/18/93	03/19/93	Gross Alpha in Soil
SOIL		7158-008	80B/80		03/18/93	03/19/93	Gross Beta in Soil
		7158-008	AM		03/24/93	04/09/93	Americium 241 in Soil
		7158-008	C		03/26/93	03/26/93	Carbon 14 in Soil
		7158-008	GAM		03/03/93	03/13/93	Gamma Scan
		7158-008	NP		04/09/93	04/10/93	Neptunium in Soil
		7158-008	PU		03/24/93	04/09/93	Plutonium, Isotopic in Soil
		7158-008	TC		03/25/93	03/29/93	Technetium 99 in Soil
		7158-008	U		03/24/93	04/02/93	Uranium, Isotopic in Soil
		7158-008	U_T		04/05/93	04/05/93	Uranium, Total in Soil
		7158-008	Y		03/23/93	03/23/93	Strontium 90 in Soil
Lab Control Sample	N302066-11	7158-011	80A/80		04/06/93	04/06/93	Gross Alpha in Soil
SOIL		7158-011	80B/80		04/06/93	04/06/93	Gross Beta in Soil
		7158-011	AM		04/08/93	04/12/93	Americium 241 in Soil
		7158-011	C		04/08/93	04/13/93	Carbon 14 in Soil
		7158-011	NP		04/09/93	04/10/93	Neptunium in Soil
		7158-011	PU		04/06/93	04/12/93	Plutonium, Isotopic in Soil
		7158-011	TC		04/07/93	04/12/93	Technetium 99 in Soil
		7158-011	U		04/06/93	04/13/93	Uranium, Isotopic in Soil
		7158-011	U_T		04/05/93	04/05/93	Uranium, Total in Soil
		7158-011	Y		04/08/93	04/08/93	Strontium 90 in Soil
Replicate (N302066-01)	N302066-10	7158-010	80A/80		03/18/93	03/23/93	Gross Alpha in Soil
SOIL	02/08/93	7158-010	80B/80		03/18/93	03/23/93	Gross Beta in Soil
EFL-1053	02/10/93	7158-010	AM		03/24/93	04/12/93	Americium 241 in Soil
		7158-010	C		03/26/93	03/26/93	Carbon 14 in Soil
		7158-010	GAM		03/03/93	03/13/93	Gamma Scan
		7158-010	NP		04/09/93	04/10/93	Neptunium in Soil
		7158-010	PU		03/24/93	04/09/93	Plutonium, Isotopic in Soil
		7158-010	TC		03/25/93	03/29/93	Technetium 99 in Soil
		7158-010	U		03/24/93	04/02/93	Uranium, Isotopic in Soil
		7158-010	U_T		04/05/93	04/05/93	Uranium, Total in Soil
		7158-010	Y		03/23/93	03/23/93	Strontium 90 in Soil

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CWS
Version 2.23
Report date 04/23/93

9613492.6896

TMA NORCAL

REPORTING GROUP 7158

SDG 7158
Contact Dinkar Kharkar

WORK SUMMARY, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / MATRIX / CUSTODY	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	PREPARED	ANALYZED	METHOD

COUNTS OF TESTS BY SAMPLE TYPE

TEST	METHOD	REFERENCE	CLIENT	RE	BLANK	LCS	REP SPIKE	TOTALS
80A/80	Gross Alpha in Soil	ASTM 1943-90, EPA 900	7		2	2	1	12
80B/80	Gross Beta in Soil	ASTM 1943-90, EPA 900	7		2	2	1	12
AM	Americium 241 in Soil	HASL 300/AM-02	7		2	2	1	12
C	Carbon 14 in Soil		7		2	2	1	12
GAM	Gamma Scan		7		1	1	1	10
NP	Neptunium in Soil		7		2	2	1	12
PU	Plutonium, Isotopic in Soil	HASL 300/PU-02	7		2	2	1	12
TC	Technetium 99 in Soil	HASL 300/TC-01	7		2	2	1	12
U	Uranium, Isotopic in Soil	HASL 300/U-04	7		2	2	1	12
U_T	Uranium, Total in Soil	EPA 908.1; ASTM 2907-83	7		2	2	1	12
Y	Strontium 90 in Soil	HASL 300/SR-01,-02	7		2	2	1	12
TOTALS			77		21	21	11	130

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CWS
Version 2.23
Report date 04/23/93

9613492.6897

N302066-08

TMA NORCAL

REPORTING GROUP 7158

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-08
Dept sample id 7158-008

Matrix SOIL
Material

PARAMETER	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST	ADDED pCi/G	2σ ERR pCi/G	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	130	17	7	10		80A	180	7.2	72	73-127	
Gross Beta	91	7.3	5	10		80B	95.8	3.8	95	75-125	
Uranium 233/234	4.3	0.97	0.3	0.3		U	4.34	0.17	99	65-135	
Uranium 235	0.23	0.20	0.3	0.3	U	U	0.199	0.016	116	-52-252	
Uranium 238	4.0	0.90	0.2	0.3		U	4.34	0.17	92	68-132	
Total Uranium (ug/g)	1.3	0.24	0.08		X	U_T	1.30	0.052	100	68-132	
Plutonium 238	0.004	0.009	0.02	0.05	U	PU	0	0			
Plutonium 239/240	0.81	0.098	0.02	0.05		PU	0.901	0.036	90	82-118	
Americium 241	1.1	0.12	0.03	0.05		AM	1.13	0.045	97	80-120	
Strontium 90	12	0.88	0.8	2		Y	9.98	0.40	120	75-125	
Technetium 99	16	0.70	0.4	0.5	BX	TC	15.3	0.61	105	81-119	
Carbon 14	590	14	10	50		C	630	25	94	84-116	
Neptunium 237	3.3	0.26	0.02	0.2		NP	4.10	0.16	80	88-112	
GAMMA SCAN ANALYTES											
Potassium 40	U		0.2		U	GAM					
Iron 59	U		0.06	0.05	U	GAM					
Chromium 51	U		0.1		U	GAM					
Cobalt 60	0.18	0.038		0.05		GAM	0.178	0.007	101	60-140	
Zinc 65	U		0.05		U	GAM					
Ruthenium 106	U		0.2		U	GAM					
Cesium 134	U		0.03		U	GAM					
Cesium 137	0.13	0.029		0.05		GAM	0.120	0.005	108	55-145	
Cerium 144	U		0.09		U	GAM					
Europium 152	U		0.04	0.1	U	GAM					
Europium 154	U		0.03	0.1	U	GAM					
Radium 226	U		0.05		U	GAM					
Thorium 228	U		0.03		U	GAM					
Thorium 232	U		0.1		U	GAM					

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-LCS
Version 2.23
Report date 04/23/93

9613492.6898

TMA NORCAL

REPORTING GROUP 7158

N302066-09

REAGENT BLANK

Reagent Blank

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-09 -
Dept sample id 7158-009

Matrix SOIL
Material

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	-1.8	3.1	6	10	U	80A
Gross Beta	Beta	1.5	3.1	5	10	U	80B
Uranium 233/234		0	0.056	0.2	0.3	U	U
Uranium 235	15117-96-1	0	0.068	0.3	0.3	U	U
Uranium 238	7440-61-1	0	0.056	0.2	0.3	U	U
Total Uranium (ug/g)		U		0.08		UX	U_T
Plutonium 238	13981-16-3	0.009	0.012	0.02	0.05	U	PU
Plutonium 239/240		0.003	0.012	0.02	0.05	U	PU
Americium 241	14596-10-2	0	0.016	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.20	0.31	0.8	2	U	Y
Technetium 99	14133-76-7	1.5	0.26	0.5	0.5	X	TC
Carbon 14	14762-75-5	-0.65	6.6	10	50	U	C
Neptunium 237	13994-20-2	0	0.004	0.02	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		0.2		U	GAM
Iron 59	14596-12-4	U		0.02	0.05	U	GAM
Chromium 51	14392-02-0	U		0.08		U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Zinc 65	13982-39-3	U		0.02		U	GAM
Ruthenium 106	13967-48-1	U		0.1		U	GAM
Cesium 134	13967-70-9	U		0.01		U	GAM
Cesium 137	10045-97-3	U		0.01	0.05	U	GAM
Cerium 144	14762-78-8	U		0.06		U	GAM
Europium 152	14683-23-9	U		0.03	0.1	U	GAM
Europium 154	15585-10-1	U		0.02	0.1	U	GAM
Radium 226	13982-63-3	U		0.03		U	GAM
Thorium 228	14274-82-9	U		0.02		U	GAM
Thorium 232	7440-29-1	U		0.07		U	GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6899

N302066-10

TMA NORCAL

REPORTING GROUP 7158

REPLICATE

B07K05

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

REPLICATE
Lab sample id N302066-10
Dept sample id 7158-010

ORIGINAL
Lab sample id N302066-01
Dept sample id 7158-001
Received 02/10/93

Client sample id B07K05
Matrix SOIL
Collected 02/08/93
Chain of custody id EFL-1053

PARAMETER	REPLICATE pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST	ORIGINAL pCi/G	2σ ERR (COUNT)	MDA pCi/G	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
Gross Alpha	14	5.3	4	10		80A	11	5.6	5		24	102	
Gross Beta	67	6.2	5	10		80B	65	6.1	5		3	38	
Uranium 233/234	5.6	1.0	0.2	0.3		U	4.9	1.2	0.3		13	46	
Uranium 235	0.10	0.10	0.2	0.3	U	U	0.20	0.24	0.3	U	-		
Uranium 238	2.3	0.53	0.2	0.3		U	1.8	0.55	0.3		24	57	
Total Uranium (ug/g)	6.6	1.2	0.08		X	U_T	6.7	1.3	0.08	X	2	44	
Plutonium 238	0.026	0.016	0.02	0.05	J	PU	0.017	0.019	0.03	U	42	174	
Plutonium 239/240	0.12	0.033	0.02	0.05		PU	0.13	0.035	0.02		8	59	
Americium 241	0.51	0.083	0.05	0.05		AM	0.49	0.075	0.02		4	35	
Strontium 90	-0.16	0.69	0.8	2	U	Y	0.53	1.6	0.8	U	-		
Technetium 99	41	1.2	0.4	0.5	B	TC	39	1.2	0.4	B	5	22	
Carbon 14	3.1	5.1	8	50	U	C	5.1	6.2	10	U	-		
Neptunium 237	0	0.78	0.02	0.2	U	NP	0	0.49	0.01	U	-		
GAMMA SCAN ANALYTES													
Potassium 40	13	0.18			X	GAM	13	2.0			0	40	
Iron 59	U		1	0.05	UX	GAM	U		1	U	-		
Chromium 51	U		3		UX	GAM	U		3	U	-		
Cobalt 60	33	0.73		0.05	X	GAM	32	0.87			3	32	
Zinc 65	U		0.9		UX	GAM	U		1	U	-		
Ruthenium 106	U		2		UX	GAM	U		3	U	-		
Cesium 134	U		0.3		UX	GAM	U		0.4	U	-		
Cesium 137	U		0.3	0.05	UX	GAM	U		0.4	U	-		
Cerium 144	U		0.8		UX	GAM	U		1	U	-		
Europium 152	U		0.6	0.1	UX	GAM	U		0.6	U	-		
Europium 154	4.5	0.27		0.1	X	GAM	4.5	0.36			0	35	
Radium 226	0.56	0.40			X	GAM	1.1	0.63			65	139	
Thorium 228	1.1	0.29			X	GAM	0.90	0.34			20	75	

Sr 90
C 14
Np 237
Rep < MDA

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-REP
Version 2.23
Report date 04/23/93

9613492.6900

TMA NORCAL

REPORTING GROUP 7158

N302066-10

B07K05

REPLICATE, cont.

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

REPLICATE
Lab sample id N302066-10
Dept sample id 7158-010

ORIGINAL
Lab sample id N302066-01
Dept sample id 7158-001
Received 02/10/93

Client sample id B07K05
Matrix SOIL
Collected 02/08/93
Chain of custody id EFL-1053

PARAMETER	REPLICATE pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST	ORIGINAL pCi/G	2σ ERR (COUNT)	MDA pCi/G	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
Thorium 232	U		2		UX	GAM	U		2	U	-		
Europium 155	4.6	0.48			X	GAM	4.4	0.57			4	40	

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-REP
Version 2.23
Report date 04/23/93

9613492.6901

N302066-11

TMA NORCAL

REPORTING GROUP 7158

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-11
Dept sample id 7158-011

Matrix SOIL
Material

PARAMETER	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST	ADDED pCi/G	2σ ERR pCi/G	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	140	17	6	10		80A	238	9.5	59	79-121	
Gross Beta	120	8.1	5	10		80B	120	4.8	100	74-126	
Uranium 233/234	5.0	0.68	0.1	0.3		U	4.78	0.19	105	76-124	
Uranium 235	0.17	0.085	0.1	0.3	J	U	0.219	0.018	78	41-159	
Uranium 238	4.8	0.66	0.09	0.3		U	4.78	0.19	100	77-123	
Total Uranium (ug/g)	1.7	0.43	0.08		X	U_T	1.95	0.078	87	64-136	
Plutonium 238	0.003	0.006	0.02	0.05	U	PU	0	0			
Plutonium 239/240	1.0	0.14	0.02	0.05		PU	1.08	0.043	93	78-122	
Americium 241	1.1	0.12	0.02	0.05		AM	1.08	0.043	102	79-121	
Strontium 90	12	0.82	0.9	2		Y	12.0	0.48	100	80-120	
Technetium 99	23	2.8	0.2	0.5	BX	TC	19.2	0.77	120	71-129	
Carbon 14	20000	390	5	50	B	C	22600	900	89	85-115	
Neptunium 237	4.2	0.29	0.02	0.2		NP	5.12	0.20	82	88-112	

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-LCS
Version 2.23
Report date 04/23/93

