4D103

CORRES CONTROL

OUTGOING LTR NO

84 RF 2761

DIST	LTR	ENCL
DORR J E		
BENJAMIN A		
CROSSLAND W D		
LANGHEIM G R.		
M NETT J F		
OWEN F G		
REBRO W L		
SHANNON W M		
SMITH R E.		
VEJVODA, E		
WEIDNER C W		
WESTON W F		
WIEDERECHT D.A		
WOZNIAK B D		
YODER R E	X	
YOUNG E.R		
BAKER J W		
BURNETT E.J		
BYRNE, J P		
CAMPBELL, G W		
CARNIVAL G.J		
CHANDA, R N		
ELLIS H R		
GILBERT K V		
HARMAN L.K.		
HEALY T.J		
HILL J E.		
HURLEY J D		
JOHNSON C H		
KRIEG D M		
LOUDENBURG G E		
NAIMON E. R.		
NICHOL, W R		
ROBERTS J K.		
SMITH M. J		
TRENKA, A. R.		
VELASQUEZ R N		
WICKLAND C E.		
CORRES CONTROL	X	X
Campbell, G.W.	X	
Setl R, G.S	X	
Hornbacher, D.D	X	

CLASSIFICATION	LTR	ENCL
UNCLASSIFIED	X	X
CONFIDENTIAL		
SECRET		

AUTH CLASSIFIER SIG

DATE

IN REPLY TO LTR NO

LTR APPROVALS

ORIG & TYPIST INITIALS

Rocky Flats Plant
Energy Systems Group
Rockwell International Corporation
P O Box 464
Golden Colorado 80402-0464

(303) 497 7000

Contractor to U S Department of Energy

Rockwell International

000066244

September 26 1984

James R Nicks
Area Manager
DOE RFAO

84-RF-2761

STANDLEY LAKE SEDIMENT STUDY

Enclosed is a sediment sample location map and short report describing Rockwell s sampling activities conducted on Standley Lake in August 1984 This material was compiled by HS&E s Encironmental Analysis and Control Section for transmittal to the Cities of Westminster Thornton and their contracted consulting firm - Richard Arber & Associates

This study was designed to closely parallel the Great Western Reservoir Study (June 1983) in both scope and timetable Currently all of the sediment samples collected from Standley Lake are being processed for plutonium analyses by our HS&E 123 laboratory These data will be shared with the cities and presented at a State Exchange meeting in Spring 1985 Future correspondence will keep the cities aware of progress on the radiochemical data acquisition and reporting schedule

Please forward the attached Sampling report and location map to the three addresses listed below Thank you

City of Westminster
c/o Kelly DiNatale
3031 West 76th Avenue
Westminster Colorado 80030

City of Thornton
c/o Mark Speed
9500 Civic Centre Drive
Thornton Colorado 80229

ADMIN RECORD

SW-A-004337

1/52

84-RF-2761

Richard Arber & Associates
c/o Richard Arber
100 Fillmore Avenue
Denver Colorado 80206

Robert E Yoder Director
Health Safety and Environment

Orig and 1 cc - J R Nicks

cc
G W Campbell
D D Hornbacher
G H Setlock

2

D
R
A
F
T

Enclosed is a sediment sample location map and a brief report describing Rockwell s sampling activities on Standley Lake in August, 1984 This material was compiled by Dr George Setlock Environmental Analysis and Control Manager who supervised the project

Currently all of the sediment samples collected from Standley Lake are undergoing processing (i e drying ball-milling sieving) prior to radiochemical analyses for plutonium - 239 240 I will keep you posted on the progress of the radiochemical data acquisition and reporting schedule in future correspondence

James R Nicks
Area Manager
DOE RFAO

3

27

STANDLEY LAKE SEDIMENT STUDY

AUGUST 1984

ROCKWELL INTERNATIONAL
GEORGE SETLOCK
MARK PARICIO
HS&E ENVIRONMENTAL ANALYSIS & CONTROL
SEPTEMBER 1984

4

SAMPLE COLLECTION SUMMARY
for the
STANDLEY LAKE PROJECT

On the dates between 7/31/84 and 8/9/84 members of the Environmental Analysis group under the direction of Dr George Setlock collected sediment grabs water samples and cores from Standley Lake located southeast of Rocky Flats Plant The lake was divided into four quadrants A B C and D from which grids of samples were taken The exact location of each sample was directed and determined by A Quintana of the Civil Engineering group using surveying techniques All samples were recorded in a log book along with their location time and date sample type sampler and any comments applicable to the particular sample

Sediment grabs were collected on all days of the sampling period 51 grabs were taken at predetermined sites from 7/31 to 8/7/84 On 8/8/84 five additional grabs were taken at areas which had been left unrepresented by the predetermined grab locations On 8/9/84 representatives from the City of Westminster joined the Rockwell team and collected grabs at seven locations of their determination using Rockwell equiptment Overall the deepest grab was taken at 86 5 (SL-10 8/3/84) the most shallow grab at 2 6" (SL-56 8/8/84) Two quarts of wet sediment were taken at each location except the Westminster sites where one quart of wet sediment was taken

Three water samples were taken all on 8/8/84 A location in Quadrant A was sampled at three depths to compose the water samples The total depth of the sample location was 73 9" Water samples were taken from depths of one foot (surface sample) 37 feet (mid sample) and 70 feet (bottom sample) Two gallons of water were taken at each location

Four core samples were collected Two cores were taken on 8/8/84 by the Rockwell team The two additional cores were taken in conjunction with the City of Westminster on 8/9/84 The maximum depth from which cores were drawn was 84 5" (SLKB-2 8/8/84) The minimum depth was 68' 0" (SLWM-60 8/9/84) The cores were of various lengths reflecting each location s susceptibility to the core sampling technique

5

Standley Lake Grab Samples

Grab #	Date Mo/Day/84	Time Hr Min	Depth Ft In
SL-1	8/2	12 55	8 00
SL-2	8/2	13 16	16 06
SL-3	8/3	9 40	30 00
SL-4	8/3	9 50	44 03
SL-5	8/6	9 22	51 08
SL-6	8/2	11 30	18 04
SL-7	8/2	13 30	34 03
SL-8	8/3	9 20	43 06
SL-9	8/3	10 00	79 04
SL-10	8/3	14 40	86 05
SL-11	8/6	9 33	61 11
SL-12	8/6	11 15	27 03
SL-13	8/2	10 00	14 08
SL-14	8/2	13 45	36 03
SL-15	8/2	14 10	46 10
SL-16	8/3	10 25	74 00
SL-17	8/3	14 20	64 00
SL-18	8/6	9 45	64 01
SL-19	8/6	10 43	30 08
SL-20	8/2	9 45	9 04

Grab #	Date Mo/Day/84	Time Hr Min	Depth Ft In
SL-21	8/1	14 30	38 03
SL-22	8/1	14 00	30 09
SL-23	8/3	10 55	60 10
SL-24	8/3	14 10	51 06
SL-25	8/6	10 16	51 07
SL-26	8/6	10 35	13 04
SL-27	8/1	10 45	21 11
SL-28	8/1	11 45	27 02
SL-29	8/3	13 45	64 06
SL-30	8/3	13 37	38 05
SL-31	8/3	13 30	25 11
SL-32	8/3	12 20	13 05
SL-33	8/1	10 10	27 05
SL-34	8/1	9 50	23 02
SL-35	8/7	10 41	50 07
SL-36	8/7	10 27	42 00
SL-37	8/3	12 50	20 08
SL-38	8/7	8 20	16 04
SL-39	7/31	11 35	17 02
SL-40	8/1	9 23	20 04

7

Grab #	Date Mo/Day/84	Time Hr Min	Depth Ft In
SL-41	8/7	10 56	40 09
SL-42	8/7	11 18	35 11
SL-43	8/7	11 41	17 05
SL-44	7/31	11 18	27 08
SL-45	7/31	11 04	25 03
SL-46	8/7	14 13	22 06
SL-47	8/7	14 30	22 01
SL-48	8/7	12 31	15 02
SL-49	8/7	13 59	12 10
SL-50	8/7	13 42	7 03
SL-51	8/7	13 20	8 00
SL-52	8/8	12 05	84 05
SL-53	8/8	13 15	48 08
SL-54	8/8	13 45	61 01
SL-55	8/8	14 02	35 00
SL-56	8/8	14 23	2 06

8

NOTICE:

"BEST AVAILABLE COPY"

PORTIONS OF THE FOLLOWING DOCUMENT ARE ILLEGIBLE

The Administrative Record Staff

Standley Lake Grab Samples

taken
in conjunction with
the
City of Westminster

Grab #	Date Mo/Day/84	Time Hr Min	Depth Ft In
SLWM-10	8/9	9 09	69 07
SLWM-10A	8/9	9 45	81 00
SLWM-20	8/9	11 25	53 00
SLWM-30	8/9	11 00	11 00
SLWM-40	8/9	13 17	11 07
SLWM-50	8/9	12 58	17 00
SLWM-60	8/9	12 10	68 00

9

Standley Lake Water Samples

Sample Name	Date Mo/Day/84	Time Hr Min	Depth Ft In
Surface	8/8	10 09	1 00
Mid	8/8	10 25	37 00
Bottom	8/8	10 30	70 00

10

Standley Lake Core Samples

Core #	Date Mo/Day/84	Time Hr Min	Depth Ft In
SLKB-1	8/8	11 18	77 00
SLKB-2	8/8	11 50	84 05
*SLWM-10A	8/9	10 34	81 00
*SLWM-60	8/9	12 10	68 00

* Denotes cores taken in conjunction with the City of Westminster

STANDLEY LAKE SEDIMENT STUDY

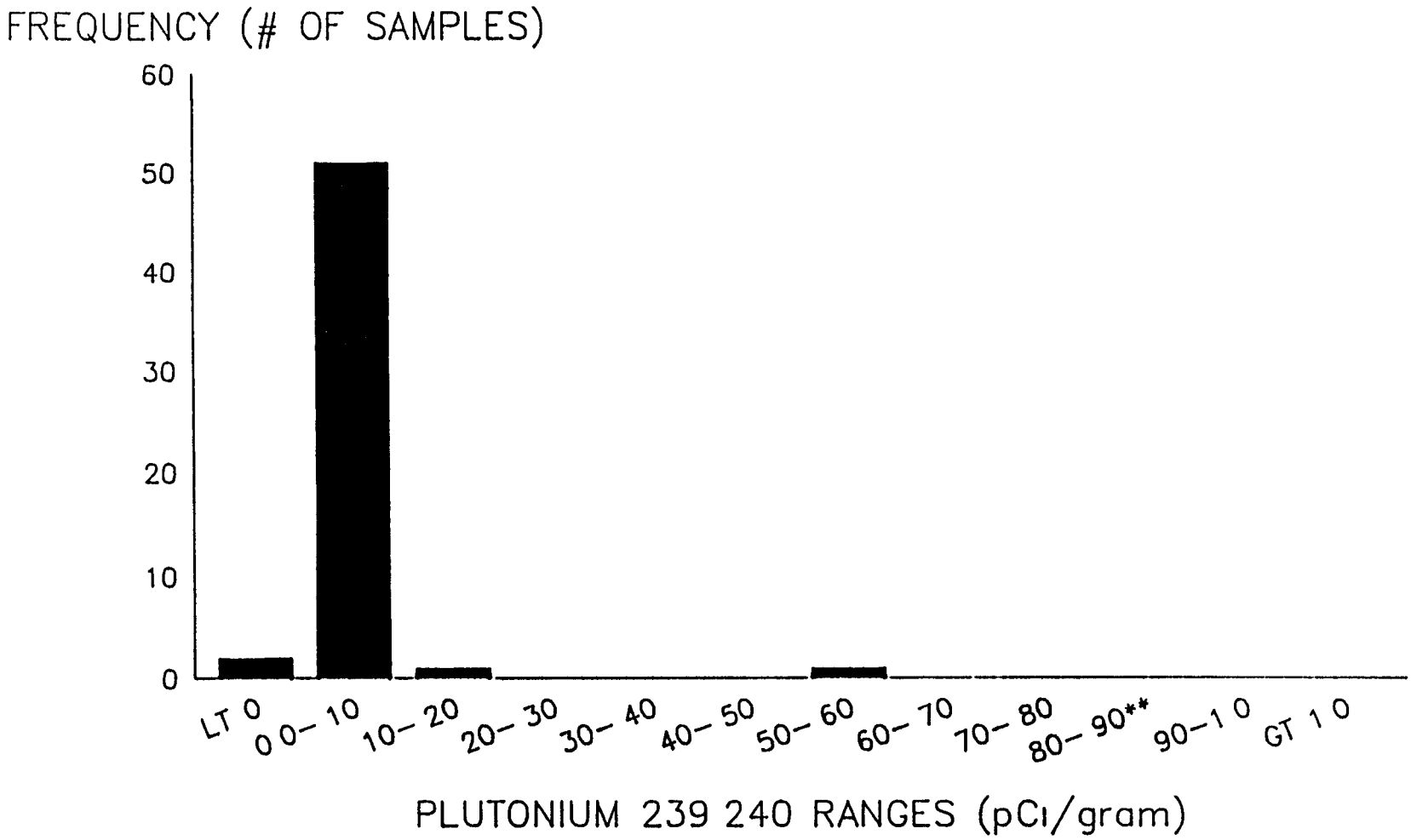
AUGUST, 1984

ROCKWELL INTERNATIONAL
HEALTH, SAFETY AND ENVIRONMENT
GEORGE H SETLOCK
MARK L PARICIO

2

STANDLEY LAKE SURFICIAL SEDIMENT SAMPLES

PLUTONIUM 239 240 CONCENTRATION DISTRIBUTION



RI STANDLEY LAKE SEDIMENT STUDY (8/84)
TOTAL SURFICIAL SAMPLES COLLECTED = 63
** CDH Pu CONSTRUCTION STD = 0 9 pCi/gram

13

STANDLEY LAKE SURFICIAL SEDIMENT SAMPLES
PLUTONIUM 239,240 ANALYTICAL RESULTS

	ROCKY FLATS LAB #	% RECOVERY OF RADIOTRACER SPIKE	Pu-239 240 (pCi/gram)
SL-1	29472	56	000 +/- 110
SL-2	29473	57	000 +/- 110
SL-3	29474	63	002 +/- 099
SL-4	29475	75	008 +/- 074
SL-5	29476	65	024 +/- 004
SL-6	29477	62	000 +/- 110
SL-7	29478	69	018 +/- 025
SL-8	29479	53	029 +/- 012
SL-9	29480	67	041 +/- 012
SL-10	29481	63	050 +/- 013
SL-11	29482	42	046 +/- 015
SL-12	29483	73	005 +/- 088
SL-13	29484	95	005 +/- 092
SL-14	29485	73	024 +/- 005
SL-15	29486	65	014 +/- 047
SL-16	29487	76	048 +/- 013
SL-17	29488	78	057 +/- 013
SL-18	29489	66	030 +/- 012
SL-19	29490	66	017 +/- 031
SL-20	29491	81	000 +/- 100
SL-21	29492	66	092 +/- 017

SEDIMENT SAMPLES COLLECTED IN AUGUST 1984

14

STANDLEY LAKE SURFICIAL SEDIMENT SAMPLES
PLUTONIUM 239,240 ANALYTICAL RESULTS

	ROCKY FLATS LAB #	% RECOVERY OF RADIOTRACER SPIKE	Pu-239 240 (pCi/gr n)
SL-22	29493	59	014 +/- 046
SL-23	29494	87	068 +/- 014
SL-24	29495	92	067 +/- 014
SL-25	29498	62	026 +/- 011
SL-26	29499	46	018 +/- 029
SL-27	29500	49	018 +/- 034
SL-28	29501	74	018 +/- 032
SL-29	29502	58	067 +/- 015
SL-30	29503	40	069 +/- 016
SL-31	29504	51	028 +/- 011
SL-32	29505	72	012 +/- 053
SL-33	29506	64	014 +/- 048
SL-34	29507	86	045 +/- 012
SL-35	29508	74	553 +/- 046
SL-36	29509	67	100 +/- 017
SL-37	29510	65	023 +/- 001
SL-38	29511	77	020 +/- 015
SL-39	29512	68	000 +/- 110
SL-40	29513	59	014 +/- 048
SL-41	29514	81	061 +/- 013
SL-42	29515	86	079 +/- 014