9613492.6902

TMA NORCAL

REPORTING GROUP 7158

N302066-12

REAGENT BLANK

Reagent Blank

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-12
Dept sample id 7158-012

Matrix SOIL
Material

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	1.5	4.5	7	10	U	80A
Gross Beta	Beta	1.1	3.2	5	10	U	80B
Uranium 233/234		0.044	0.044	0.07	0.3	U	U
Uranium 235	15117-96-1	-0.007	0.027	0.06	0.3	U	U
Uranium 238	7440-61-1	0.005	0.011	0.04	0.3	U	U
Total Uranium (ug/g)		U		0.08		UX	U_T
Plutonium 238	13981-16-3	0	0.005	0.02	0.05	U	PU
Plutonium 239/240		0.002	0.009	0.02	0.05	U	PU
Americium 241	14596-10-2	0.004	0.015	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.11	0.22	0.8	2	U	Y
Technetium 99	14133-76-7	0.80	0.13	0.3	0.5	X	TC
Carbon 14	14762-75-5	7.4	4.7	5	50	J	C
Neptunium 237	13994-20-2	0.004	0.004	0.006	0.2	U	NP

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6903

N302066-01

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

B07K05

SDG 7158
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-01 -
Dept sample id 7158-001
Received 02/10/93

Client sample id B07K05
Matrix SOIL
Collected 02/08/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	11	5.6	5	10		80A
Gross Beta	Beta	65	6.1	5	10		80B
Uranium 233/234		4.9	1.2	0.3	0.3		U
Uranium 235	15117-96-1	0.20	0.24	0.3	0.3	U	U
Uranium 238	7440-61-1	1.8	0.55	0.3	0.3		U
Total Uranium (ug/g)		6.7	1.3	0.08		X	U_T
Plutonium 238	13981-16-3	0.017	0.019	0.03	0.05	U	PU
Plutonium 239/240		0.13	0.035	0.02	0.05		PU
Americium 241	14596-10-2	0.49	0.075	0.02	0.05		AM
Strontium 90	10098-97-2	0.53	1.6	0.8	2	U	Y
Technetium 99	14133-76-7	39	1.2	0.4	0.5	B	TC
Carbon 14	14762-75-5	5.1	6.2	10	50	U	C
Neptunium 237	13994-20-2	0	0.49	0.01	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	2.0				GAM
Iron 59	14596-12-4	U		1	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	32	0.87		0.05		GAM
Zinc 65	13982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		3		U	GAM
Cesium 134	13967-70-9	U		0.4		U	GAM
Cesium 137	10045-97-3	U		0.4	0.05	U	GAM
Cerium 144	14762-78-8	U		1		U	GAM
Europium 152	14683-23-9	U		0.6	0.1	U	GAM
Europium 154	15585-10-1	4.5	0.36		0.1		GAM
Radium 226	13982-63-3	1.1	0.63				GAM
Thorium 228	14274-82-9	0.90	0.34				GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6904

TMA NORCAL

REPORTING GROUP 7158

N302066-01

DATA SHEET, cont

B07K05

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-01 -	Client sample id	B07K05
Dept sample id	7158-001	Matrix	SOIL
Received	02/10/93	Collected	02/08/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		2		U	GAM
Europium 155	14391-16-3	4.4	0.57				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6905

TMA NORCAL

REPORTING GROUP 7158

DATA SHEET

N302066-02

B07K11

SDG 7158
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-02
Dept sample id 7158-002
Received 02/16/93
Client sample id B07K11
Matrix SOIL
Collected 02/09/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	5.1	5.6	6	10	U	80A
Gross Beta	Beta	160	9.0	5	10		80B
Uranium 233/234		0.72	0.20	0.1	0.3		U
Uranium 235	15117-96-1	0.013	0.051	0.1	0.3	U	U
Uranium 238	7440-61-1	0.59	0.16	0.08	0.3		U
Total Uranium (ug/g)		2.1	0.52	0.08			U_T
Plutonium 238	13981-16-3	0.002	0.014	0.03	0.05	U	PU
Plutonium 239/240		0.026	0.019	0.02	0.05	J	PU
Americium 241	14596-10-2	0.021	0.018	0.03	0.05	U	AM
Strontium 90	10098-97-2	0.17	0.31	1	2	U	Y
Technetium 99	14133-76-7	350	5.6	0.9	0.5		TC
Carbon 14	14762-75-5	-2.5	4.2	5	50	U	C
Neptunium 237	13994-20-2	0	0.13	0.02	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	10	2.6				GAM
Iron 59	14596-12-4	U		2	0.05	U	GAM
Chromium 51	14392-02-0	U		5		U	GAM
Cobalt 60	10198-40-0	47	1.2		0.05		GAM
Zinc 65	13982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		4		U	GAM
Cesium 134	13967-70-9	U		0.6		U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	U	GAM
Cerium 144	14762-78-8	U		2		U	GAM
Europium 152	14683-23-9	U		0.7	0.1	U	GAM
Europium 154	15585-10-1	U		0.4	0.1	U	GAM
Radium 226	13982-63-3	0.71	0.59				GAM
Thorium 228	14274-82-9	1.3	0.48				GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6906

TMA NORCAL

REPORTING GROUP 7158

N302066-02

DATA SHEET, cont

B07K11

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-02 -	Client sample id	B07K11
Dept sample id	7158-002	Matrix	SOIL
Received	02/16/93	Collected	02/09/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		3		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6907

N302066-03

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

B07K13

SDG 7158
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-03 -
Client sample id B07K13
Dept sample id 7158-003
Matrix SOIL
Received 02/16/93
Collected 02/09/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	14	7.2	7	10		80A
Gross Beta	Beta	150	9.0	6	10		80B
Uranium 233/234		0.76	0.19	0.07	0.3		U
Uranium 235	15117-96-1	0.012	0.046	0.09	0.3	U	U
Uranium 238	7440-61-1	0.77	0.19	0.07	0.3		U
Total Uranium (ug/g)		2.1	0.52	0.08			U_T
Plutonium 238	13981-16-3	-0.007	0.014	0.03	0.05	U	PU
Plutonium 239/240		0.014	0.014	0.02	0.05	U	PU
Americium 241	14596-10-2	0.004	0.012	0.02	0.05	U	AM
Strontium 90	10098-97-2	0.29	0.44	2	2	U	Y
Technetium 99	14133-76-7	160	2.5	0.4	0.5	B	TC
Carbon 14	14762-75-5	-0.15	3.9	4	50	U	C
Neptunium 237	13994-20-2	0	0.12	0.004	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	9.6	2.4				GAM
Iron 59	14596-12-4	U		2	0.05	U	GAM
Chromium 51	14392-02-0	U		4		U	GAM
Cobalt 60	10198-40-0	46	1.1		0.05		GAM
Zinc 65	13982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		3		U	GAM
Cesium 134	13967-70-9	U		0.5		U	GAM
Cesium 137	10045-97-3	U		0.4	0.05	U	GAM
Cerium 144	14762-78-8	U		1		U	GAM
Europium 152	14683-23-9	U		0.4	0.1	U	GAM
Europium 154	15585-10-1	U		0.3	0.1	U	GAM
Radium 226	13982-63-3	0.91	0.53				GAM
Thorium 228	14274-82-9	0.89	0.36				GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6908

TMA NORCAL

REPORTING GROUP 7158

N302066-03

DATA SHEET, cont

B07K13

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-03	Client sample id	B07K13
Dept sample id	7158-003	Matrix	SOIL
Received	02/16/93	Collected	02/09/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6909

N302066-04

TMA NORCAL

REPORTING GROUP 7158

DATA SHEET

B07K17

SDG 7158
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-04
Dept sample id 7158-004
Received 02/18/93
Client sample id B07K17
Matrix SOIL
Collected 02/12/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	22	13	8	10		80A
Gross Beta	Beta	1200	24	5	10		80B
Uranium 233/234		2.0	0.37	0.08	0.3		U
Uranium 235	15117-96-1	0.13	0.081	0.1	0.3	J	U
Uranium 238	7440-61-1	1.9	0.34	0.08	0.3		U
Total Uranium (ug/g)		5.6	1.4	0.08			U_T
Plutonium 238	13981-16-3	0.032	0.026	0.03	0.05	J	PU
Plutonium 239/240		4.6	0.35	0.02	0.05		PU
Americium 241	14596-10-2	0.62	0.078	0.02	0.05		AM
Strontium 90	10098-97-2	82	2.7	1	2		Y
Technetium 99	14133-76-7	1200	7.9	0.4	0.5	B	TC
Carbon 14	14762-75-5	4.0	4.1	5	50	U	C
Neptunium 237	13994-20-2	0	0.18	0.03	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	5.4	2.5				GAM
Iron 59	14596-12-4	U		3	0.05	U	GAM
Chromium 51	14392-02-0	U		6		U	GAM
Cobalt 60	10198-40-0	140	1.6		0.05		GAM
Zinc 65	13982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		5		U	GAM
Cesium 134	13967-70-9	U		0.8		U	GAM
Cesium 137	10045-97-3	U		0.6	0.05	U	GAM
Cerium 144	14762-78-8	U		1		U	GAM
Europium 152	14683-23-9	U		0.5	0.1	U	GAM
Europium 154	15585-10-1	U		0.4	0.1	U	GAM
Radium 226	13982-63-3	2.6	0.87				GAM
Thorium 228	14274-82-9	U		0.6		U	GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6910

TMA NORCAL

REPORTING GROUP 7158

N302066-04

DATA SHEET, cont

B07K17

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-04	Client sample id	B07K17
Dept sample id	7158-004	Matrix	SOIL
Received	02/18/93	Collected	02/12/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		4		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6911

TMA NORCAL

REPORTING GROUP 7158

DATA SHEET

N302066-05

B07K19

SDG 7158
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-05
Dept sample id 7158-005
Received 02/18/93
Client sample id B07K19
Matrix SOIL
Collected 02/12/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	-1.1	9.2	7	10	U	80A
Gross Beta	Beta	1400	35	10	10		80B
Uranium 233/234		1.2	0.17	0.05	0.3		U
Uranium 235	15117-96-1	0.019	0.025	0.05	0.3	U	U
Uranium 238	7440-61-1	0.99	0.16	0.04	0.3		U
Total Uranium (ug/g)		2.9	0.73	0.08			U_T
Plutonium 238	13981-16-3	0.009	0.009	0.02	0.05	U	PU
Plutonium 239/240		2.1	0.20	0.02	0.05		PU
Americium 241	14596-10-2	0.34	0.058	0.02	0.05		AM
Strontium 90	10098-97-2	34	3.5	0.8	2		Y
Technetium 99	14133-76-7	2900	45	0.8	0.5		TC
Carbon 14	14762-75-5	0.47	4.3	5	50	U	C
Neptunium 237	13994-20-2	0	0.13	0.005	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	11	4.4				GAM
Iron 59	14596-12-4	U		4	0.05	U	GAM
Chromium 51	14392-02-0	U		10		U	GAM
Cobalt 60	10198-40-0	210	3.0		0.05		GAM
Zinc 65	13982-39-3	U		3		U	GAM
Ruthenium 106	13967-48-1	U		9		U	GAM
Cesium 134	13967-70-9	U		1		U	GAM
Cesium 137	10045-97-3	U		0.9	0.05	U	GAM
Cerium 144	14762-78-8	U		3		U	GAM
Europium 152	14683-23-9	U		1	0.1	U	GAM
Europium 154	15585-10-1	U		0.8	0.1	U	GAM
Radium 226	13982-63-3	1.2	1.1				GAM
Thorium 228	14274-82-9	0.83	0.62				GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6912

TMA NORCAL

REPORTING GROUP 7158

N302066-05

DATA SHEET, cont

B07K19

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-05 -	Client sample id	B07K19
Dept sample id	7158-005	Matrix	SOIL
Received	02/18/93	Collected	02/12/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		6		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6913

N302066-06

TMA NORCAL
REPORTING GROUP 7158

DATA SHEET

B07K22

SDG 7158
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-06
Dept sample id 7158-006
Received 02/22/93
Client sample id B07K22
Matrix SOIL
Collected 02/16/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	17	9.2	7	10		80A
Gross Beta	Beta	570	23	10	10		80B
Uranium 233/234		2.5	0.41	0.1	0.3		U
Uranium 235	15117-96-1	0.081	0.081	0.1	0.3	U	U
Uranium 238	7440-61-1	1.3	0.28	0.1	0.3		U
Total Uranium (ug/g)		3.9	0.97	0.08			U_T
Plutonium 238	13981-16-3	0.002	0.010	0.02	0.05	U	PU
Plutonium 239/240		0.020	0.015	0.02	0.05	J	PU
Americium 241	14596-10-2	0.015	0.011	0.01	0.05	J	AM
Strontium 90	10098-97-2	-0.10	1.6	0.9	2	U	Y
Technetium 99	14133-76-7	1200	7.6	0.5	0.5	B	TC
Carbon 14	14762-75-5	2.0	4.3	5	50	U	C
Neptunium 237	13994-20-2	0	0.82	0.02	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	7.6	2.1				GAM
Iron 59	14596-12-4	U		2	0.05	U	GAM
Chromium 51	14392-02-0	U		4		U	GAM
Cobalt 60	10198-40-0	75	1.4		0.05		GAM
Zinc 65	13982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		5		U	GAM
Cesium 134	13967-70-9	U		0.7		U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	U	GAM
Cerium 144	14762-78-8	U		1		U	GAM
Europium 152	14683-23-9	U		0.6	0.1	U	GAM
Europium 154	15585-10-1	U		0.4	0.1	U	GAM
Radium 226	13982-63-3	1.2	0.67				GAM
Thorium 228	14274-82-9	U		0.6		U	GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6914

TMA NORCAL

REPORTING GROUP 7158

N302066-06

DATA SHEET, cont

B07K22

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-06 -	Client sample id	B07K22
Dept sample id	7158-006	Matrix	SOIL
Received	02/22/93	Collected	02/16/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		3		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6915

TMA NORCAL

REPORTING GROUP 7158

N302066-07

B07K25

DATA SHEET

SDG 7158
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N302066-07
Dept sample id 7158-007
Received 02/24/93
Client sample id B07K25
Matrix SOIL
Collected 02/18/93
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	8.7	11	10	10	U	80A
Gross Beta	Beta	780	27	10	10		80B
Uranium 233/234		3.7	0.44	0.07	0.3		U
Uranium 235	15117-96-1	0.10	0.053	0.07	0.3	J	U
Uranium 238	7440-61-1	3.7	0.44	0.05	0.3		U
Total Uranium (ug/g)		12	3.0	0.08			U_T
Plutonium 238	13981-16-3	0	0.005	0.02	0.05	U	PU
Plutonium 239/240		0.007	0.009	0.02	0.05	U	PU
Americium 241	14596-10-2	0.008	0.012	0.02	0.05	U	AM
Strontium 90	10098-97-2	0.12	0.26	0.9	2	U	Y
Technetium 99	14133-76-7	4500	41	5	0.5		TC
Carbon 14	14762-75-5	-0.54	4.4	5	50	U	C
Neptunium 237	13994-20-2	0	0.46	0.02	0.2	U	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	3.5	1.7				GAM
Iron 59	14596-12-4	U		1	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	19	0.72		0.05		GAM
Zinc 65	13982-39-3	U		0.8		U	GAM
Ruthenium 106	13967-48-1	3.9	1.7				GAM
Cesium 134	13967-70-9	U		0.4		U	GAM
Cesium 137	10045-97-3	U		0.3	0.05	U	GAM
Cerium 144	14762-78-8	U		0.8		U	GAM
Europium 152	14683-23-9	U		0.3	0.1	U	GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-63-3	3.3	0.52				GAM
Thorium 228	14274-82-9	U		0.3		U	GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 04/23/93

9613492.6916

TMA NORCAL

REPORTING GROUP 7158

N302066-07

DATA SHEET, cont

B07K25

SDG	7158	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N302066-07 -	Client sample id	B07K25
Dept sample id	7158-007	Matrix	SOIL
Received	02/24/93	Collected	02/18/93
		Chain of custody id	EFL-1053

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/23/93

9613492.6917

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator Wendy S. Thompson PROJECT NUMBER: 92-336

Company Contact Wendy S. Thompson Telephone (509) 376-2153

Project Designation/Sampling Locations 241-T-106 Collection Date 2-8-93

Borehole Number: 299-W10-196 Time: ① 0910 ② 0730

Ice Chest No. SML 284 Field Logbook No. ~~EFL-1053~~

Bill of Lading/Airbill No. 2536953034 Offsite Property No. W930-0190-38

Method of Shipment AIR (EMERY)

Shipped to TMA-Norcal

Possible Sample Hazards/Remarks Keep samples chilled. All analysis per lab statement of work.
Samples are nonhazardous/nonradioactive with field instruments

Sample Identification

① B07K05

1x120 ml., amber glass, soil, CLP-VOA

1x250 ml., amber glass, soil, CLP-Semi-VOA

1x250 ml., amber glass, soil, Anions-SO_4, PO_4, NO_2-NO_3, CL, F, pH

1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg

1x500 ml., amber glass, soil, gross alpha, gross beta, GEA, including Co_{60}, Ru_{106}, Ce_{144}, Cs_{137}, isotopic U, total U, Am_{241}, Np_{237}, $Pu_{238/239/240}$, Sr_{90}, Tc_{99}, C_{14}

~~1x120ml., amber glass, soil, CLP-VOA~~
~~1x250 ml., amber glass, soil, CLP-Semi-VOA~~
~~1x250 ml., amber glass, soil, Anions-SO_4, PO_4, NO_2-NO_3, Cl, F, pH~~
~~1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg~~ 2-8-93
~~1x500 ml., amber glass, soil, gross alpha, gross beta, GEA, including Co_{60}, Ru_{106}, Ce_{144}, Cs_{137} isotopic U, total U, Am_{241}, Np_{237}, $Pu_{238/239/240}$, Sr_{90}, Tc_{99}, C_{14}~~

② B07K07; 3x40ml; amberglass; water; CLP-VOA

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Name)

Relinquished By	Date	Time	Received By	Date	Time
W.S. Thompson Wendy S Thompson	2-9-93	1100	Al Gobaleza Alfonso Gobaleza	2-10-93	1140

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

1100

9613492.6918 (TMA [illegible] - soil)

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector Wendy S. Thompson Date 2-8-93

Company Contact Wendy S. Thompson Telephone (509) 376-2153

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
1) B07K05	S	2-8-93	0910 ✓	1x120ml., amber glass, soil, CLP-VOA
			✓	1x250 ml., amber glass, soil, CLP-Semi-VOA
			✓	1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
			✓	1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
			✓	1x500 ml., glass, soil, gross alpha, gross beta, GEA,
		2-8-93 WSH		including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241,
				Np-237, Pu-238,-239,-240, Sr-90, Tc-99, total U, C-14
2) B07K07	W	2-8-93	0730 ✓	3x40ml; amberglass; water CLP-VOA
	~~S~~			1x120ml., amber glass, soil, CLP-VOA
	WSH 2-8-93			1x250 ml., amber glass, soil, CLP-Semi-VOA
				1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
				1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
				1x500 ml., glass, soil, gross alpha, gross beta, GEA,
				including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241
				Np-237, Pu-238,-239,-240, Sr-90, Tc-99, total U, C-14
	~~S~~ WSH 2-8-93			1x120 ml., amber glass, soil, CLP-VOA
				1x250 ml., amber glass, soil, CLP-Semi-VOA
				1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
				1x250ml., glass, soil, ICP/AA metals, Bi, CN, Hg
				1x500 ml., glass, soil, gross alpha, gross beta, GEA
				including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241,
				Np-237, Pu-238,-239,-240, Sr-90, Tc-99, total U, C-14

*Type of Sample: A = Air; DL = Drum Liquids; DS = Drum Solids; L = Liquid; O = Oil; S = Soil; SE = Sediment; SL = Sludge; SO = Solid; T = Tissue; W = Water; WI = Wipe; X = Other

Field Information: Samples support the 241-T-106 characterization (soil). All analysis per lab statement of work.

Special Handling and/or Storage: KEEP SAMPLES CHILLED.

Possible Sample Hazards: Samples are nonhazardous with field instruments

1 of 3

9613492.6919

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator Wendy S. Thompson PROJECT NUMBER: 92-336

Company Contact Wendy S. Thompson Telephone (509) 376-2153

Project Designation/Sampling Locations 241-T-106 Collection Date 2-9-93

Borehole Number: 299-W10-196 Time: ① 0830, ② 0830, ③ 0715

Ice Chest No. #SML226 Field Logbook No. ~~EFL-1053~~

Bill of Lading/Airbill No. Offsite Property No. W93-00190-43

Method of Shipment ~~AIR (EMERY)~~ WST 2-10-93 TRUCK

Shipped to TMA-Norcal

Possible Sample Hazards/Remarks Keep samples chilled. All analysis per lab statement of work. Samples #1&2 have ≈ 122 pCi/gm total radioactivity. Sample #3 is nonhaz/nonrad

Sample Identification

① B07K11

1x120 ml., amber glass, soil, CLP-VOA

1x250 ml., amber glass, soil, CLP-Semi-VOA

1x250 ml., amber glass, soil, Anions-SO_4, PO_4, NO_2-NO_3, CL, F, pH

1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg

1x500 ml., amber glass, soil, gross alpha, gross beta, GEA, including Co_{60}, Ru_{106}, Ce_{144}, Cs_{137} isotopic U, total U, Am_{241}, Np_{237}, $Pu_{238/239/240}$, Sr_{90}, Tc_{99}, C_{14}

② B07K13

1x120ml., amber glass, soil, CLP-VOA

~~1x250 ml., amber glass, soil, CLP-Semi-VOA~~

1x250 ml., amber glass, soil, Anions-SO_4, PO_4, NO_2-NO_3, Cl, F, pH

1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg

~~1x500 ml., amber glass, soil, gross alpha, gross beta, GEA, including Co_{60}, Ru_{106}, Ce_{144}, Cs_{13}~~ isotopic U, total U, Am_{241}, Np_{237}, $Pu_{238/239/240}$, Sr_{90}, Tc_{99}, C_{14}

③ B07K09, 3x40ml; amber glass, water, CLP-VOA

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Name)

Relinquished By	Date	Time	Received By	Date	Time
W.S. Thompson Wendy S Thompson	2-9-93	1030	Alfonso Rodriguez	2-16-93	1145

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

1110

9613492.6920 (TMA 100 - soil)

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector: Wendy S. Thompson Date: 2-9-93

Company Contact: Wendy S. Thompson Telephone: (509) 376-2153

	Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
1	B07K11	S	2-9-93	0830	✓ 1x120ml., amber glass, soil, CLP-VOA
					✓ 1x250 ml., amber glass, soil, CLP-Semi-VOA
					✓ 1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH Cl, F
					✓ 1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
					✓ 1x500 ml., glass, soil, gross alpha, gross beta, GEA,
					including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241,
					Np-237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14
2	B07K13	S	2-9-93	0830	✓ 1x120ml., amber glass, soil, CLP-VOA
					✓ 1x250 ml., amber glass, soil, CLP-Semi-VOA
					✓ 1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH Cl, F
					✓ 1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
					✓ 1x500 ml., glass, soil, gross alpha, gross beta, GEA,
					including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241,
					Np-237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14
					✓ 3x40ml, amber glass, water, CLP-VOA
3	B07K09	~~SW~~	2-9-93	0715	1x120 ml., amber glass, soil, CLP-VOA
		2-9-93			1x250 ml., amber glass, soil, CLP-Semi-VOA
					1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
					1x250ml., glass, soil, ICP/AA metals, Bi, CN, Hg
					1x500 ml., glass, soil, gross alpha, gross beta, GEA
					including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241,
					Np=237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14

*Type of Sample: A = Air; DL = Drum Liquids; DS = Drum Solids; L = Liquid; O = Oil; S = Soil; SE = Sediment; SL = Sludge; SO = Solid; T = Tissue; W = Water; WI = Wipe; X = Other

Field Information: Samples support the 241-T-106 characterization (soil). All analysis per lab statement of work. Project # 92-336

Special Handling and/or Storage: KEEP SAMPLES CHILLED.

Possible Sample Hazards: Samples #1 & 2 have ≈ 122 pCi/gm total radioactivity. Sample #3 is [illegible] nonradioactive

9613492.6921

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator Wendy S. Thompson PROJECT NUMBER: 92-336

Company Contact Wendy S. Thompson Telephone (509) 376-2153

Project Designation/Sampling Locations 241-T-106 Collection Date 2-12-93

Borehole Number: 299-W10-196 Time: ① 0945; ② 1015; ③ 0730

Ice Chest No. EFS 10 Field Logbook No. EFL-1053

Bill of Lading/Airbill No. RSR # 18341 Offsite Property No. N/A

Method of Shipment ~~AIR (EMERY)~~ WST 2-16-93 Viking - truck

Shipped to TMA-Norcal

Possible Sample Hazards/Remarks Keep samples chilled. All analysis per lab statement of work.

Sample #1 + #2 are radioactive upto 1000 cpm. #3 is nonhazardous

Sample Identification

1) B07K17

1x120 ml., amber glass, soil, CLP-VOA

1x250 ml., amber glass, soil, CLP-Semi-VOA

1x250 ml., amber glass, soil, Anions-SO_4, PO_4, NO_2-NO_3, CL, F, pH

1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg

1x500 ml., amber glass, soil, gross alpha, gross beta, GEA, including Co_{60}, Ru_{106}, Ce_{144}, Cs_{137}, isotopic U, total U, Am_{241}, Np_{237}, $Pu_{238/239/240}$, Sr_{90}, Tc_{99}, C_{14}

2) B07K19

1x120ml., amber glass, soil, CLP-VOA

~~1x250 ml., amber glass, soil, CLP-Semi-VOA~~

1x250 ml., amber glass, soil, Anions-SO_4, PO_4, NO_2-NO_3, Cl, F, pH

1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg

* ~~1x500 ml., amber glass, soil, gross alpha, gross beta, GEA, including Co_{60}, Ru_{106}, Ce_{144}, Cs_{137}~~, isotopic U, total U, Am_{241}, Np_{237}, $Pu_{238/239/240}$, Sr_{90}, Tc_{99}, C_{14}

3) B07K15; 3x40ml, amber glass, water, CLP-VOA

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Name)

Relinquished By	Date	Time	Received By	Date	Time
W.S. Thompson / Wendy Thompson	2-12-93	11:00	Alfonso Gutierrez	2-18-93	300

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: * One vial, B07K15, received @ TMA/Norcal with bubbles KB 1/18

A-6000-407 (12/92)

9613492.6922 (TMA - soil)

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector Wendy S Thompson Date 2-12-93

Company Contact Wendy S. Thompson Telephone (509) 376-2153

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07K17	S	2-12-93	0915	1x120ml., amber glass, soil, CLP-VOA
				1x250 ml., amber glass, soil, CLP-Semi-VOA
				1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
				1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
				1x500 ml., glass, soil, gross alpha, gross beta, GEA,
				including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241
				Np-237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14
B07K19	S	2-12-93	1015	1x120ml., amber glass, soil, CLP-VOA
				1x250 ml., amber glass, soil, CLP-Semi-VOA
				1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
				1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
				1x500 ml., glass, soil, gross alpha, gross beta, GEA,
				including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241
				Np-237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14
B07K15	W	2-12-93	0730	3x40ml, amber glass, water-CLP VOA
	WST	2-12-93		~~1x120 ml., amber glass, soil, CLP-VOA~~ WST 2-12-93
				~~1x250 ml., amber glass, soil, CLP-Semi-VOA~~
				~~1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH~~
				~~1x250ml., glass, soil, ICP/AA metals, Bi, CN, Hg~~
				~~1x500 ml., glass, soil, gross alpha, gross beta, GEA~~
				~~including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241,~~
				~~Np-237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14~~

*Type of Sample: A = Air; DL = Drum Liquids; DS = Drum Solids; L = Liquid; O = Oil; S = Soil; SE = Sediment; SL = Sludge; SO = Solid; T = Tissue; W = Water; WI = Wipe; X = Other

Field Information: Samples support the 241-T-106 characterization (soil). All analysis per lab statement of work. Project # 92-336

Special Handling and/or Storage: KEEP SAMPLES CHILLED.