15 SEDIMENT SAMPLES COLLECTED IN AUGUST 1984

STANDLEY LAKE SURFICIAL SEDIMENT SAMPLES
PLUTONIUM 239,240 ANALYTICAL RESULTS

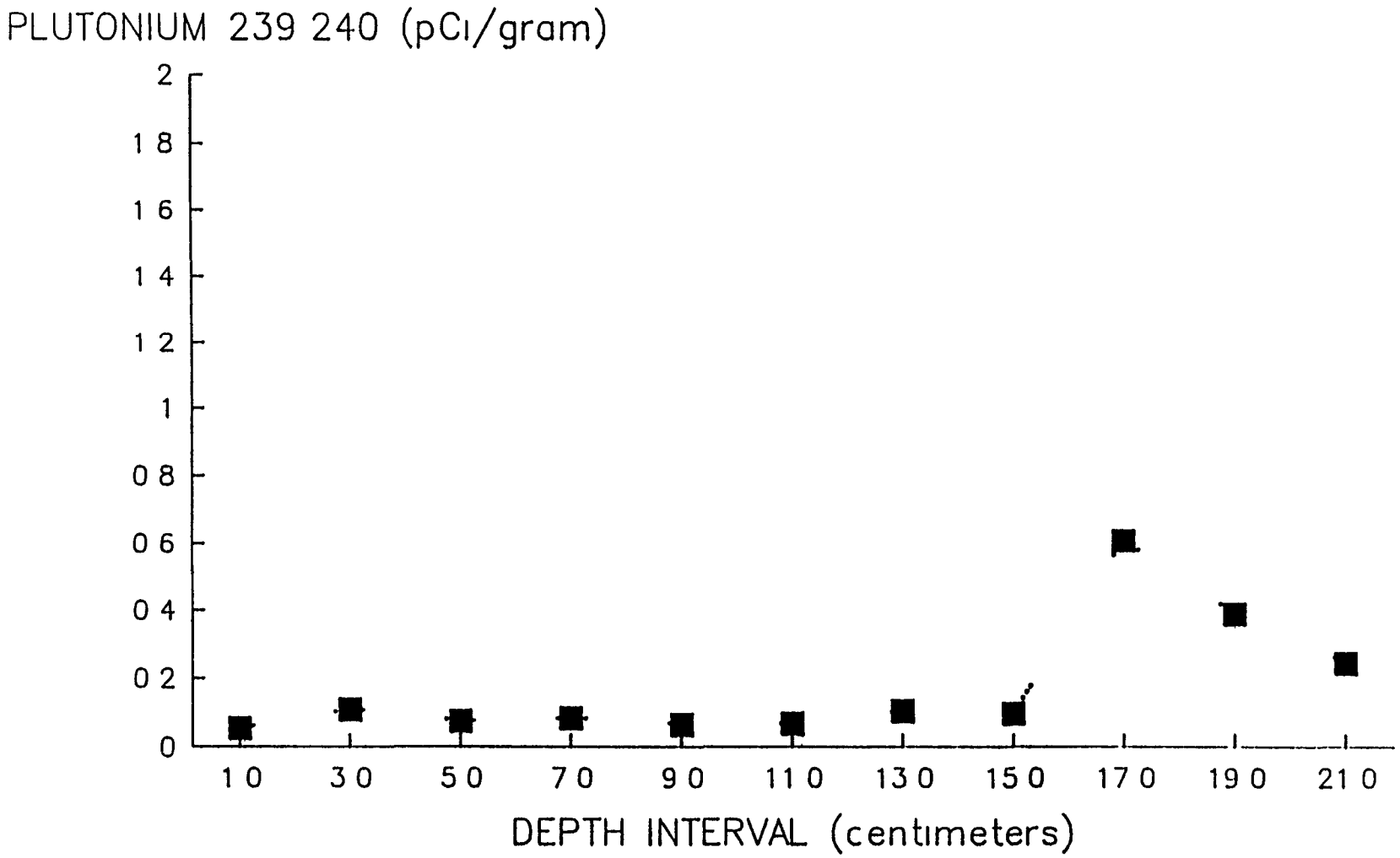
	ROCKY FLATS LAB #	% RECOVERY OF RADIOTRACER SPIKE	Pu-239 240 (pCi/gr m)
SL-43	29516	61	018 +/- 025
SL-44	29517	91	063 +/- 013
SL-45	29518	73	071 +/- 014
SL-46	29519	65	022 +/- 008
SL-47	29520	70	041 +/- 012
SL-48	29521	76	047 +/- 012
SL-49	31930	73	- 012 +/- 059
SL-50	31931	66	003 +/- 012
SL-51	31932	54	063 +/- 017
SL-52	31933	62	027 +/- 013
SL-53	31934	62	- 013 +/- 065
SL-54	31935	92	029 +/- 013
SL-55	31936	82	024 +/- 012
SL-56	31937	51	- 015 +/- 074
SLWM-10	31941	66	062 +/- 016
SLWM-10A	31942	61	028 +/- 013
SLWM-20	31943	81	015 +/- 006
SLWM-30	31944	76	- 015 +/- 076
SLWM-40	31945	38	- 004 +/- 024
SLWM-50	31946	32	- 011 +/- 057
SLWM-60	31947	42	025 +/- 013

16

SEDIMENT SAMPLES COLLECTED IN AUGUST 1984

STANDLEY LAKE SEDIMENT CORE SAMPLE KB1

PLOT OF Pu-239 240 VS SEDIMENT DEPTH



17

RI STANDLEY LAKE SEDIMENT STUDY (8/84)
CDH CONSTRUCTION STANDARD = 1 0 pCi/gram

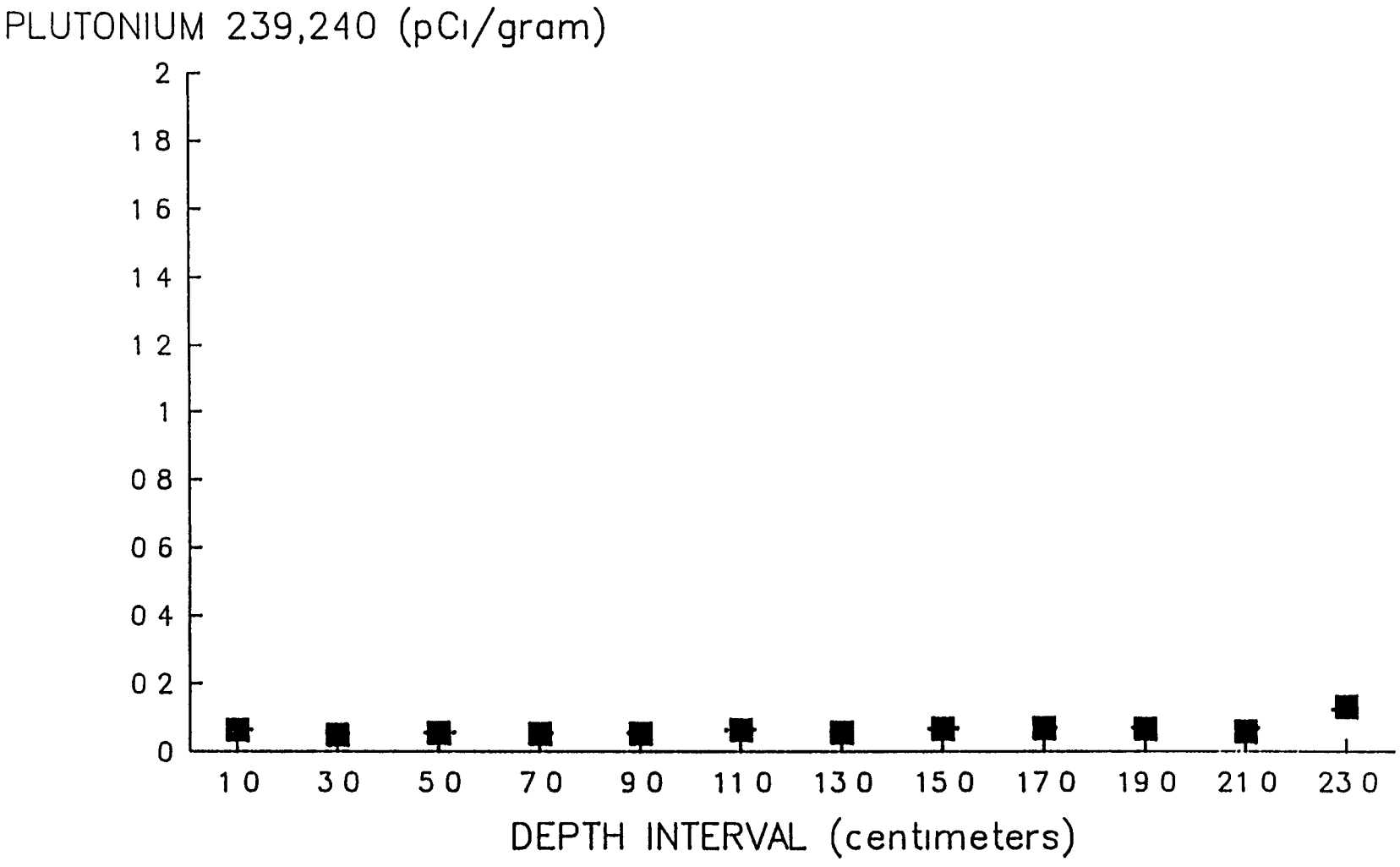
STANDLEY LAKE SEDIMENT CORE SAMPLE KB1
PLUTONIUM 239,240 ANALYTICAL RESULTS

	ROCKY FLATS LAB #	% RECOVERY OF RADIOTRACER SPIKE	Pu-239 240 (pCi/gram)
SL-KB1A (0 - 2 cm)	85002361	55	054 +/- 007
SL-KB1B (2 - 4 cm)	85002362	74	109 +/- 013
SL-KB1C (4 - 6 cm)	85002363	58	075 +/- 010
SL-KB1D (6 - 8 cm)	85002364	61	084 +/- 009
SL-KB1E (8 -10 cm)	85002365	51	065 +/- 008
SL-KB1F (10 -12 cm)	85002366	73	068 +/- 009
SL-KB1G (12 -14 cm)	85002367	60	105 +/- 014
SL-KB1H (14 -16 cm)	85002368	42	097 +/- 011
SL-KB1I (16 -18 cm)	85002369	57	607 +/- 056
SL-KB1J (18 -20 cm)	85002370	61	388 +/- 042
SL-KB1K (20 -22 cm)	85002371	56	244 +/- 025