Possible Sample Hazards: Sample #1 + #2 are radioactive up to 1000cpm internal contamination. Sample #3 is nonhazardous/nonradioactive.

A-6000-466 (08/91)

9613492.6923

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator Wendy S. Thompson PROJECT NUMBER: 92-336

Company Contact Wendy S. Thompson Telephone (509) 376-2153

Project Designation/Sampling Locations 241-T-106 Collection Date 2-16-93

Borehole Number: 299-W10-196 Time: ① 1310, ② 1140

Ice Chest No. EFS12 Field Logbook No. EFL-1053

Bill of Lading/Airbill No. offsite RSR# 18342 Offsite Property No. N/A

Method of Shipment ~~AIR (EMERY)~~ TRUCK WSH 2-16-93

Shipped to TMA-Norcal

Possible Sample Hazards/Remarks Keep samples chilled. All analysis per lab statement of work.
Sample#1 is radioactive has up to 1.32 nCi/gm
#2 is nonradioactive

Sample Identification

① B07K22

✓ 1x120 ml., amber glass, soil, CLP-VOA

✓ 1x250 ml., amber glass, soil, CLP-Semi-VOA

✓ 1x250 ml., amber glass, soil, Anions-SO_4, PO_4, NO_2-NO_3, CL, F, pH

✓ 1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg

✓ 1x500 ml., amber glass, soil, gross alpha, gross beta, GEA, including Co_{60}, Ru_{106}, Ce_{144}, Cs_{137}, isotopic U, total U, Am_{241}, Np_{237}, $Pu_{238/239/240}$, Sr_{90}, Tc_{99}, C_{14}

~~B07K~~ WSH 2-16-93

1x120ml., amber glass, soil, CLP-VOA

~~1x250 ml., amber glass, soil, CLP-Semi-VOA~~

1x250 ml., amber glass, soil, Anions-SO_4, PO_4, NO_2-NO_3, Cl, F, pH

1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg

~~1x500 ml., amber glass, soil, gross alpha, gross beta, GEA, including Co_{60}, Ru_{106}, Ce_{144}, Cs_{137}~~ isotopic U, total U, Am_{241}, Np_{237}, $Pu_{238/239/240}$, Sr_{90}, Tc_{99}, C_{14}

② B07K21, 3x40ml, amberglass, water, CLP-VOA

☒ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Name)

Relinquished By	Date	Time	Received By	Date	Time
W. S. Thompson Wendy S Thompson	2-18-93	1100	Alfonso Gutierrez	2-22-93	1145

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

017

9613492.6924 (TMA - soil)

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector Wendy S. Thompson Date 2-16-93

Company Contact Wendy S. Thompson Telephone (509) 376-2153

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
(1) B07K22	S	2-16-93	1310	1x120ml., amber glass, soil, CLP-VOA
				1x250 ml., amber glass, soil, CLP-Semi-VOA
				1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, Cl, F, pH
				1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
				1x500 ml., glass, soil, gross alpha, gross beta, GEA,
				including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241,
				Np-237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14
	X	WSF 2-16-93		1x120ml., amber glass, soil, CLP-VOA
				1x250 ml., amber glass, soil, CLP-Semi-VOA
				1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
				1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
				1x500 ml., glass, soil, gross alpha, gross beta, GEA,
				including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241
				Np-237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14
(2) B07K21	W	2-16-93	1140	3x40ml, amber glass, water, CLP-VOA
	X	WSF 2-16-93		1x120 ml., amber glass, soil, CLP-VOA
				1x250 ml., amber glass, soil, CLP-Semi-VOA
				1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
				1x250ml., glass, soil, ICP/AA metals, Bi, CN, Hg
				1x500 ml., glass, soil, gross alpha, gross beta, GEA
				including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241,
				Np=237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14

*Type of Sample: A = Air; DL = Drum Liquids; DS = Drum Solids; L = Liquid; O = Oil; S = Soil; SE = Sediment; SL = Sludge; SO = Solid; T = Tissue; W = Water; WI = Wipe; X = Other

Field Information: Samples support the 241-T-106 characterization (soil). All analysis per lab statement of work. Project #92-336

Special Handling and/or Storage: KEEP SAMPLES CHILLED.

Possible Sample Hazards: Sample #1 is radioactive. #2 is nonradioactive

9613492.6425

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator Wendy S. Thompson PROJECT NUMBER: 92-336

Company Contact Wendy S. Thompson Telephone (509) 376-2153

Project Designation/Sampling Locations 241-T-106 Collection Date 2-18-93

Borehole Number: 299-W10-196 Time: 0850; 0730

Ice Chest No. SML160 Field Logbook No. EFL-1053

Bill of Lading/Airbill No. RSR # 17576 Offsite Property No. N/A.

Method of Shipment AIR (EMERY)

Shipped to TMA-Norcal

Possible Sample Hazards/Remarks Keep samples chilled. All analysis per lab statement of work.

Sample #1 is Radioactive. #2 is nonradioactive up to 2.5 nCi/gm

Sample Identification

1) B07K25

✓ 1x120 ml., amber glass, soil, CLP-VOA

✓ 1x250 ml., amber glass, soil, CLP-Semi-VOA

✓ 1x250 ml., amber glass, soil, Anions-SO_4, PO_4, NO_2-NO_3, Cl, F, pH

✓ 1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg

✓ 1x500 ml., amber glass, soil, gross alpha, gross beta, GEA, including Co_{60}, Ru_{106}, Ce_{144}, Cs_{137}, isotopic U, total U, Am_{241}, Np_{237}, $Pu_{238/239/240}$, Sr_{90}, Tc_{99}, C_{14}

2) B07K27, 3x40ml, amber glass, water, CLP-VOA

~~1x120ml., amber glass, soil, CLP-VOA~~

~~1x250 ml., amber glass, soil, CLP-Semi-VOA~~

~~1x250 ml., amber glass, soil, Anions-SO_4, PO_4, NO_2-NO_3, Cl, F, pH~~

~~1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg~~

~~1x500 ml., amber glass, soil, gross alpha, gross beta, GEA, including Co_{60}, Ru_{106}, Ce_{144}, Cs_{137} isotopic U, total U, Am_{241}, Np_{237}, $Pu_{238/239/240}$, Sr_{90}, Tc_{99}, C_{14}~~

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Name)

Relinquished By	Date	Time	Received By	Date	Time
W.S. Thompson Wendy S. Thompson	2-22-93	1100	Hanu Gokul	2-24-93	1:50

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

676

9613492.6926 (TMA - soil)

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector Wendy S. Thompson Date 2-18-93

Company Contact Wendy S. Thompson Telephone (509) 376-2153

	Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
1)	B07K25	S	2-18-93	0850	1x120ml., amber glass, soil, CLP-VOA
					1x250 ml., amber glass, soil, CLP-Semi-VOA
					1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
					1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
					1x500 ml., glass, soil, gross alpha, gross beta, GEA,
					including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241,
					Np-237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14
2)	B07K27	W	2-18-93	0730	3x40ml, amber glass; ~~SO~~ water; CLP-VOA WSF 2-18-93
		X			1x120ml., amber glass, soil, CLP-VOA
		WSF 2-22-93			1x250 ml., amber glass, soil, CLP-Semi-VOA
					1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
					1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
					1x500 ml., glass, soil, gross alpha, gross beta, GEA,
					including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241
					Np-237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14
		X WSF 2-22-93			1x120 ml., amber glass, soil, CLP-VOA
					1x250 ml., amber glass, soil, CLP-Semi-VOA
					1x250 ml., amber glass, soil, IC Anions, SO_4, PO_4, NO_2-NO_3, pH
					1x250ml., glass, soil, ICP/AA metals, Bi, CN, Hg
					1x500 ml., glass, soil, gross alpha, gross beta, GEA
					including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241,
					Np-237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14

*Type of Sample: A = Air; DL = Drum Liquids; DS = Drum Solids; L = Liquid; O = Oil; S = Soil; SE = Sediment; SL = Sludge; SO = Solid; T = Tissue; W = Water; WI = Wipe; X = Other

Field Information: Samples support the 241-T-106 characterization (soil). All analysis per lab statement of work. Project # 92-336

Special Handling and/or Storage: KEEP SAMPLES CHILLED.

Possible Sample Hazards: Sample #1 is Radioactive up to 2.5 nCi/gm #2 is nonradioactive.

A-6000-406 (05/91)

9613492.6927

EBASCO SERVICES INCORPORATED

BY _____ DATE _____ SHEET 1 OF 5

CHKD. BY _____ DATE _____ OFS NO. _____ DEPT. NO. _____

CLIENT Westinghouse Hanford

PROJECT Data Validation, Task F-93-

SUBJECT Delivery Group B07K04

Package contains Seven Samples, Soil

Case Narrative

Holding times ok COC

QC Samples 7158-08, -09, -10 associated w/ B07K05
All others associated with 7158-11, -12

Tc-99 initial cal data not available
Letter in package verifying initial cal in 1983
and on-going cal verification — accept for now
no qualifiers.

Neptunium - ~~Pu-239~~ Plutonium & Uranium contamination
interfered w/ analysis - All results reported as
nondetects with MDA > RDL. Qualify as
UJ

Tracers/Carrier		Source	NIST ?
U-232 -	F-H1-A	F-H1	No Certificate
Am-243 -	H-E2-C-(10) H-E2-D-(14)	> H-E2	No Certificate
Pu-242	H-A1-A-(7)		4
C14	X-1-A	X-1-A	4
4 curium	D-51		N (but certifiable standardization)

581 2-88

9613492.6928

EBASCO SERVICES INCORPORATED

BY _____ DATE _____ SHEET 2 OF 5

CHKD. BY _____ DATE _____ OFS NO. _____ DEPT. NO. _____

CLIENT _____

PROJECT _____

SUBJECT _____

Continuing Calibration

LSC - BKG counts (2 daily 9/14/92 - 3/30/93
H3 Eff (TRI WKG) 9/14/92 - 3/30/93
Figure of Merit " "
χ^2 daily " "

for H3 & C14

Co α/β - ok

No Continuing Calib check of α Spect. R

Primary Calib. for LBG, GEA - ok

No primary Calib. data for α-Spect R

BLANK SAMPLE RESULTS.

7158-009

	Blank		10X
	~~α~~	~~β~~	
α/β	~~0.18<~~	~~0.15<~~ <	
C14	<		
TC-99	3.0		30.0
TOTAL U	<		
U234	<		
U235	<		
U238	<		

581 2-88

9613492.6929

EBASCO SERVICES INCORPORATED

BY _____ DATE _____ SHEET 3 OF 5

CHKD. BY _____ DATE _____ OFS NO. _____ DEPT. NO. _____

CLIENT _____

PROJECT _____

SUBJECT _____

7158-009 ~~all~~ Blank (cont)

	Result	10X
Pu-238	<	
Pu-239/240	<	
Am-241	<	
Np 237	<	
Sr-90	<	
Co-60	<	
Cs-137	<	
Th-228	<	

B07K05 Tc-99 Result = 39.1

Result > 30X Blank ok

7158-012

	Blank	10X	
α/β	<		
C14	0.74	7.4	No Hits
Tc-99	1.64	16.4	All Sample Results >10X
Total U	<		
U234	<		
U-235	<		
U-238	<		
Pu-238	<		
Pu-239/240	<		
Am-241	<		
Np 237	<		
Sr 90	<		
Co 60			
Cs 137			
Th-228			

NO Blank Prepared

7158-002, 007 ~~TTS~~ JorUJ

581 2-88

9613492.6950

EBASCO SERVICES INCORPORATED

BY _____ DATE _____ SHEET 4 OF 5

CHKD. BY _____ DATE _____ OFS NO. _____ DEPT. NO. _____

CLIENT _____

PROJECT _____

SUBJECT _____

— ~~Non~~ DETECTION LIMITS & SAMPLE RESULTS
SEE Calculation Spreadsheet.

— Radiometric and Gravimetric Yields

CRITERIA
R <30% – 105% >J ≤ 115%

Gross α/β = N/A
C-14 = ~~N/A~~ All ok (LSC Efficiencies)
Tc-99
7158-002 – 28% "R"

Total U = N/A

ISOTOPIC-U = All ok

ISOTOPIC-Pu = all ok

Am-241 = all ok

Sr-90 = all ok

Gamma = N/A

Replicates

Radium 226 by gamma > 35%

OTHER Analytes > MDA ok — ~~not~~ No Qualifier Assigned

581 2-88

9613492.6931

Safety Performance Measurement System

Laboratory Control Samples

Limits : ~~≤50% - 79% >~~ ~~≤120%~~ R

All analytes OK

≤50% - 79% > ≤120%

R J/UJ OK R

Gross Alpha/Beta

Sample #	7158-001		7158-002		7158-003		7158-004		7158-005		7158-006		7158-007		7158-008		7158-009		7158-010	
Cust. I.D. #	B07K05		B07K11		B07K13		B07K17		B07K19		B07K22		B07K25		LCS		BLANK		REPLICATE	
Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Aliquot (g or l)	0.100		0.100		0.100		0.100		0.050		0.050		0.050		1.000		1.000		0.100	
Sample Weight (g or l)	0.081		0.093		0.108		0.131		0.057		0.054		0.075		0.112		0.108		0.071	
Counted Weight (g or l)	0.081		0.093		0.108		0.131		0.057		0.054		0.075		0.112		0.108		0.071	
[GROSS BETA]																				
Gross Counts	699.000		1581.000		1515.000		11297.000		6685.000		2787.000		3768.000		991.000		107.000		727.000	
Time (min)	100.000		100.000		100.000		100.000		100.000		100.000		100.000		100.000		100.000		100.000	
Gross CPM	6.990		15.810		15.150		112.970		66.850		27.870		37.680		9.910		1.070		7.270	
BKG CPM	0.945		0.961		1.340		1.047		1.038		1.185		1.442		0.926		0.950		0.985	
Observed CPM	6.045		14.849		13.810		111.923		65.812		26.685		36.238		8.984		0.120		6.285	
Alpha to Beta Xtalk	0.284		0.297		0.311		0.331		0.266		0.264		0.280		0.314		0.311		0.278	
Observed Alpha	0.300		0.205		0.370		1.033		0.393		0.434		0.336		2.535		-0.036		0.417	
Beta to Alpha Xtalk	0.006		0.006		0.006		0.006		0.006		0.006		0.006		0.006		0.006		0.006	
True CPM	5.970		14.815		13.721		111.803		65.812		26.813		36.205		8.203		0.131		6.180	
Efficiency (CPM/DPM)	0.415		0.412		0.408		0.405		0.421		0.421		0.416		0.408		0.408		0.418	
DPM of Aliquot	14.385		35.958		33.629		276.057		156.324		63.213		87.031		20.107		0.322		14.785	
Reported Results (pCi/g or pCi/l)	64.800		162.000		151.000		1244.000		1410.000		569.000		783.000		9.060		0.145		66.600	
Calculated Results (pCi/g or pCi/l)	64.799	OK	161.971	OK	151.481	OK	1243.500	OK	1408.326	OK	569.484	OK	784.060	OK	9.057	OK	0.145	OK	66.599	OK
Reported MDA	4.920		5.000		5.950		5.300		10.200		10.800		12.100		0.495		0.501		4.990	
Calculated MDA	4.917	OK	4.995	OK	5.956	OK	5.303	OK	10.180	OK	10.855	OK	12.119	OK	0.495	OK	0.501	OK	4.984	OK
Results > MDA?	YES		YES		YES		YES		YES		YES		YES		YES		NO		YES	
[GROSS ALPHA]																				
Gross Counts	38.000		30.000		45.000		112.000		45.000		49.000		41.000		262.000		3.000		48.000	
Time (min)	100.000		100.000		100.000		100.000		100.000		100.000		100.000		100.000		100.000		100.000	
Gross CPM	0.380		0.300		0.450		1.120		0.450		0.490		0.410		2.620		0.030		0.480	
BKG CPM	0.080		0.095		0.080		0.087		0.057		0.058		0.074		0.085		0.066		0.063	
Observed CPM	0.300		0.205		0.370		1.033		0.393		0.432		0.336		2.535		-0.036		0.417	
Beta to Alpha Xtalk	0.006		0.006		0.006		0.006		0.006		0.006		0.006		0.006		0.006		0.006	
True CPM	0.264		0.116		0.288		0.362		-0.002		0.272		0.119		2.486		-0.037		0.380	
Efficiency (CPM/DPM)	0.109		0.102		0.091		0.077		0.139		0.144		0.117		0.089		0.091		0.124	
DPM of Aliquot	2.424		1.138		3.161		4.704		-0.013		1.891		1.015		27.930		-0.404		3.064	
Reported Results (pCi/g or pCi/l)	10.780		5.100		14.300		22.000		-1.140		18.700		8.680		12.600		-0.182		13.700	
Calculated Results (pCi/g or pCi/l)	10.917	OK	5.126	OK	14.240	OK	21.188	OK	-0.122	*	17.037	OK	9.145	OK	12.581	OK	-0.182	OK	13.801	OK
Reported MDA	5.430		6.370		6.530		8.080		7.190		6.910		9.740		0.685		0.594		4.230	
Calculated MDA	5.447	OK	6.343	OK	6.524	OK	8.041	OK	7.211	OK	7.021	OK	9.781	OK	0.688	OK	0.593	OK	4.249	OK
Results > MDA?	YES		NO	U	YES		YES		NO	U	YES		NO	U	YES		NO		YES	

Gross Alpha/Beta

Sample #	7158-011		7158-012	
Cust. I.D. #	LCS		BLANK	
Type	Soil		Soil	
Aliquot (g or l)	1.000		1.000	
Sample Weight (g or l)	0.118		0.123	
Counted Weight (g or l)	0.118		0.123	
[GROSS BETA]				
Gross Counts	1241.000		108.000	
Time (min)	100.000		100.000	
Gross CPM	12.410		1.080	
BKG CPM	0.963		0.956	
Observed CPM	11.447		0.104	
Alpha to Beta Xtalk	0.319		0.324	
Observed Alpha	2.665		0.028	
Beta to Alpha Xtalk	0.006		0.006	
True CPM	10.617		0.095	
Efficiency (CPM/DPM)	0.406		0.408	
DPM of Aliquot	26.151		0.234	
Reported Results (pCi/g or pCi/l)	11.800		0.108	
Calculated Results (pCi/g or pCi/l)	11.780	OK	0.108	OK
Reported MDA	0.507		0.506	
Calculated MDA	0.507	OK	0.506	OK
Results > MDA?	YES		NO	
[GROSS ALPHA]				
Gross Counts	273.000		10.000	
Time (min)	100.000		100.000	
Gross CPM	2.730		0.100	
BKG CPM	0.065		0.072	
Observed CPM	2.665		0.028	
Beta to Alpha Xtalk	0.006		0.006	
True CPM	2.601		0.027	
Efficiency (CPM/DPM)	0.086		0.083	
DPM of Aliquot	30.248		0.330	
Reported Results (pCi/g or pCi/l)	13.600		0.150	
Calculated Results (pCi/g or pCi/l)	13.625	OK	0.149	OK
Reported MDA	0.623		0.682	
Calculated MDA	0.622	OK	0.679	OK
Results > MDA?	YES		NO	

Carbon 14

Sample #	7158-001		7158-002		7158-003		7158-004		7158-005		7158-006		7158-007		7158-008		7158-009		7158-010	
Cust. I.D. #	B07K05		B07K11		B07K13		B07K17		B07K19		B07K22		B07K25		LCS		BLANK		REPLICATE	
Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Sample Count 1	1125.000		656.000		689.000		752.000		698.000		720.000		684.000		9689.000		1039.000		1103.000	
Sample Count 2	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000	
Sample Count 3	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000	
Sample Count Time	100.000		100.000		100.000		100.000		100.000		100.000		100.000		100.000		100.000		100.000	
WsubS1	8.917		15.254		14.524		13.311		14.338		13.901		14.630		3.144		9.649		9.094	
WsubS2	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000	
WsubS3	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000	
Blank Count 1	1130.000		708.000		708.000		708.000		708.000		708.000		708.000		1130.000		1130.000		1130.000	
Blank Count 2	997.000		676.000		676.000		676.000		676.000		676.000		676.000		997.000		997.000		997.000	
Blank Count 3	1026.000		691.000		691.000		691.000		691.000		691.000		691.000		1026.000		1026.000		1026.000	
Blank Count time	100.000		100.000		100.000		100.000		100.000		100.000		100.000		100.000		100.000		100.000	
WsubB1	8.878		14.136		14.136		14.136		14.136		14.136		14.136		8.878		8.878		8.878	
WsubB2	10.052		14.803		14.803		14.803		14.803		14.803		14.803		10.052		10.052		10.052	
WsubB3	9.770		14.483		14.483		14.483		14.483		14.483		14.483		9.770		9.770		9.770	
Blank CPM Average	10.480		6.914		6.914		6.914		6.914		6.914		6.914		10.480		10.480		10.480	
Sample CPM average	11.250		6.560		6.890		7.520		6.980		7.200		6.840		96.890		10.390		11.030	
Net CPM	0.770		-0.354		-0.024		0.606		0.066		0.286		-0.074		86.410		-0.090		0.550	
Decay Correction	1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000	
Efficiency	0.631		0.616		0.643		0.650		0.619		0.631		0.577		0.660		0.622		0.640	
DPM of Aliquot	1.220		-0.575		-0.038		0.932		0.106		0.453		-0.129		130.924		-0.145		0.859	
Aliquot	0.107		0.103		0.110		0.106		0.103		0.102		0.107		1.000		1.000		0.126	
Reported Results (pCi/l)	5.139	U	-2.515	U	-0.154	U	3.962	U	0.465	U	2.001	U	-0.541	U	58.946		-0.085		3.075	
Calculated Results (pCi/l)	5.136	OK	-2.515	OK	-0.154	OK	3.961	OK	0.465	OK	2.000	OK	-0.541	OK	58.975	OK	-0.085	OK	3.072	OK
Reported MDA	9.900		5.013		4.493		4.617		4.989		4.942		5.151		1.012		1.074		8.294	
Calculated MDA (method 1)	5.803		5.021		4.504		4.623		4.996		4.949		5.160		0.594		0.630		4.859	
Calculated MDA (method 2)	5.811		5.023		4.505		4.625		4.998		4.951		5.162		0.594		0.631		4.865	

Carbon 14

Sample #	7158-011		7158-012	
Cust. I.D. #	LCS		BLANK	
Type	Soil		Soil	
Sample Count 1	10034.000		791.000	
Sample Count 2	0.000		0.000	
Sample Count 3	0.000		0.000	
Sample Count Time	3.280		100.000	
WsubS1	2105.636		12.656	
WsubS2	0.000		0.000	
WsubS3	0.000		0.000	
Blank Count 1	708.000		708.000	
Blank Count 2	676.000		676.000	
Blank Count 3	691.000		691.000	
Blank Count time	100.000		100.000	
WsubB1	14.136		14.136	
WsubB2	14.803		14.803	
WsubB3	14.483		14.483	
Blank CPM Average	6.914		6.914	
Sample CPM average	100.340		7.910	
Net CPM	93.426		0.996	
Decay Correction	1.000		1.000	
Efficiency	0.700		0.608	
DPM of Aliquot	133.465		1.638	
Aliquot	1.000		1.000	
Reported Results (pCi/l)	1964.500		0.738	
Calculated Results (pCi/l)	60.120	*	0.738	OK
Reported MDA	0.454		0.523	
Calculated MDA (method 1)	0.455		0.524	
Calculated MDA (method 2)	0.455		0.524	

TECHNETIUM 99

Sample #	7158-001		7158-002		7158-003		7158-004		7158-005		7158-006		7158-007		7158-008		7158-009		7158-010	
Cust. I.D. #	B07K05		B07K11		B07K13		B07K17		B07K19		B07K22		B07K25		LCS		BLANK		REPLICATE	
Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Aliquot	2.00000		2.01000		2.00000		2.00000		2.01000		2.05000		2.04000		1.00000		1.00000		2.00000	
Average Net CPM	40.23000		192.57000		187.94000		1406.24000		1987.20000		1458.61000		4861.97000		20.64000		1.30000		51.27000	
P-Factor	2.34000		2.34000		2.34000		2.34000		2.34000		2.34000		2.74000		2.34000		2.34000		2.34000	
Yield	0.54230		0.28510		0.62480		0.60500		0.36360		0.62180		0.65620		0.68550		0.46370		0.66450	
Reported Results	39.10100		354.20000		158.53000		1231.50000		2866.10000		1206.10000		4462.70000		31.73100		2.96580		40.66500	
Calculated Results	39.09699	OK	354.20790	OK	158.52986	OK	1225.00246	OK	2866.05506	OK	1206.13936	OK	4462.73917	OK	31.73694	OK	2.95508	OK	40.66317	OK
Bkg 1	0.44000		0.72000		0.50000		0.52000		0.69000		0.72000		13.32000		0.55000		0.54000		0.52000	
Time 1	61.80000		77.30000		77.30000		63.10000		63.10000		63.10000		11.00000		61.80000		61.80000		61.80000	
SF 1	0.97800		1.02700		1.03300		1.06200		1.07300		1.02700		1.01300		1.02700		1.03800		1.04500	
Reported MDA	0.42022		0.92373		0.35908		0.43295		0.82483		0.46348		5.04020		0.77051		0.86311		0.39520	
Calculated MDA 1	0.37372	*	0.84958	OK	0.32657	OK	0.39136	*	0.75412	OK	0.42273	OK	4.78941	OK	0.69422	*	1.02781	*	0.35428	*
Results > MDA ?	YES		YES		YES		YES		YES		YES		YES		YES		YES		YES	

96/31/27-0956

TECHNETIUM 99

Sample #	7158-011		7158-012	
Cust. I.D. #	LCS		BLANK	
Type	Soil		Soil	
Aliquot	1.00000		1.00000	
Average Net CPM	31.45000		1.07000	
P-Factor	2.34000		2.34000	
Yield	0.73990		0.68770	
Reported Results	44.80400		1.63670	
Calculated Results	44.80335	OK	1.64001	OK
Bkg 1	0.54000		0.62000	
Time 1	124.40000		124.40000	
SF 1	0.94400		0.99500	
Reported MDA	0.44404		0.47683	
Calculated MDA 1	0.41289	OK	0.50172	OK
Results > MDA ?	YES		YES	

9513942.0957

Total Uranium

Sample #	7158-001		7158-002		7158-003		7158-004		7158-005		7158-006		7158-007		7158-008		7158-009	
Cust. I.D. #	B07K05		B07K11		B07K13		B07K17		B07K19		B07K22		B07K25		LCS		BLANK	
Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Final Result (ug/l)	83.12800		26.45000		26.01600		69.81600		36.65300		48.99500		153.43000		15.74100		0.08000	
Prep Volume (l)	0.02000		0.02000		0.02000		0.02000		0.02000		0.02000		0.02000		0.02000		0.02000	
Aliquot (g or l)	0.25000		0.25000		0.25000		0.25000		0.25000		0.25000		0.25000		1.00000		1.00000	
Reported Results (ug/unit aliquot)	6.65000		2.11600		2.08130		5.58530		2.93220		3.91960		12.27440		0.31480		0.00160	
Calclulated Results (ug/unit aliquot)	6.65024	OK	2.11600	OK	2.08128	OK	5.58528	OK	2.93224	OK	3.91960	OK	12.27440	OK	0.31482	OK	0.00160	OK
MDA																	0.08000	
Results > MDA ?	YES		YES		YES		YES		YES		YES		YES		YES		NO	