18 SEDIMENT SAMPLES COLLECTED IN AUGUST 1984

STANDLEY LAKE SEDIMENT CORE SAMPLE KB2

PLOT OF Pu-239 240 VS SEDIMENT DEPTH



RI STANDLEY LAKE SEDIMENT STUDY (8/84)
CDH CONSTRUCTION STANDARD = 1 0 pCi/gram

STANDLEY LAKE SEDIMENT CORE SAMPLE KB2
PLUTONIUM 239,240 ANALYTICAL RESULTS

	ROCKY FLATS LAB #	% RECOVERY OF RADIOTRACER SPIKE	Pu-239 240 (pCi/gram)
SL-KB2A (0 - 2 cm)	85002372	55	064 +/- 008
SL-KB2B (2 - 4 cm)	85002373	72	049 +/- 007
SL-KB2C (4 - 6 cm)	85002374	51	055 +/- 007
SL-KB2D (6 - 8 cm)	85002375	48	052 +/- 007
SL-KB2E (8 -10 cm)	85002376	46	053 +/- 007
SL-KB2F (10 -12 cm)	85002377	46	064 +/- 008
SL-KB2G (12 -14 cm)	85002378	51	056 +/- 007
SL-KB2H (14 -16 cm)	85002379	58	067 +/- 009
SL-KB2I (16 -18 cm)	85002380	55	069 +/- 009
SL-KB2J (18 -20 cm)	85002381	59	067 +/- 008
SL-KB2K (20 -22 cm)	85002382	49	059 +/- 009
SL-KB2L (22 -24 cm)	85002383	37	132 +/- 015

20 SEDIMENT SAMPLES COLLECTED IN AUGUST 1984

PLUTONIUM SOIL STANDARD ANALYSES
STANDLEY LAKE SEDIMENT STUDY SAMPLES

	ROCKY FLATS LAB #	% RECOVERY OF RADIOTRACER SPIKE	Pu-239 240 (pCi/gram)
SOIL BLANK	19260	82	-003 +/- 007
SOIL BLANK	19261	37	-004 +/- 010
SOIL BLANK	29497	58	-024 +/- 120
SOIL BLANK	85002386	31	001 +/- 001
SOIL BLANK	85002412	68	003 +/- 002
SOIL STANDARD 601220	19258	81	810 +/- 056
SOIL STANDARD 601220	29496	87	830 +/- 059
SOIL STANDARD 601220	31949	75	870 +/- 066
SOIL STANDARD 601220	85002384	61	893 +/- 070
SOIL STANDARD 601220	85002410	83	938 +/- 078
SOIL STANDARD 601221	19259	76	3 100 +/- 190
SOIL STANDARD 601221	29522	86	3 200 +/- 200
SOIL STANDARD 601221	31950	78	3 000 +/- 210
SOIL STANDARD 601221	85002385	67	3 381 +/- 248
SOIL STANDARD 601221	85002411	76	3 637 +/- 365

RFP Pu SOIL STDS PREPARED FROM NBS PRIMARY STD
SOIL STANDARD 601220 = 900 +/- 180
SOIL STANDARD 601221 = 3 514 +/- 090

21

STANDLEY LAKE

POST STUDIES

- EPA CONDUCTED A SEDIMENT STUDY IN SEPTEMBER, 1970
  SCOPE - 2 SURFACE GRABS + 2 SEDIMENT CORES
  MAXIMUM PU-239 CONCENTRATION = 37 PCI/GRAM

- EPA CONDUCTED ANOTHER SEDIMENT STUDY IN SEPTEMBER, 1973
  EXPANDED SCOPE - 17 SURFACE GRABS + 8 SEDIMENT CORES
  MAXIMUM PU-239 CONCENTRATION = 17 PCI/GRAM

- BATTELLE'S PACIFIC NORTHWEST LAB CONDUCTED A SEDIMENT STUDY IN MAY, 1974
  SCOPE - 8 SURFACE GRABS
  MAXIMUM PU-239 CONCENTRATION = 29 PCI/GRAM

ROCKWELL STUDY

- ROCKWELL CONDUCTED A SEDIMENT STUDY TO UPDATE PREVIOUS STANDLEY LAKE STUDIES IN AUGUST, 1984
  SCOPE - 63 SURFACE GRABS + 2 SEDIMENT CORES
  MAXIMUM PU-239 CONCENTRATION = 61 PCI/GRAM

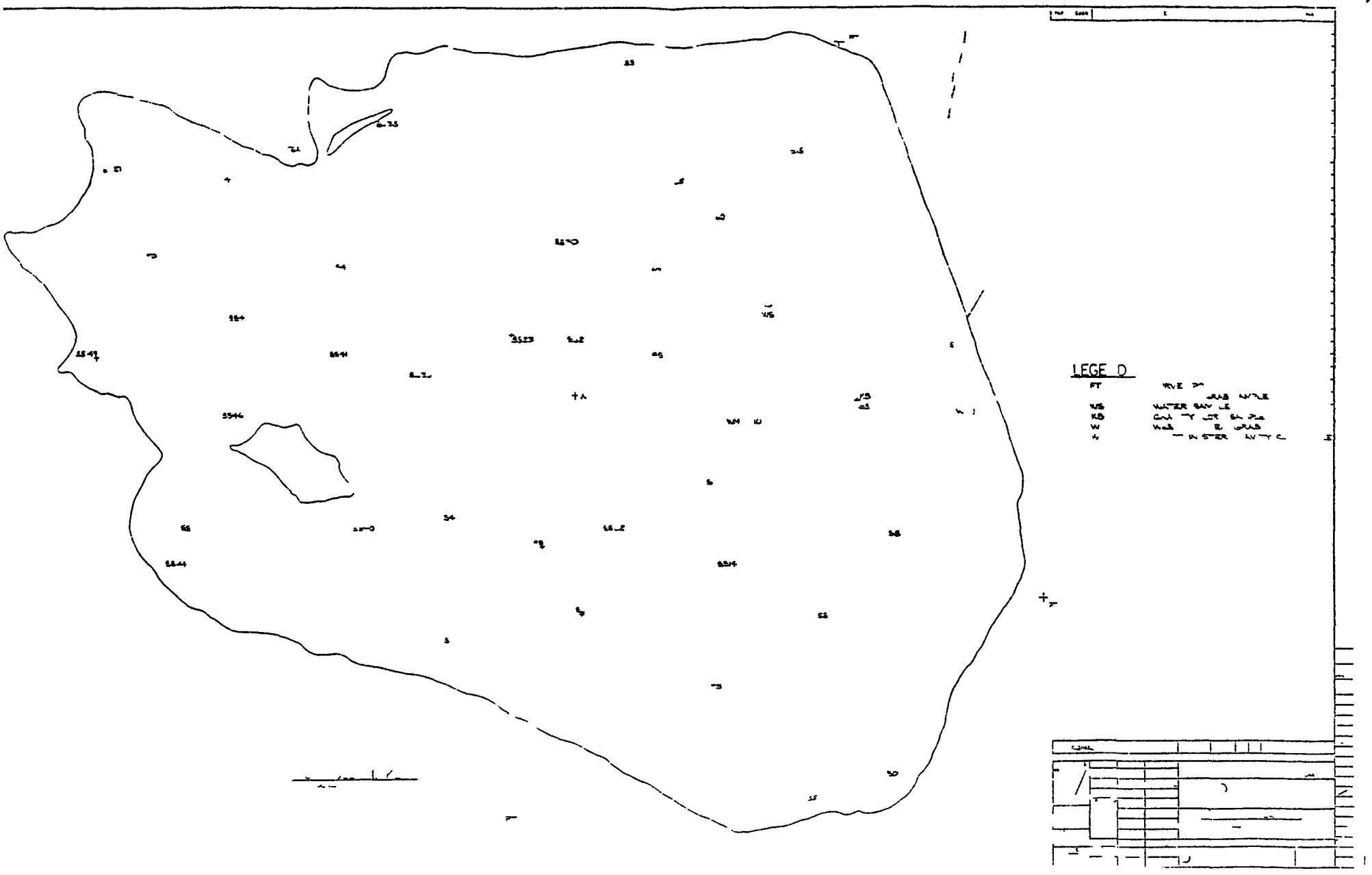
STANDLEY LAKE SEDIMENT STUDY

SUMMARY

- o ROCKWELL'S 1984 STUDY OF STANDLEY LAKE SEDIMENTS UPDATED STUDIES CONDUCTED BY EPA/BATTELLE IN 1970'S

- o LEVELS OF PLUTONIUM IN SEDIMENTS HAVE REMAINED AT LOW LEVELS CONSISTENT WITH ATMOSPHERIC FALLOUT (1950-70'S WEAPONS TESTS)

- o NATURALLY OCCURRING RADIUM-226 CONCENTRATIONS ARE 100-1000X THOSE OF PU-239 AND REPRESENT A GREATER CONTRIBUTION TO PUBLIC RADIATION EXPOSURE THAN THE TRACES OF PLUTONIUM-239 (BATTELLE-1974)


LEGE D
FT
WS
KB
W

Plutonium-239 Activities of Standley Lake Cores

DEPTH (cm)	SLKB1 Core (pCi/gm)	+/-	SLKB2 Core (pCi/gm)	+/-
0 to 2	0 10	0 02	0 12	0 02
2 to 4	0 20	0 03	0 09	0 02
4 to 6	0 15	0 02	0 10	0 02
6 to 8	0 18	0 02	0 10	0 01
8 to 10	0 12	0 02	0 10	0 02
10 to 12	0 13	0 02	0 12	0 02
12 to 14	0 21	0 03	0 10	0 02
14 to 16	0 14	0 02	0 13	0 02
16 to 18	1 33	0 12	0 13	0 02
18 to 20	0 84	0 09	0 13	0 02
20 to 22	0 52	0 06	0 06	0 01
22 to 24			0 13	0 02
24 to 26				

DEPTH (cm)	SLWM10A Core (pCi/gm)	+/-	SLWM60 Core (pCi/gm)	+/-
0 to 2	0 11	0 02	0 13	0 02
2 to 4	0 14	0 02	0 19	0 02
4 to 6	0 10	0 02	0 14	0 02
6 to 8	0 14	0 02	0 18	0 02
8 to 10	0 13	0 02	0 15	0 02
10 to 12	0 14	0 02	0 18	0 02
12 to 14	0 12	0 02	0 27	0 03
14 to 16	0 20	0 02	no data	
16 to 18	0 17	0 02	12 14	1 18
18 to 20	0 12	0 02	0 32	0 03
20 to 22	0 13	0 02		
22 to 24	1 61	0 13		
24 to 26	0 80	0 08		

Blank Corrected

25

HEALTH, SAFETY AND ENVIRONMENT LABORATORIES
AUTOMATED INFORMATION SYSTEM
ANALYTICAL REPORT

EXPERIMENTAL SOILS -- NOT BLANK CORRECTED

DATA VALIDATED AND APPROVED BY

SAMPLE NUMBER	LOCATION	% REC	DPM/GM PU239	DPM/GM Pu-239 Blank 6
84031930	SL-49	71	0 03 +/- 0 01	0.01 ± 0.01
84031934	SL-53	43	0 03 +/- 0 01	0.01 ± 0.01
84031937	SL-56	29	0 13 +/- 0 02	0.11 ± 0.02
84031943	SLWM-20	45	0.09 +/- 0 01	0.07 ± 0.01
84031944	SLWM-30	37	0 08 +/- 0 01	0.06 ± 0.01
84031945	SLWM-40	43	0 04 +/- 0 01	0.02 ± 0.01
84031946	SLWM-50	45	0 04 +/- 0 01	0.02 ± 0.01
84031948	~~Control~~ Background Blank	74	0 05 +/- 0 01	
85002361	SLKB-1	55	0 12 +/- 0 02	0.10 ± .02
85002362	SLKB-2	74	0 22 +/- 0 03	0.20 ± .03
85002363	SLKB-3	58	0 17 +/- 0 02	0.15 ± .02
85002364	SLKB-4	61	0 19 +/- 0 02	0.17 ± .02
85002365	SLKB-5	51	0 14 +/- 0 02	0.12 ± .02
85002366	SLKB-6	73	0 15 +/- 0 02	0.13 ± .02
85002367	SLKB-7	60	0 23 +/- 0 03	0.21 ± .03
85002368	SLKB-8	42	0 16 +/- 0 02	0.14 ± 0.02
85002369	SLKB-9	57	1 35 +/- 0 12	1.33 ± 0.12
85002370	SLKB-10	61	0 86 +/- 0 09	0.84 ± .09
85002371	SLKB-11	56	0 54 +/- 0 06	0.52 ± .06
85002372	SLKB-12	55	0 14 +/- 0 02	0.12 ± .02

26

HEALTH, SAFETY AND ENVIRONMENT LABORATORIES
AUTOMATED INFORMATION SYSTEM
ANALYTICAL REPORT

EXPERIMENTAL SOILS -- NOT BLANK CORRECTED

DATA VALIDATED AND APPROVED BY

SAMPLE NUMBER	LOCATION	/ REC	DPM/GM PU239	DPM/GM Pu-239 Blank Corrected
85002373	SLKB-13	72	0 11 +/- 0 02	0.09 ± .02
85002374	SLKB-14	51	0 12 +/- 0 02	0 10 ± .02
85002375	SLKB-15	48	0 12 +/- 0 01	0 10 ± 01
85002376	SLKB-16	46	0 12 +/- 0 02	0 10 ± 02
85002377	SLKB-17	46	0 14 +/- 0 02	0 12 ± 02
85002378	SLKB-18	51	0 12 +/- 0 02	0 10 ± 02
85002379	SLKB-19	58	0 15 +/- 0 02	0 13 ± .02
85002380	SLKB-20	55	0 15 +/- 0 02	0.13 ± 02
85002381	SLKB-21	59	0 15 +/- 0 02	0 13 ± .02
85002382	SLKB-22	45	0 08 +/- 0 01	.06 ± .01
85002383	SLKB-23	37	0 15 +/- 0 02	.13 ± 02
85002384	Control	61	1 98 +/- 0 16	1 96 ± 0 16
85002385	Control	67	7 53 +/- 0 55	7.51 ± 55
85002386	Reagent Blank	31	0 00 +/- 0 00	0 11 ± 02
85002387	SLKB-24	54	0 13 +/- 0 02	0.11 ± 02
85002388	SLKB-25	43	0 16 +/- 0 02	0 14 ± 02
85002389	SLKB-26	51	0 12 +/- 0 02	0.10 ± .02
85002390	SLKB-27	47	0 16 +/- 0 02	0.14 ± 02
85002391	SLKB-28	51	0 15 +/- 0 02	0 13 ± .02
85002392	SLKB-29	46	0 16 +/- 0 02	0 14 ± .02

HEALTH, SAFETY AND ENVIRONMENT LABORATORIES
AUTOMATED INFORMATION SYSTEM
ANALYTICAL REPORT

EXPERIMENTAL SOILS -- NOT BLANK CORRECTED

DATA VALIDATED AND APPROVED BY

SAMPLE NUMBER	LOCATION	/ REC	DPM/GM PU239	DPM/GM Pu 239 Blank Corrected
85002393	SLKB-30	28	0 14 +/- 0 02	0 12 ± 02
85002394	SLKB-31	35	0 22 +/- 0 02	0 20 ± .02
85002395	SLKB-32	22	0 19 +/- 0 02	0 17 ± .02
85002396	SLKB-33	37	0 14 +/- 0 02	0 12 ± 02
85002397	SLKB-34	34	0 15 +/- 0 02	0 13 ± 02
85002398	SLKB-~~9835~~	40	1 63 +/- 0 13	1 61 ± 0 13
85002399	SLKB-36	33	0 82 +/- 0 08	0.8 ± 0.08
85002400	SLKB-37	40	0 15 +/- 0 02	0 13 ± 02
85002401	SLKB-38	34	0 21 +/- 0 02	0 19 ± 02
85002402	SLKB-39	61	0 16 +/- 0 02	0 14 ± 02
85002403	SLKB-40	67	0 20 +/- 0 02	0.18 ± .02
85002404	SLKB-41	76	0 17 +/- 0 02	0.15 ± .02
85002405	SLKB-42	49	0 20 +/- 0 02	0.18 ± 02
85002406	SLKB-43	67	0 29 +/- 0 03	0 27 ± .03
85002407	SLKB-44	840801 840830	PLUTONIUM DATA UNAVAILABLE	
85002408	SLKB-45	40	12 16 +/- 1 18	12 14 ± 1 18
85002409	SLKB-46	62	0 34 +/- 0 03	0 32 ± 03
85002410	Control	83	2 08 +/- 0 17	2.06 ± 17
85002411	Control	76	8 07 +/- 0 81	8.05 ± 81
85002412	Reagent Blank	68	0 01 +/- 0 00	