Total Uranium

Sample #	7158-010		7158-011		7158-012	
Cust. I.D. #	REPLICATE		LCS		BLANK	
Type	Soil		Soil		Soil	
Final Result (ug/l)	**82.09900**		**21.43100**		**0.08000**	
Prep Volume (l)	0.02000		0.02000		0.02000	
Aliquot (g or l)	0.25000		1.00000		1.00000	
Reported Results (ug/unit aliquot)	6.60000		0.42860		0.00160	
Calclulated Results (ug/unit aliquot)	6.56792	OK	0.42862	OK	0.00160	OK
MDA					0.08000	
Results > MDA ?	YES		YES		NO	

Isotopic Uranium

Sample #	7158-001		7158-002		7158-003		7158-004		7158-005		7158-006		7158-007		7158-008		7158-009		7158-010	
Cust. I.D. #	B07K05		B07K11		B07K13		B07K17		B07K19		B07K22		B07K25		LCS		BLANK		REPLICATE	
Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
U232 Tracer Added (DPM)	10.540		10.540		10.540		10.540		10.540		10.540		10.540		10.540		10.540		10.540	
Sample Size (g or l)	1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000	
Tracer BKG (CPM)	0.007		0.020		0.022		0.010		0.017		0.022		0.017		0.019		0.005		0.014	
Tracer Counts	144.000		457.000		499.000		431.000		934.000		430.000		667.000		175.000		170.000		224.000	
Counting Time (min)	151.830		185.220		185.220		185.220		384.050		168.150		255.850		151.830		151.830		151.830	
Detector Efficiency	0.254		0.257		0.280		0.233		0.261		0.279		0.266		0.280		0.233		0.270	
Reported Yield	0.351		0.902		0.905		0.942		0.879		0.861		0.924		0.384		0.454		0.513	
Calculated Yield	0.351	OK	0.902	OK	0.905	OK	0.942	OK	0.879	OK	0.861	OK	0.923	OK	0.384	OK	0.455	OK	0.513	OK
[U233/234]																				
BKG (CPM)	0.004		0.011		0.004		0.001		0.006		0.004		0.006		0.006		0.007		0.003	
Gross Counts	151.000		72.000		81.000		185.000		231.000		224.000		525.000		158.000		1.000		262.000	
U235 Counts	1.000		0.000		0.000		1.000		0.000		1.000		1.000		1.000		0.000		0.000	
Branch Ratio	1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000	
Tracer Counts	0.000		1.000		1.000		1.000		1.000		1.000		1.000		0.000		0.000		0.000	
Reported Results (pCi/g or pCi/l)	4.947		0.723		0.758		2.025		1.168		2.463		3.737		4.307		0.000		5.582	
Calculated Results (pCi/g or pCi/l)	4.960	OK	0.722	OK	0.760	OK	2.023	OK	1.167	OK	2.465	OK	3.738	OK	4.305	OK	-0.001	•	5.594	OK
MDA Reported	0.308		0.100		0.073		0.085		0.049		0.107		0.069		0.264		0.215		0.164	
MDA Calculated	0.199	•	0.085	•	0.059	•	0.076	•	0.042	•	0.085	•	0.062	•	0.178	•	0.133	•	0.072	•
Results > MDA?	YES		YES		YES		YES		YES		YES		YES		YES		NO		YES	
[U235]																				
BKG (CPM)	0.007		0.004		0.003		0.002		0.002		0.003		0.002		0.001		0.001		0.001	
Gross Counts	6.000		2.000		2.000		10.000		5.000		7.000		12.000		7.000		0.000		4.000	
U235 Counts	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000	
Branch Ratio	0.826		0.826		0.826		0.826		0.826		0.826		0.826		0.826		0.826		0.826	
Tracer Counts	0.000		0.000		0.000		0.000		1.000		0.000		0.000		0.000	DSK	0.000		0.000	
Table Counts	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000	
Reported Results (pCi/g or pCi/l)	0.201	U	0.013	U	0.012	U	0.134		0.019	U	0.081	U	0.104		0.234	U	0.000		0.104	
Calculated Results (pCi/g or pCi/l)	0.200	OK	0.016	•	0.016	•	0.130	OK	0.021	•	0.087	OK	0.101	OK	0.229	OK	-0.004	•	0.100	OK
MDA Reported	0.308		0.097		0.089		0.102		0.047		0.103		0.066		0.256		0.260		0.198	
MDA Calculated	0.191	•	0.051	•	0.041	•	0.034	•	0.037	•	0.046	•	0.026	•	0.056	•	0.057	•	0.043	•
Results > MDA?	NO		NO		NO		YES		NO		NO		YES		NO		NO		NO	
[U238]																				
BKG (CPM)	0.001		0.001		0.004		0.000		0.001		0.004		0.001		0.001		0.001		0.002	
Gross Counts	54.000		56.000		81.000		169.000		194.000		120.000		524.000		147.000		0.000		108.000	
U235 Counts	1.000		0.000		0.000		1.000		0.000		1.000		1.000		1.000		0.000		0.000	
Branch Ratio	1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000	
Tracer Counts	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000	
Reported Results (pCi/g or pCi/l)	1.760		0.587		0.767		1.859		0.994		1.315		3.744		4.030		0.000		2.310	
Calculated Results (pCi/g or pCi/l)	1.756	OK	0.585	OK	0.770	OK	1.858	OK	0.992	OK	1.318	OK	3.746	OK	4.023	OK	-0.004	•	2.305	OK
MDA Reported	0.254		0.080		0.073		0.085		0.039		0.107		0.055		0.211		0.215		0.164	
MDA Calculated	0.164	•	0.019	•	0.038	•	0.052	•	0.013	•	0.067	•	0.037	•	0.137	•	0.047	•	0.051	•
Results > MDA?	YES		YES		YES		YES		YES		YES		YES		YES		NO		YES	

Isotopic Uranium

Sample #	7158-011		7158-012	
Cust. I.D. #	LCS		BLANK	
Type	Soil		Soil	
U232 Tracer Added (DPM)	10.540		10.540	
Sample Size (g or l)	1.000		1.000	
Tracer BKG (CPM)	0.013		0.020	
Tracer Counts	414.000		872.000	
Counting Time (min)	168.150		384.050	
Detector Efficiency	0.269		0.257	
Reported Yield	0.864		0.829	
Calculated Yield	0.864	OK	0.830	OK
[U233/234]				
BKG (CPM)	0.005		0.011	
Gross Counts	435.000		13.000	
U235 Counts	1.000		0.000	
Branch Ratio	1.000		1.000	
Tracer Counts	1.000		1.000	
Reported Results (pCi/g or pCi/l)	4.977		0.044	
Calculated Results (pCi/g or pCi/l)	4.984	OK	0.043	OK
MDA Reported	0.110		0.044	
MDA Calculated	0.090	*	0.059	*
Results > MDA?	YES		NO	
[U235]				
BKG (CPM)	0.002		0.004	
Gross Counts	12.000		2.000	
U235 Counts	0.000		0.000	
Branch Ratio	0.826		0.826	
Tracer Counts	0.000		1.000	
Table Counts	0.000		0.000	
Reported Results (pCi/g or pCi/l)	0.167		-0.007	
Calculated Results (pCi/g or pCi/l)	0.164	OK	-0.003	*
MDA Reported	0.107		0.064	
MDA Calculated	0.034	*	0.049	*
Results > MDA?	YES		NO	
[U238]				
BKG (CPM)	0.000		0.001	
Gross Counts	417.000		1.000	
U235 Counts	1.000		0.000	
Branch Ratio	1.000		1.000	
Tracer Counts	0.000		0.000	
Reported Results (pCi/g or pCi/l)	4.793		0.005	
Calculated Results (pCi/g or pCi/l)	4.797	OK	0.004	*
MDA Reported	0.088		0.042	
MDA Calculated	0.054	*	0.014	*
Results > MDA?	YES		NO	

Isotopic Plutonium

Sample #	7158-001		7158-002		7158-003		7158-004		7158-005		7158-006		7158-007		7158-008		7158-009	
Cust. I.D. #	B07K05		B07K11		B07K13		B07K17		B07K19		B07K22		B07K25		LCS		BLANK	
Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Pu242 Tracer Added (DPM)	4.86000		4.86000		4.86000		4.86000		4.86000		4.86000		4.86000		4.86000		4.86000	
Sample Size (g or l)	1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000	
Tracer BKG (CPM)	0.00000		0.00173		0.00000		0.00348		0.00079		0.00000		0.00159		0.00237		0.00079	
Tracer Counts	906.00000		933.00000		928.00000		1025.00000		927.00000		882.00000		927.00000		1002.00000		745.00000	
Counting Time (min)	721.82000		710.98000		710.98000		725.32000		729.03000		729.03000		729.03000		723.40000		723.40000	
Detector Efficiency	0.40890		0.37410		0.36910		0.37820		0.27170		0.41220		0.36400		0.39480		0.39970	
Reported Yield	0.63210		0.72160		0.72820		0.76720		0.96280		0.60440		0.71860		0.72110		0.52990	
Calculated Yield	0.63161	OK	0.72082	OK	0.72763	OK	0.76695	OK	0.96236	OK	0.60392	OK	0.71788	OK	0.72066	OK	0.52975	OK
[Pu238]																		
BKG (CPM)	0.00609		0.00606		0.00693		0.01043		0.00079		0.00079		0.00079		0.00316		0.00000	
Gross Counts	11.00000		5.00000		2.00000		23.00000		5.00000		2.00000		1.00000		4.00000		3.00000	
Branch Ratio	1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000	
Tracer Counts	0.00000		0.00000		0.00000		0.00000		0.00000		0.00000		0.00000		0.00000		0.00000	
Reported Results (pCi/g or pCi/l)	0.01692	U	0.00235	U	-0.00708	U	0.03215	U	0.00946	U	0.00248	U	0.00000	U	0.00438	U	0.00882	
Calculated Results (pCi/g or pCi/l)	0.01596	OK	0.00162	•	-0.00691	OK	0.03305	OK	0.01045	OK	0.00353	•	0.00100	•	0.00375	•	0.00882	OK
MDA Reported	0.02970		0.01410		0.03160		0.03460		0.01810		0.01900		0.01810		0.02090		0.02250	
MDA Calculated	0.02359	•	0.02270	•	0.02438	•	0.02743	•	0.00835	•	0.00877	•	0.00835	•	0.01541	•	0.00000	ERR
Results > MDA?	NO		NO		NO		NO		NO		NO		NO		NO		NO	
[Pu239]																		
BKG (CPM)	0.00000		0.00260		0.00087		0.00000		0.00000		0.00000		0.00159		0.00158		0.00158	
Gross Counts	54.00000		13.00000		7.00000		2165.00000		894.00000		8.00000		4.00000		369.00000		2.00000	
Branch Ratio	1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000	
Tracer Counts	0.00000		0.00000		0.00000		0.00000		0.00000		0.00000		0.00000		0.00000		0.00000	
Reported Results (pCi/g or pCi/l)	0.13040		0.02582		0.01414	U	4.63400		2.11200		0.01984		0.00709	U	0.80500		0.00294	
Calculated Results (pCi/g or pCi/l)	0.13048	OK	0.02620	OK	0.01505	OK	4.63541	OK	2.11257	OK	0.01986	OK	0.00672	OK	0.80508	OK	0.00252	•
MDA Reported	0.01850		0.02250		0.01800		0.01640		0.01810		0.01900		0.01810		0.01670		0.02250	
MDA Calculated	0.00000	ERR	0.01487	•	0.00864	•	0.00000	ERR	0.00000	ERR	0.00000	ERR	0.01185	•	0.01090	•	0.01465	•
Results > MDA?	YES		YES		NO		YES		YES		YES		NO		YES		NO	

Isotopic Plutonium

Sample #	7158-010		7158-011		7158-012	
Cust. I.D. #	REPLICATE		LCS		BLANK	
Type	Soil		Soil		Soil	
Pu242 Tracer Added (DPM)	4.86000		4.86000		4.86000	
Sample Size (g or l)	1.00000		1.00000		1.00000	
Tracer BKG (CPM)	0.00079		0.00079		0.00079	
Tracer Counts	1095.00000		692.00000		931.00000	
Counting Time (min)	723.40000		729.03000		729.03000	
Detector Efficiency	0.38980		0.37680		0.34690	
Reported Yield	0.79890		0.51800		0.75720	
Calculated Yield	0.79860	OK	0.51791	OK	0.75700	OK
[Pu238]						
BKG (CPM)	0.00473		0.00000		0.00000	
Gross Counts	16.00000		1.00000		0.00000	
Branch Ratio	1.00000		1.00000		1.00000	
Tracer Counts	0.00000		0.00000		0.00000	
Reported Results (pCi/g or pCi/l)	0.02603		0.00317		0.00000	
Calculated Results (pCi/g or pCi/l)	0.02516	OK	0.00317	OK	0.00000	ERR
MDA Reported	0.02210		0.02420		0.01800	
MDA Calculated	0.01724	*	0.00000	ERR	0.00000	ERR
Results > MDA?	YES		NO		NO	
[Pu239]						
BKG (CPM)	0.00000		0.00159		0.00079	
Gross Counts	62.00000		332.00000		2.00000	
Branch Ratio	1.00000		1.00000		1.00000	
Tracer Counts	0.00000		0.00000		0.00000	
Reported Results (pCi/g or pCi/l)	0.12400		1.04800		0.00235	
Calculated Results (pCi/g or pCi/l)	0.12402	OK	1.04751	OK	0.00335	*
MDA Reported	0.01530		0.02420		0.01800	
MDA Calculated	0.00000	ERR	0.01588	*	0.00832	*
Results > MDA?	YES		YES		NO	