HEALTH SAFETY AND ENVIRONMENT LABORATORIES
AUTOMATED INFORMATION SYSTEM
ANALYTICAL REPORT

EXPERIMENTAL SOILS -- NOT BLANK CORRECTED

DATA VALIDATED AND APPROVED BY

SAMPLE NUMBER	LOCATION	/ REC	DPM/GM PU239		DPM/GM Pu-239 Blank Corrected
85002432	GWDD1 1	65	0 67 +/-	0 07	0 65 ± 07
85 02433	GWDD1-2	44	0 90 +/-	0 07	0 88 ± 07
85 02434	GWDD1-3	62	2 60 +/-	0 26	2 58 ± 0 26
85002435	GW D1 4	57	6 84 +/-	0 55	6 82 ± 55
85002436	GWDD1-5	59	12 98 +/-	1 07	12 96 ± 1 07
85002437	GWDD1 6	62	14 32 +/-	1 12	14 30 ± 1 12
85002438	GWDD1 7	59	6 39 +/-	0 47	6 37 ± 0 47
85002439	GWDD1 8	53	3 33 + -	0 26	3 31 ± .26
85002440	GWDD1-9	47	3 70 +/-	0 28	3 68 ± .28
85002441	Control	51	2 28 +/-	0 18	2 26 ± .18
85002442	Control	57	9 22 +/-	0 72	9 20 ± 72
85002~~497~~	SLKB 44	~~84080~~ 11	~~840830~~ 03 ± #	0 ~~PLUTONIUM DATA UNAVAILABLE~~	
85004646	SLKB-47	58	1 75 +/-	0 16	1 73 ± .16
85004647	SLKB-48	53	1 76 +/-	0 14	1 74 ± 14
85007043	SLKB-35-A	35	1 05 +/-	0 11	1 03 ± 11
85007084	Reagent Blank	14	0 01 +/-	0 00	
85007085	Reagent Blank	52	0 01 +/-	0 00	

29

HEALTH SAFETY AND ENVIRONMENT LABORATORIES
AUTOMATED INFORMATION SYSTEM
ANALYTICAL REPORT

ENVIRONMENTAL SEDIMENTS -- NOT BLANK CORRECTED

DATA VALIDATED AND APPROVED BY

SAMPLE LOCATION NUMBER	% REC	DPM/GM PU239			
84 31948	74	0 05	+ -	0 01	1
85002386	31	0 00	+/-	0 00	2
85002412	68	0 01	+ -	0 00	3
85007084	4	0 01	+ -	0 00	4
85007085	52	0 0	+/-	0 00	5
					6
85002443	11	0 03	±	0	

Average BLK 02

30

LAB NO	USER DESTINATION	ORIGINATOR	DATE RECEIVED	DATE ANALIZED	ANALYST	PU ANALYSIS REC 90	Pu 239 Pci/gr	Pu 238 Pci/gr	Am ANALYSIS REC 90	LLI
84031933	SL 52	G SETLOCK	8 1-84			62	027 ± 013	009 ± 006		
31934	SL 53					62	-013 ± 065	008 ± 008		
31935	SL 54					92	029 ± 013	014 ± 006		
31936	SL 55					82	024 ± 012	016 ± 006		
31937	SL 56					51	-015 ± 074	025 ± 009		
31938	GWST 2		10 1 84			73	018 ± 024	016 ± 006		
31939	GWST 3					82	017 ± 022	019 ± 006		
31940	GWST 4					81	018 ± 023	015 ± 006		
31941	SLWM 10					66	062 ± 016	007 ± 005		
31942	SLWM -10a					61	028 ± 013	010 ± 006		
31943	SLWM 20						Lost			
31944	SLWM -30					76	-015 ± 076	013 ± 006		
31945	SLWM -40					38	-004 ± 024	013 ± 007		
31946	SLWM 50					32	-011 ± 057	011 ± 007		
31947	SLWM -60					42	025 ± 013	011 ± 006		
31948	601224 BLANK 1					82	-005 ± 027	008 ± 005		
31949	601220 CONTROL 1					75	087 ± 066	008 ± 005		
31950	601221 CONTROL 2					78	3.0 ± 021	009 ± 005		

LAB NO	USER DESIGNATION	ORIGINATOR	DATE RECEIVED	DATE ANALIZED	ANAL. WT	Pu ANALYSIS REC %	Pu 239 pCi/g	Pu 238 pCi/g	Am ANALYSIS REC %	Am 241 pCi/g
14029491	SL 20	G SETLOCK	7 1 84 (11 8 84)			81	-021 ± 010	011 ± 005		
29492	SL-21					66	069 ± 017	014 ± 006		
29493	SL 22					59	-009 ± 046	013 ± 007		
29494	SL-23					87	045 ± 014	008 ± 005		
29495	SL 24					92	044 ± 014	014 ± 006		
29496	CONTROL 1 601220					87	083 ± 059	011 ± 005		
29497	BLANK 1					58	-024 ± 012	011 ± 006		
29498	SL 25					62	003 ± 011	010 ± 006		
29499	SL 26					46	-005 ± 029	008 ± 006		
29500	SL 27					49	-006 ± 034	014 ± 007		
29501	SL 28					74	-006 ± 032	009 ± 005 ~~090 ± 058~~		
29502	SL 29					58	044 ± 015	019 ± 007		
29503	SL 30					40	046 ± 016	021 ± 008		
29504	SL-31					51	005 ± 011	011 ± 005		
29505	SL 32					72	-011 ± 053	013 ± 006		
29506	SL-33					64	-009 ± 048	007 ± 005		
29507	SL-34					86	022 ± 012	012 ± 005		
29508	SL 35					74	053 ± 046	020 ± 006		
29509	SL-36					67	077 ± 017	014 ± 006		
29510	SL-37					65	-0001 ± 0006	008 ± 005		
29511	SL-38					77	-003 ± 015	007 ± 005		
29512	SL-39					68	-022 ± 011	012 ± 006		
29513	SL-40					59	-009 ± 048	006 ± 005		
29514	SL-41					81	038 ± 013	009 ± 005		
29515	SL-42					86	056 ± 014	012 ± 005		
29516	SL-43					61	-005 ± 025	011 ± 006		
29517	SL-44					91	048 ± 012	009 ± 005		

29494	SL-23					87	.045+ 014	008+ 005
29495	SL 24					92	.044± .014	.014+ .006
29496	CONTROL 1 601220					87	083+ 059	011+ 005
29497	BLANK 1					58	-024± 012	011+ 006
29498	SL-25					62	003+ 011	010+ 006
29499	SL 26					46	-005± 029	008+ 006
29500	SL 27					49	-006+ 034	014+ 007
29501	SL 28					74	-006+ 032	009 005 ~~090± 058~~
29502	SL 29					58	044± 015	019+ 007
29503	SL 30					40	046+ 016	021+ 008
29504	SL-31					51	005+ 011	011+ 005
29505	SL 32					72	-011± 053	013+ 006
29506	SL-33					64	-009± 048	007± 005
29507	SL-34					86	022+ 012	012+ 005
29508	SL-35					74	053+ 046	020+ 006
29509	SL-36					67	077+ 017	014± 006
29510	SL-37					65	-0001+ 0006	008+ 005
29511	SL-38					77	-003+ 015	007+ 005
29512	SL-39					68	-022+ 011	012+ 006
29513	SL-40					59	-009+ 048	006+ 005
29514	SL-41					81	038+ 013	009± 005
29515	SL-42					86	.056+ 014	012+ 005
29516	SL-43					61	-005+ 025	011+ 006
29517	SL-44					91	040+ 013	008+ 005
29518	SL-45					73	048+ 014	008+ 005
29519	SL-46					65	-001+ 008	011+ 006
29520	SL-47					70	018+ 012	007+ 005
29521	SL-48 +					76	024+ 012	007+ 005
29522	CONTROL 2 601221					86	32+ 0 20	007+ 005
29523	BLANK 2						LOST	
19 30	SL 49	G SETLOCK	81 84			73	-012± 059	009± 006
19 31	SL 50					66	.003± .012	049+ .012
19 32	-51					54	.063+ 017	015± 009

33

LAB NO	USER DESIGNATION	ORIGINATOR	DATE RECEIVED	DATE ANALYZED	ANAL WT	REC %	Pu 239 pCi/gr	Pu 238 pCi/gr	REC %	Am 24 pCi/gr	
19250	RF/EAC 25	G SETLOCK	6 27 84			75	015 ± 010	046 ± 010			
19251	26					72	019 ± 013	056 + 011			
19252	27					75	020 + 023	009 ± 006			
19253	28					89	023 + 025	014 + 005			
19254	29					70	075 + 062	022 + 007			
19255	30					71	010 + 078	038 + 009			
19256	31					63	010 ± 082	030 + 008			
19257	32					89	011 + 017	009 + 008			
19258	STD 601220					81	081 ± 056	009 + 006			
19259	STD 601221					76	031 ± 019	008 + 005			
19260	BLK 601224 1					82	-003 + 007	006 ± 005			
19261	BLK 601224 2					37	-004 + 010	005 + 016			
22191	707 SW 1S	C ILLSLEY	7 30 84			~~69~~					U 69%
22192	707 SW 1N										76
22193	707 SW 2N										74
22194	707 SW 3S										77
22196	707 BLANK										64
29472	SL 1	G SETLOCK	7 1 84 (11 8 84)			56	-023 + 011	018 + 009			
29473	SL 2					57	-021 + 011	006 ± 010			
29474	SL-3					63	-020 + 099	008 + 005			
29475	SL 4					75	-015 + 074	004 ± 007			
29476	SL-5					65	0008 ± 004	012 + 006			
29477	SL 6					62	-021 ± 011	006 + 008			
29478	SL 7					69	-005 + 025	005 + 005			
29479	SL-8					53	006 + 012	014 ± 009			
29480	SL-9					[illegible]	[illegible]	[illegible]			

34

19255	30					[illegible]	[illegible]	[illegible]			
19256	31					63	01.0±.082	030±.008			
19257	32					89	0.11+.017	.009+.008			
19258	STD 601220					81	0.81±.056	.009+.006			
19259	STD 601221					76	031±0.19	.008±.005			
19260	BLK 601224 1					82	-003±007	006±005			
19261	BLK 601224 2					37	-004+010	005+016			
022191	707 SW 1S	C ILLSLEY	7 30 84			~~69~~	~~0~~				u 6
22192	707 SW 1N										1
22193	707 SW 2N										7
22194	707 SW 3S										7
22195	707 BLANK										6
29472	SL 1	G SETLOCK	7 1 84 (11 8 84)			56	-023+011	018+009			
29473	SL 2					57	-021+011	006±010			
29474	SL 3					63	-020+.099	008+005			
29475	SL 4					75	-015+074	004±007			
29476	SL-5					65	0008+004	012+006			
29477	SL 6					62	-021+011	006+008			
29478	SL 7					69	-005+025	005+005			
29479	SL-8					53	.006+012	014±009			
29480	SL-9					67	018+012	013+007			
29481	SL-10					63	027+013	012+006			
29482	SL-11					42	023+015	013+007			
29483	SL-12					73 ~~99~~	-018±088 ~~-018±.088~~	010±009 ~~010±009~~			
29484	SL-13					95	-018±092	015+006			RP
29485	SL-14					73	001+005	014+006			
29486	SL-15					65	-009+047	018+007			
29487	SL 16					76	025+013	011+006			
29488	SL-17					78	034±013	014±006			
29489	SL-18					66	007+.012	.011+.006			
29490	SL 19					66	-.006±031	011+006			

35

#	USER DESIGNATION	ORIGINATOR	DATE RECEIVED	DATE ANALYZED	ANAL. WT	REC %	Pu239 Pci/gr	Pu 238 Pci/gr	REC %	Am 241 Pci/gr
2851	A3 EG 8	G SETLOCK	12 13 83	2/18/83		62	.625±.057	≤.041 -.027±.013		
2852	A2 A3-STREAM					58	1.10±.09	≤.04 -.017±.013		
2853	A3 KB 1					50	22.5±1.80	.56±.06		
2854	A3 KB 2					62	2.76±.20	≤.040 .018±.016		
2855	BLANK					70	-.103±.239	.103±.239		
2856	A3 KB 3					65	1.36±.10	≤.038 -.013±.013		
2857	A3 KB 4					88	1.72±.110	≤.029 -.004±.013		
2858	A4 SS1					74	.082±.017	.113±.021		
2859	A4 SS1(LT/GT)				10	72	≤.017 .006±.008	≤.034 -.045±.011		
2860	A4 SS2					82	.078±.014	≤.030 -.026±.012		
2861	A4 SS3					58	.086±.016	≤.043 .003±.012		
2862	A4 SS4					48	.057±.016	≤.053 -.035±.013		
2863	A4 ESS1					71	.301±.032	≤.036 -.035±.012		
2864	A4 ESS2					33	.506±.066	≤.076 -.035±.015		
2865	A4 ESS3					53	.252±.033	≤.048 .039±.013		
2866	A4 ESS4					55	1.47±.12	≤.045 -.006±.014		
2867	A4 ESS5					67	.702±.056	≤.037 -.021±.013		
2868	A4 ESS6					71	.228±.020	≤.037 -.041±.013		
2869	A4 ESS7					87	1.14±.09	≤.029 -.008±.013		
2870	A4 KB1					50	.566±.054	≤.049 .025±.013		
2871	A4 KB2					48	.198±.026	≤.032 -.033±.012		
2872	A4 KB3					78	.621±.052	≤.032 .024±.012		
2873	A4 KB4					50	2.51±.19	5.84±.060		
2874	BLANK					69	.275±.098 DPM	.092±.080 DPM		
2996	QAP SOIL SAMPLE									
2882	1 SOIL RF BUFFERZONE	TF WINSOR	5 26 83			55	3.15±.152	.064±.007		
2883	2					60	3.03±.109	.048±.006		
2884	3					31	.071±.008	-.003±.004		
2885	4					31	.028±.006	-.005±.005		
2886	5					59	4.52±.170	.065±.007		

36

						72	.009 ± .010	.014 + .006	
21	23 324				794.5	85	.077 ± .015	.016 ± .006	
						65	.079 ± .018	.011 ± .006	
22	23 342				770 5	84	0 15 ± 022	017 + 009	
						78	0.11 ± .018	.015 + .007	
0323	82 360				623	63	017 + 012	009 ± 006	
						77	030 + 013	012 + 007	
19226	RF/EAC	1	G SETLOCK	6 27 84		75	025 + 026	016 + 006	
19227		2				75	0 39 + 036	018 + 008	
19228		3				75	0 95 + 069	027 + 008	
19229		4				70	014 + 099	039 + 009	
19230		5				72	016 + 011	050 ± 011	
19231		6				94	021 + 013	063 + 011	
19232		7				68	037 + 025	089 + 014	
19233		8				81	03 8 ± 023	097 ± 014	
19234		9				55	054 + 039	012 + 019	
19235		10				90	033 + 019	075 + 011	
19236		11				74	0.19 + 023	018 ± 006	
19237		12				84	0 18 + 021	012 + 005	
19238		13				75	016 + 020	009 + 004	
19239		14				73	014 + 019	.018 + 006	
19240		15				76	0.17 + 022	017 ± 006	
19241		16				119	0 63 + 050	024 + 007	RC PU
19242		17				82	097 + 067	033 + 007	
19243		18				88	013 + 088	032 + 007	
19244		19				68	016 + 021	013 + 006	
19245		20				80	018 + 022	013 + 005	
19246		21 ~~22~~ dn				87	014 + 018	009 + 005	
19247		22 ~~23~~ dn				79	024 ± 024	015 + 005	
19248		23 ~~24~~ dn				79	013 + .088	.041 + .009	
19249		24 ~~25~~ dn				82	0 75 ± 057	021 ± .007	

Blank	11260	02	- 003 ± 001
Blank	19261	37	- 004 ± 010
~~Blank~~	~~29497~~	~~58%~~	~~- .024 ± .020~~ OK
Blank	85012386	31	001 ± 001
Blank	85002412	68%	003 ± 012
601220			
Standard V	85012384	61%	893 ± 070
Standard V	85002410	83%	938 ± 078
Standard 1	31949	75	870 ± 066
Standard X	29496	87	830 ± 059
Standard	19258	81	810 ± 056
601221			
Standard X	85002385	67%	3 381 ± 248
Standard X	85002411	76%	3 637 ± 365
Standard X	31950	78%	3 00 ± 210
Standard X	29522	86%	3200 ± 200
	19259	76%	3 100 ± .190

3 514 ± 090

900 ± 180

Prepared from NBS Pu-239 Primary Std

~~Prepared from~~

2 22 dpm/pC

Sol Standard X = 900 ± 180

Sol Standard Z = 3514 ± 010

38

STANDLEY LAKE CORES

SAMPLE/LABEL KEY

Typed Label #	Standley Lake Core Sample # (log # + core # run)
EAC-SLKB1	SLKB1-#1
EAC-SLKB-2	SLKB1-#2
" -3	" " -#3
-4	#4
-5	-#5
-6	-#6
-7	-#7
-8	-#8
-9	-#9
-10	-#10
-11	-#11
12	SLKB2-#1
-13	SLKB2-#2
-14	" " -#3
-15	" -#4
-16	" -#5
-17	-#6
-18	" " -#7
-19	-#8
-20	" " -#9
-21	" -#10
-22	" " -#11
-23	" " -#12

Typed Label #	Standley Lake Core Sampl # (log # + 2 m s #
EAC - SLKB-24	SLWM 1CA # 1
EAC - SLKB-25	SLWM 1) A-# 2
-26	-# 3
-27	-# 4
-28	-# 5
-29	-# 6
-30	-# 7
-31	-# 8
-32	-# 9
-33	# 10
-34	-# 11
-35	-# 12
-36	-# 13
EAC - SLKB - 37	SLWM 60 - # 1
EAC - SLKB - 38	SLWM 60 - # 2
-39	-# 3
-40	-# 4
41	# 5
-42	-# 6
-43	-# 7
-44	-# 8
-45	-# 9
-46	-# 10