Americium 241

Sample #	7158-001		7158-002		7158-003		7158-004		7158-005		7158-006		7158-007		7158-008		7158-009	
Cust. I.D. #	B07K05		B07K11		B07K13		B07K17		B07K19		B07K22		B07K25		LCS		BLANK	
Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Am241 Spike Added (CPM)	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		4.95000		4.95000	
Sample Size (g or l)	1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000	
Tracer BKG (CPM)	0.00173		0.00261		0.00348		0.00261		0.00158		0.00316		0.00000		0.00173		0.00346	
Tracer Counts	993.00000		981.00000		1131.00000		1168.00000		1153.00000		1228.00000		1094.00000		1006.00000		864.00000	
Counting Time (min)	723.40000		706.67000		706.67000		706.67000		710.98000		710.98000		710.98000		723.40000		723.40000	
Detector Efficiency	0.38810		0.41970		0.40720		0.40260		0.39970		0.39910		0.38640		0.38410		0.36830	
Reported Yield	0.71330		0.66640		0.79210		0.82730		0.81850		0.87230		0.80390		0.73020		0.65240	
Calculated Yield	0.71363	OK	0.66695	OK	0.79230	OK	0.82606	OK	0.81886	OK	0.87269	OK	0.80448	OK	0.73052	OK	0.65323	OK
[Am241]																		
BKG (CPM)	0.00346		0.00522		0.00348		0.00609		0.00316		0.00000		0.00473		0.00779		0.00520	
Gross Counts	**224.00000**		**15.00000**		**6.00000**		**330.00000**		**182.00000**		**10.00000**		**9.00000**		**497.00000**		**6.00000**	
Branch Ratio	**1.00000**		**1.00000**		**1.00000**		**1.00000**		**1.00000**		**1.00000**		**1.00000**		**1.00000**		**1.00000**	
Tracer Counts	**2.00000**		**2.00000**		**2.00000**		**2.00000**		**2.00000**		**2.00000**		**2.00000**		**2.00000**		**2.00000**	
Reported Results (pCi/g or pCi/l)	**0.49270**		**0.02052** U		**0.00395** U		**0.62010**		**0.34480**		**0.01456**		**0.00816** U		**1.08600**		**0.00000**	
Calculated Results (pCi/g or pCi/l)	**0.49349**	OK	**0.02120**	OK	**0.00304**	*	**0.61892**	OK	**0.34408**	OK	**0.01455**	OK	**0.00741**	*	**1.08599**	OK	**0.00062**	*
MDA Reported	**0.02490**		**0.02800**		**0.01890**		**0.02350**		**0.01880**		**0.01390**		**0.02250**		**0.03190**		**0.03190**	
MDA Calculated	**0.02224**	*	**0.02533**	*	**0.01945**	OK	**0.02239**	OK	**0.01880**	OK	**0.01199**	*	**0.02201**	OK	**0.02859**	*	**0.02899**	*
Results > MDA?	**YES**		**NO**		**NO**		**YES**		**YES**		**YES**		**NO**		**YES**		**NO**	

Americium 241

Sample #	7158-010		7158-011		7158-012	
Cust. I.D. #	REPLICATE		LCS		BLANK	
Type	Soil		Soil		Soil	
Am243 Tracer Added (DPM)	[illegible]		4.95000		4.95000	
Sample Size (g or l)	1.00000		1.00000		1.00000	
Tracer BKG (CPM)	0.00261		0.00173		0.00173	
Tracer Counts	947.00000		1115.00000		1155.00000	
Counting Time (min)	699.98000		710.98000		710.98000	
Detector Efficiency	0.37660		0.38830		0.38410	
Reported Yield	0.72370		0.81470		0.85310	
Calculated Yield	0.72434	OK	0.81501	OK	0.85352	OK
[Am241]						
BKG (CPM)	0.02174		0.00346		0.00779	
Gross Counts	**233.00000**		**572.00000**		**10.00000**	
Branch Ratio	**1.00000**		**1.00000**		**1.00000**	
Tracer Counts	**2.00000**		**2.00000**		**2.00000**	
Reported Results (pCi/g or pCi/l)	**0.51010**		**1.13800**		**0.00387**	
Calculated Results (pCi/g or pCi/l)	**0.50905**	OK	**1.13620**	OK	**0.00476**	*
MDA Reported	**0.04960**		**0.01920**		**0.02780**	
MDA Calculated	**0.04566**	OK	**0.01971**	OK	**0.02474**	*
Results > MDA?	**YES**		**YES**		**NO**	

Neptunium 237

Sample #	7158-001		7158-002		7158-003		7158-004		7158-005		7158-006		7158-007		7158-008		7158-009		7158-010	
Cust. I.D. #	B07K05		B07K11		B07K13		B07K17		B07K19		B07K22		B07K25		LCS		BLANK		REPLICATE	
Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		1146 000		[illegible]		[illegible]		1075 520		1075 520	
Gross Alpha (dpm)	0 292		0 068		0 089		0 096		0 090		0.597		0 293		2.849		0 000		0.545	
Bkg CPM	0.001		0.001		0.000		0.003		0.000		0.003		0.003		0.001		0.001		0.003	
Tracer Counts	0 000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000	
Yield	0 539		0.482		0.688		0.473		0.621		0.654		0.574		0 386		0.527		0.629	
Aliquot (g or l)	1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000		1.000	
Efficiency	0 386		0 388		0 384		0 374		0 369		0 355		0 355		0 377		0 395		0 362	
Reported Results (pCi/g or pCi/l)	0 244		0.063		0 058		0.091		0 065		0 411		0 230		3 324		0 000		0 391	
Calculated Results (pCi/g or pCi/l)	0.244	OK	0.063	OK	0.058	OK	0.092	OK	0.065	OK	0.411	OK	0.230	OK	3.324	OK	0.000	ERR	0.391	OK
MDA Reported	0.014		0.016		0.004		0.025		0.005		0.019		0.023		0.022		0.015		0.023	
MDA Calculated	0.015	OK	0.016	OK	0.004	OK	0.025	OK	0.005	OK	0.019	OK	0.023	OK	0.022	OK	0.015	OK	0.020	*

All results U.J
due to Pu contamination

Neptunium 237

Sample #	7158-011		7158-012	
Cust. I.D. #	LCS		BLANK	
Type	Soil		Soil	
Count Time (min)	1143.760		1143.760	
Gross Alpha (dpm)	4.274		0.004	
Bkg CPM	0.002		0.000	
Tracer Counts	0.000		0.000	
Yield	0.459		0.475	
Aliquot (g or l)	1.000		1.000	
Efficiency	0.400		0.399	
Reported Results (pCi/g or pCi/l)	4.163		0.004	
Calculated Results (pCi/g or pCi/l)	4.194	OK	0.004	OK
MDA Reported	0.024		0.006	
MDA Calculated	0.021	*	0.006	*

Strontium 90

7158-001	0.99800	56.00000	50.00000	0.46360	0.99370	0.65226	0.76045	42.35524	1078.51548	27.62728	32.59079	21.25782	25.07590
B07K05	1.53200	32.00000	33.00000	0.42970	1.00040	0.54021	0.67035	32.83455	1163.60251	17.73765	22.01079	11.89052	14.76504
Soil	2.25400	52.00000	50.00000	0.60880	0.99870	0.42978	0.55515	44.32159	821.26778	19.30631	24.93837	10.71794	13.84450
	3.00900	35.00000	33.00000	0.49800	0.99400	0.55923	0.45000	29.55027	1004.01806	16.74910	13.67703	7.04861	6.24573
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	302.56778					SUMS=	150.06245	4067.42232	81.42035	93.21698	51.51480	59.92234

			PRODUCT	NBS CORR.	REPORTED	CALCULATED		Calculated	Calculated
Y @ MILK	REPORTED	CALCULATED	0.73187	1.00000	RESULTS	RESULTS		MDA	Results > MDA ?
1 COMP=	0.46500	0.46500			0.53241	0.98364	OK	0.51179	Yes
2 COMP=	NA	0.40451	P-FACTOR	C-ZERO					
			1.85900	1.17499					

7158-002	0.56800	26.00000	33.00000	0.51260	0.99790	0.27470	0.68122	39.83613	975.41943	10.97046	34.39361	9.44800	29.62088
B07K11	1.10300	22.00000	33.00000	0.88010	0.99870	-0.21316	0.74042	45.32635	566.11726	0.04533	33.96853	0.03397	25.45669
Soil	2.01700	16.00000	33.00000	0.47840	0.99130	0.00637	0.59096	65.70209	1049.53520	0.53360	37.64566	0.31528	22.24724
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	200.95660					SUMS=	148.86458	2593.07489	11.54931	106.00610	9.79725	77.32476

			PRODUCT	NBS CORR.	REPORTED	CALCULATED		Calculated	Calculated
Y @ MILK	REPORTED	CALCULATED	0.61978	1.00000	RESULTS	RESULTS		MDA	Results > MDA ?
1 COMP=	0.12700	0.12070			0.17134	0.17119	OK	0.78399	No
2 COMP=	NA	0.55093	P-FACTOR	C-ZERO					
			1.85900	0.50723					

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7158-003	0.34600	21.00000	33.00000	0.46260	0.99370	0.17287	0.91237	49.26003	1080.84736	8.50583	44.94432	7.78049	41.00597
B07K13	0.88100	17.00000	33.00000	0.47500	1.00510	0.04036	0.79394	60.18718	1062.63158	2.42812	47.78883	1.92777	37.92536
Soil	1.79500	18.00000	33.00000	0.44820	0.99590	0.09686	0.62906	57.18612	1115.57340	5.53706	35.79092	3.46858	22.40743
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	300.95367					SUMS=	166.59621	3249.05237	16.47102	128.50406	13.15482	101.33875

			PRODUCT	NBS CORR.	REPORTED	CALCULATED		Calculated	Calculated
Y @ MILK	REPORTED	CALCULATED	0.37964	1.00000	RESULTS	RESULTS		MDA	Results > MDA ?
1 COMP=	0.13000	0.12061			0.28641	0.28633	OK	1.21315	No
2 COMP=	NA	0.20292	P-FACTOR	C-ZERO					
			1.85900	0.34184					

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9615492.0918

Strontium 90

7158-004	0.56800	1853.00000	33.00000	0.47220	0.99000	55.12252	0.86122	0.41481	1068.87336	22.85412	0.35707	19.66244	0.30781
B07K17	1.10400	1502.00000	33.00000	0.44820	0.99520	44.85063	0.74923	0.54164	1115.57540	24.28270	0.40581	18.20078	0.30404
Soil	2.01700	1239.00000	33.00000	0.51800	0.99650	36.89788	0.59096	0.68884	985.25097	25.34276	0.40590	14.97668	0.23667
	3.17400	581.00000	20.00000	0.47500	1.00580	28.74074	0.43780	0.60662	1052.89138	17.46936	0.26841	7.55676	0.11863
	5.27000	518.00000	33.71000	0.60110	1.00190	14.79331	0.25373	1.98013	531.60836	28.89862	0.49734	7.38730	0.12619
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	0.87405					SUMS=	4.21173	5024.13766	118.97578	1.93252	67.87596	1.09425

			PRODUCT	NBS CORR.	REPORTED	CALCULATED		Calculated	Calculated
Y @ MILK	REPORTED	CALCULATED	0.63131	1.00000	RESULTS	RESULTS		MDA	Results > MDA ?
1 COMP=	62.05600	62.02764 OK			82.31300	82.27566	OK	0.73569	Yes
2 COMP=	NA	64.00654	P-FACTOR	C-ZERO					
			1.85900	59.28364					

7158-005	0.56800	971.00000	33.00000	0.44510	0.99510	28.83714	0.86122	0.91968	1123.34307	28.52092	0.79205	22.84036	0.68213
B07K19	1.10300	848.00000	33.00000	0.49190	1.01110	25.48485	0.74942	1.07729	1016.46676	27.45457	0.80735	20.57510	0.60504
Soil	2.01700	689.00000	33.00000	0.46100	0.99420	20.29986	0.59096	1.36669	1064.59670	27.74292	0.80766	16.36507	0.47730
	3.17400	532.00000	33.00000	0.47980	0.99510	15.66477	0.43749	1.82496	1042.10068	28.40506	0.79640	12.42861	0.34929
	5.04700	336.00000	33.00000	0.42240	0.99530	9.71355	0.26586	3.00562	1183.71212	29.19621	0.80814	7.84906	0.21729
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	2.99222					SUMS=	8.19424	5450.22153	139.31870	4.01360	80.08739	2.33106

			PRODUCT	NBS CORR.	REPORTED	CALCULATED		Calculated	Calculated
Y @ MILK	REPORTED	CALCULATED	0.80172	1.00000	RESULTS	RESULTS		MDA	Results > MDA ?
1 COMP=	32.49600	34.35671 OK			33.94200	35.88537	OK	0.56369	Yes
2 COMP=	NA	32.44591	P-FACTOR	C-ZERO					
			1.85900	42.56397					

7158-006	0.56800	20.00000	33.00000	0.51750	1.00920	0.08936	0.86122	51.32649	966.18367	4.58732	44.20343	3.95070	38.06890
B07K22	1.10400	13.00000	33.00000	0.42680	0.99450	-0.03268	0.74923	77.96618	1171.50690	0.07797	58.41449	0.05841	43.76581
Soil	2.01700	16.00000	33.00000	0.39330	1.01430	0.09266	0.59096	64.36574	1271.29418	5.97862	36.04649	3.53309	22.48530
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	417.28569					SUMS=	193.67841	3408.98666	10.64361	140.66841	7.54220	104.32001

			PRODUCT	NBS CORR.	REPORTED	CALCULATED		Calculated	Calculated
Y @ MILK	REPORTED	CALCULATED	0.72208	1.00000	RESULTS	RESULTS		MDA	Results > MDA ?
1 COMP=	NA	0.07230			-0.10488	-0.10136	OK	0.67965	No
2 COMP=	-0.09000	-0.06742 OK	P-FACTOR	C-ZERO					
			1.85900	0.12107					

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Strontium 90

7158-007	0.56800	20.00000	33.00000	0.44980	0.99920	0.15634	0.88122	51.58675	1112.09984	8.08047	44.51369	6.95907	38.33611
B07K25	1.15100	19.00000	33.00000	0.51800	0.99740	0.05761	0.74013	53.88574	985.25067	3.10422	39.58257	2.29753	29.51898
Soil	2.01700	14.00000	33.00000	0.44360	0.99930	-0.01934	0.59096	72.55037	1127.14157	0.07255	42.87466	0.04287	25.53740
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	401.71287					SUMS=	178.12286	3204.49218	11.25724	127.27094	9.29947	93.19188

			PRODUCT	NBS CORR.	REPORTED	CALCULATED		Calculated	Calculated	
Y @ MILK	REPORTED	CALCULATED	0.67855	1.00000	RESULTS	RESULTS		MDA	Results > MDA ?	
1 COMP=	0.10000	0.00079	OK		0.12297	0.12315	OK	0.67098	No	u
2 COMP=	NA	0.50004		P-FACTOR	C-ZERO					
				1.85900	0.14709					

7158-008	0.99800	460.00000	50.00000	0.49300	0.98960	8.81645	0.76945	4.90124	1014.19878	42.23128	3.77128	32.48457	2.90180
LCS	1.53200	241.00000	33.00000	1.09030	0.99610	6.18850	0.67036	4.24656	458.58936	26.27984	2.84670	17.61661	1.90630
Soil	2.16600	218.00000	33.00000	0.49800	0.99270	6.06347	0.56852	4.73937	1004.01006	28.73762	2.69441	16.33747	1.53182
	3.00900	177.00000	33.00000	0.43300	0.99370	4.69957	0.45666	5.66874	1154.73441	26.84250	2.66823	13.17116	1.22760
	4.15600	188.00000	50.00000	0.42840	1.00180	5.33760	0.33563	12.62025	1167.13362	42.12129	4.27361	14.28959	1.44718
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	27.93625					SUMS=	32.39415	4796.67216	168.21192	16.27421	93.66390	9.01869

			PRODUCT	NBS CORR.	REPORTED	CALCULATED		Calculated	Calculated	
Y @ MILK	REPORTED	CALCULATED	0.71448	1.00000	RESULTS	RESULTS		MDA	Results > MDA ?	
1 COMP=	10.42400	10.41223	OK		12.21700	12.20342	OK	0.53950	Yes	
2 COMP=	NA	11.15246		P-FACTOR	C-ZERO					
				1.85900	14.57329					

7158-009	0.99800	21.00000	50.00000	0.50650	1.00210	-0.06966	0.76945	105.78999	987.18683	0.10579	81.40014	0.08140	62.63336
BLANK	1.53200	13.00000	33.00000	0.48740	1.00360	-0.09380	0.67036	77.25653	1025.65146	0.07724	51.77574	0.09178	34.70811
Soil	2.16600	9.00000	33.00000	0.43300	0.99410	-0.15933	0.56852	109.52309	1154.73441	0.10952	82.15199	0.06215	35.33443
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	534.74799					SUMS=	292.34941	3167.75270	0.29235	195.32786	0.19533	132.67590

			PRODUCT	NBS CORR.	REPORTED	CALCULATED		Calculated	Calculated	
Y @ MILK	REPORTED	CALCULATED	0.73468	1.00000	RESULTS	RESULTS		MDA	Results > MDA ?	
1 COMP=	NA	0.00149			-0.19817	-0.00000	*	0.53515	No	u
2 COMP=	-0.16030	-0.00000		P-FACTOR	C-ZERO					
				1.85900	0.00000					

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Strontium 90

7158-010	0.99800	68.00000	50.00000	0.45010	0.99660	0.90681	0.76945	35.06759	1110.86425	31.79851	26.98277	24.46814	20.78190
BLANK	2.16300	15.00000	33.00000	0.49720	1.00990	-0.04306	0.56896	67.49919	1005.63154	0.08750	36.40434	0.09840	21.65053
Soil	2.42300	53.00000	33.00000	0.49750	1.00990	1.11954	0.53178	19.90292	1005.02513	22.28203	10.58404	11.84921	5.62842
	3.00900	63.00000	33.00000	0.41720	0.99800	1.46891	0.45666	16.50512	1196.46696	26.02126	7.67419	11.42816	3.50448
	4.15600	86.00000	50.00000	1.07900	0.99780	0.83959	0.33863	26.96465	463.39203	17.18236	6.09721	5.81645	3.08060
	8.03200	179.00000	131.25000	0.46360	0.99250	0.69346	0.12312	85.20337	1078.61596	76.12563	10.49024	9.37259	1.29156
	8.47800	110.00000	60.00000	0.49710	0.99400	1.32822	0.11007	30.95400	1005.63384	41.11359	3.40700	4.52523	0.37500
	DELTA=	4575.60458					SUMS=	262.29654	6867.72871	213.59166	106.63979	67.49522	56.49248

			PRODUCT	NBS CORR.	REPORTED	CALCULATED		Calculated	Calculated
Y @ MILK	REPORTED	CALCULATED	0.68554	1.00000	RESULTS	RESULTS		MDA	Results > MDA ?
1 COMP=	NA	1.19482 *			-0.15511	-0.99385	*	0.55915	No
2 COMP=	-0.12700	-0.81383 *	P-FACTOR	C-ZERO					
			1.85900	[illegible]					

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7158-011	0.56800	325.00000	33.00000	0.60340	1.00250	9.26820	0.86122	3.11072	828.63772	28.63076	2.67902	24.82984	2.30722
LCS	1.15100	271.00000	33.00000	0.46100	0.99390	7.70384	0.74013	3.77433	1084.59670	29.07681	2.79850	21.52098	2.06759
Soil	2.01700	284.00000	33.00000	0.60620	1.00430	7.42569	0.59696	3.87542	524.81029	28.77726	2.29023	17.00534	1.36345
	3.17400	158.00000	33.00000	0.42310	0.99450	4.34077	0.43749	6.81652	1181.75372	28.72947	2.89553	12.56882	1.28676
	5.04700	107.00000	33.00000	0.41450	1.00010	2.82821	0.28888	9.85709	1206.27262	27.87790	2.85036	7.49576	0.71262
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	92.66636					SUMS=	27.23607	5128.07305	143.29222	13.50863	83.42125	7.70761

			PRODUCT	NBS CORR.	REPORTED	CALCULATED		Calculated	Calculated
Y @ MILK	REPORTED	CALCULATED	0.73872	1.00000	RESULTS	RESULTS		MDA	Results > MDA ?
1 COMP=	10.93800	10.82323 OK			12.39900	12.26883	OK	0.71519	Yes
2 COMP=	NA	11.12755 *	P-FACTOR	C-ZERO					
			1.85900	[illegible]					

7158-012	0.56800	15.00000	33.00000	0.49480	1.00980	-0.04065	0.86122	87.52107	1010.60930	0.06752	58.15053	0.05815	50.08043
BLANK	1.15100	9.00000	33.00000	0.44820	0.99520	-0.17453	0.74013	106.96097	1115.57340	0.10896	80.64553	0.08065	59.68536
Soil	2.08000	13.00000	33.00000	0.42680	0.99450	-0.03266	0.56137	77.96918	1171.50890	0.07797	45.52594	0.04553	28.36158
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	DELTA=	734.90414					SUMS=	254.44821	3297.59160	0.25445	184.12300	0.18412	138.12037

			PRODUCT	NBS CORR.	REPORTED	CALCULATED		Calculated	Calculated
Y @ MILK	REPORTED	CALCULATED	0.81888	1.00000	RESULTS	RESULTS		MDA	Results > MDA ?
1 COMP=	NA	0.00135 *			-0.16695	-0.00000	*	0.58638	No
2 COMP=	-0.12360	-0.00000 *	P-FACTOR	C-ZERO					
			1.85900	0.00000					

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Gamma Spectroscopy

Sample #	7158-001		7158-002		7158-003		7158-004		7158-005		7158-006		7158-007		7158-008		7158-009
Cust. I.D. #	B07K05		B07K11		B07K13		B07K17		B07K19		B07K22		B07K25		LCS		BLANK
Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil
Aliquot (g or l)	190.36000		153.85000		174.30000		163.50999		141.69000		198.12000		153.88000		1.00000		1.00000
Counting Time (min)	110.93000		110.95000		115.98000		158.60000		100.93000		101.13000		127.78000		101.21000		163.46000
[Cobalt 60; Co-60]																	
Background CTS	139.00000		114.00000		126.00000		423.00000		0.00000		289.00000		64.00000		5.00000		0.00000
Background CPM	0.02200		0.02080		0.02910		0.02910		0.06010		0.02200		0.02910		0.02080		0.06010
Net CPM	53.87400		57.32600		67.93200		194.59300		213.12000		132.50800		25.26400		1.14500		0.10700
Branch Fraction	1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000		1.00000
Efficiency	0.00408		0.00362		0.00388		0.00388		0.00324		0.00408		0.00388		0.00362		0.00343
Reported Results (pCi/g or pCi/l)	31.66000	OK	46.92000	OK	45.85000	OK	139.80000	OK	211.40000	OK	74.61000	OK	19.25000	OK	135.00000	OK	<
Calculated Results (pCi/g or pCi/l)	31.24571		46.36525		45.24726		138.16506		209.11588		73.84152		19.06054		135.01722		14.05195
Reported MDA	NA	•	NA	•	NA	•	NA	•	NA	•	NA	•	NA	•	NA	•	13.98000
Calculated MDA	0.28976		0.36636		0.30440		0.43140		0.11158		0.43821		0.22642		14.47216		11.73465
Detect/Non Detect	Detect		Detect		Detect		Detect		Detect		Detect		Detect		Detect		Non Detect
[Cesium 137; Cs-137]																	
Background CTS	0.00000		0.00000		0.00000		0.00000		0.00000		0.00000		0.00000		25.00000		0.00000
Background CPM	0.03850		0.00000		0.02830		0.02830		0.02560		0.03850		0.02830		0.00000		0.02560
Net CPM	1.08500		1.05600		1.00800		1.52500		1.68300		1.65800		0.62800		1.39600		0.11900
Branch Fraction	0.85100		0.85100		0.85100		0.85100		0.85100		0.85100		0.85100		0.85100		0.85100
Efficiency	0.00831		0.00718		0.00794		0.00794		0.00664		0.00831		0.00794		0.00732		0.00673
Reported Results (pCi/g or pCi/l)	< u	•	< u	•	< u	•	< u	•	< u	•	< u	•	< u	•	100.90000	OK	<
Calculated Results (pCi/g or pCi/l)	0.36305		0.50601		0.38553		0.62176		0.94688		0.53306		0.27207		100.94662		9.35943
Reported MDA	0.36350	OK	0.50690	OK	0.38620	OK	0.62290	OK	0.94820	OK	0.53380	OK	0.27260	OK	NA	•	9.37500
Calculated MDA	0.02905		0.00000		0.02784		0.02538		0.04175		0.02923		0.03004		16.64711		4.58672
Detect/Non Detect	Non Detect		Non Detect		Non Detect		Non Detect		Non Detect		Non Detect		Non Detect		Detect		Non Detect
[Thorium 228; Th-228]																	
Background CTS	1863.00000		1574.00000		1962.00000		0.00000		2638.00000		3042.00000		642.00000		0.00000		68.00000
Background CPM	0.21080		0.25790		0.06560		0.18600		0.16070		0.21080		0.18600		0.25790		0.16070
Net CPM	3.88700		3.64000		3.39800		2.17300		2.08900		1.27100		0.54000		0.46000		0.25800
Branch Fraction	0.44800		0.44800		0.44800		0.44800		0.44800		0.44800		0.44800		0.44800		0.44800
Efficiency	0.02354		0.01928		0.02269		0.02269		0.01844		0.02354		0.02269		0.01866		0.01731
Reported Results (pCi/g or pCi/l)	0.90120	OK	1.27300	OK	0.89370	OK	< u	•	0.82780	OK	0.28100	OK	0.15940	OK	<	•	<
Calculated Results (pCi/g or pCi/l)	0.87217		1.23386		0.86389		0.58891		0.80391		0.27402		0.15551		24.78650		14.98620
Reported MDA	NA	•	NA	•	NA	•	0.60760	OK	NA	•	NA	•	NA	•	24.81000	OK	14.99000
Calculated MDA	0.40939		0.56995		0.45335		0.04325		0.91538		0.54984		0.27098		12.67527		16.07787
Detect/Non Detect	Detect		Detect		Detect		Non Detect		Detect		Detect		Detect		Non Detect		Non Detect

	7158-010 REPLICATE Soil		7158-011 LCS Soil		7158-012 BLANK Soil	
	188.98000	NOT IN		NOT IN		
	163.56000	PACKAGE		PACKAGE		
	232.00000					
	0.02200					
	55.04400					
	1.00000		1.00000		1.00000	
	0.00408					
*	32.58000	OK		ERR		ERR
	32.15741		ERR		ERR	
OK	NA	*		ERR		ERR
	0.25549		ERR		ERR	
	Detect		Detect		Detect	
	0.00000					
	0.03850					
	0.82900					
	0.85100		0.85100		0.85100	
	0.00831					
*	<	*		ERR		ERR
	0.27942		ERR		ERR	
OK	0.27990	OK		ERR		ERR
	0.02410		ERR		ERR	
	Non Detect		Detect		Detect	
	0.00000					
	0.21080					
	4.50600					
	0.44800		0.44800		0.44800	
	0.02354					
*	1.05300	OK		ERR		ERR
	1.01845		ERR		ERR	
OK	NA	*		ERR		ERR
	0.03781		ERR		ERR	
	Detect		Detect		Detect	

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