40

9A103

Rockwell International

Energy Systems Group
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80401

ANALYTICAL REPORT

To
G H Setlock
Mark Paricio
T452B
cc
C Trice
D L Bokowski

Account No

Date 1/8/85

Lab No

Reported by M T Jameson

Approved D Bokowski

Sample Description
Standley Lake Samples

Analysis Results

pCi/gm

SAMPLE NO	SAMPLE DESIGNATION	% REC	Pu-239	Pu-238
29472	SL-1	56	00 ±0 11	0180± 0090
29473	SL-2	57	00 ±0 11	006 ± 010
29474	SL-3	63	002 ± 099	0080± 0050
29475	SL-4	75	008 ± 074	0040± 0070
29476	SL-5	65	0238± 0040	0120± 0060
29477	SL-6	62	00 ±0 11	0060± 0080
29478	SL-7	69	018 ± 025	0050± 0050
29479	SL-8	53	029 ± 012	0140± 0090
29480	SL-9	67	041 ± 012	0130± 0070
29481	SL-10	63	050 ± 013	0120± 0060
29482	SL-11	42	046 ± 015	0130± 0070
29483	SL-12	73	005 ± 088	0100± 0090
29484	SL-13	95	005 ± 092	0150± 0060
29485	SL-14	73	024 ± 0050	0140± 0060
29486	SL-15	65	014 ± 047	0180± 0070
29487	SL-16	76	048 ± 013	0110± 0060
29488	SL-17	78	057 ± 013	0140± 0060
29489	SL-18	66	030 ± 012	0110± 0060

41

Rockwell International
Energy Systems Group
Rocky Flats Plant
P.O Box 464
Golden, Colorado 80401

ANALYTICAL REPORT

To | Account No | Date | Lab No

Page 2
Standley Lake Samples

Reported by

Approved

Sample Description

Analysis Results

SAMPLE NO	SAMPLE DESIGNATION	% REC	Pu-239	Pu-238
29490	SL-19	66	017 ± 031	0110± 0060
29491	SL-20	81	00 ±0 10	0110± 0050
29492	SL-21	66	092 ± 017	0140± 0060
29493	SL-22	59	014 ± 046	0130± 0070
29494	SL-23	87	068 ± 014	0080± 0050
29495	SL-24	92	067 ± 014	0140± 0060
29496	CONTROL 1 601220	87	853 ± 059	0110± 0050
29497	BLANK 1	58	0 00 ±0 12	0110± 0060
29498	SL-25	62	026 ± 011	0100± 0060
29499	SL-26	46	018 ± 029	0080± 0060
29500	SL-27	49	018 ± 034	0140± 0070
29501	SL-28	74	018 ± 032	0090± 0050
29502	SL-29	58	067 ± 015	0190± 0070
29503	SL-30	40	069 ± 016	0210± 0080
29504	SL-31	51	028 ± 011	0110± 0050
29505	SL-32	72	012 ± 053	0130± 0060
29506	SL-33	64	014 ± 048	0070± 0050

42

Rockwell International
Energy Systems Group
Rocky Flats Plant
P O Box 464
Golden, Colorado 80401

ANALYTICAL REPORT

To | Account No | Date | Lab No

Page 3
Standley Lake Samples

Reported by

Approved

Sample Description

Analysis Results

SAMPLE NO	SAMPLE DESIGNATION	% REC	Pu-239	Pu-238
29507	SL-34	86	045 ± 012	0120± 0050
29508	SL-35	74	0 553 ± 046	0200± 0060
29509	SL-36	67	0 100 ± 017	0140± 0060
29510	SL-37	65	02290± 00060	0080± 0050
29511	SL-38	77	020 ± 015	0070± 0050
29512	SL-39	68	00 ±0 11	0120± 0060
29513	SL-40	59	014 ± 048	0060± 0050
29514	SL-41	81	061 ± 012	0080± 0050
29515	SL-42	86	079 ± 014	0120± 0050
29516	SL-43	61	018 ± 025	0110± 0060
29517	SL-44	91	063 ± 013	0080± 0050
29518	SL-45	73	071 ± 014	0080± 0050
29519	SL-46	65	0220 ± 0080	0110± 0060
29520	SL-47	70	041 ± 012	0070± 0050
29521	SL-48	76	047 ± 012	0070± 0050
29522	CONTROL 2 601221	86	3.22 ±0 20	0070± 0050
29523	BLANK		LOST	

43

Rockwell International
Energy Systems Group
Rock Flats Plant
P.O Box 464
Golden, Colorado 80401

ANALYTICAL REPORT

To G Setlock | Account No | Date 4/6/87 | Lab No

Reported by J Van Waldick

Approved Carl Trice 4/6/87

Sample Description

Standley Lake Samples

Analysis Results

SAMPLE NO	SAMPLE DESIGNATION	% REC	Pu-239 (pCi/gm)	Pu-238 (pCi/gm)
31930	SL-49	73	- 012 ±0 059	009 ± 006
31931	SL-50	66	003 ± 012	049 ± 012
31932	SL-51	54	063 ± 017	015 ± 009
31933	SL-52	62	027 ± 013	009 ± 006
[redacted]				
			-013 ± 065	008 ± .008
31935	SL-54	92	029 ± 013	014 ± 006
31936	SL-55	82	024 ± 012	016 ± 006

Above report has been regenerated from 1984 Environmental Log Book for G Setlock

44

Plutonium-239 Activities of Standley Lake Cores

DEPTH (cm)	SLKB1 Core (pCi/gm)	+/-	SLKB2 Core (pCi/gm)	+/-
0 to 2	0 054	0 007	0 064	0 008
2 to 4 3	0 109	0 013	0 049	0 007
4 to 6	0 075	0 010	0 055	0 007
6 to 8 7	0 084	0 009	0 052	0 007 7
8 to 10	0 065	0 008	0 053	0 007 6
10 to 12	0 068	0 009	0 064	0 008
12 to 14	0 105	0 014	0 056	0 007 3
14 to 16	0 097	0 011	0 067	0 009
16 to 18 7	0 607	0 056	0 069	0 009 7
18 to 20 16	0 388	0 042	0 067	0 008 9
20 to 22 21	0 244	0 025	0 059	0 009
22 to 24			0 132	0 015 3
24 to 26				

DEPTH (cm)	SLWM10A Core (pCi/gm)	+/-	SLWM60 Core (pCi/gm)	+/-
0 to 2	0 053	0 007	0 069	0 008
2 to 4	0 073	0 009	0 095	0 011
4 to 6	0 055	0 007	0 073	0 009
6 to 8	0 073	0 009	0 088	0 010
8 to 10	0 065	0 008	0 077	0 010
10 to 12	0 072	0 009	0 092	0 010
12 to 14	0 063	0 008	0 131	0 015
14 to 16	0 101	0 011	0 295	0 026
16 to 18	0 085	0 011	5 477	0 531
18 to 20	0 065	0 008	0 155	0 016
20 to 22	0 067	0 009		
22 to 24	0 735	0 059		
24 to 26	0 371	0 034		

45

HEALTH, SAFETY AND ENVIRONMENT LABORATORIES
AUTOMATED INFORMATION SYSTEM
ANALYTICAL REPORT

ANNUAL SOILS -- NOT BLANK CORRECTED

DATA VALIDATED AND APPROVED BY Conrad Trice 4/6/87

SAMPLE NUMBER	LOCATION	ROCK MASS	SOIL MASS	% REC	PCI/UNIT PU239	UNIT
85002361	SLKB-1	0	0	56	0 054 +/- 0 007	GRAM
85002362	SLKB-2	0	0	74	0 109 +/- 0 01_	GRAM
85002363	SLKB-3	0	0	58	0 075 +/- 0 010	GRAM
85002364	SLKB-4	0	0	61	0 084 +/- 0 009	GRAM
85002365	SLKB-5	0	0	51	0 065 +/- 0 008	GRAM
85002366	SLKB-6	0	0	73	0 068 +/- 0 009	GRAM
85002367	SLKB-7	0	0	60	0 105 +/- 0 014	GRAM
85002368	SLKB-8	0	0	42	0 057 +/- 0 011	GRAM
85002369	SLKB-9	0	0	62	[illegible]	[illegible]
85002370	SLKB-10	0	0	61	0 386 +/- 0 042	GRAM
85002371	SLKB-11	0	0	56	0 244 +/- 0 025	GRAM
85002372	SLKB-12	0	0	55	0 064 +/- 0 008	GRAM
85002373	SLKB-13	0	0	72	0 049 +/- 0 007	GRAM
85002374	SLKB-14	0	0	51	0 055 +/- 0 007	GRAM
85002375	SLKB-15	0	0	46	0 0 2 +/- 0 007	GRA
85002376	SLKB-16	0	0	46	0 053 +/- 0 007	GRA
85002377	SLKB-17	0	0	46	0 064 +/- 0 008	GRA
85002378	SLKB-18	0	0	51	0 056 +/- 0 007	GRA
85002379	SLKB-19	0	0	58	0 067 +/- 0 009	GRA
85002380	SLKB-20	0	0	55	0 069 +/- 0 009	GRA

SLKB1

SLKB2

SLKB2

46

HEALTH, SAFETY AND ENVIRONMENT LABORATORIES
AUTOMATED INFORMATION SYSTEM
ANALYTICAL REPORT

ANNUAL SOILS -- NOT BLANK CORRECTED

DATA VALIDATED AND APPROVED BY

SLKB2

SAMPLE NUMBER	LOCATION	ROCK MASS	SOIL MASS	% REC	PCI/UNIT PU239			UNIT
85002381	SLKB-21	0	0	59	0 0-7	+/-	0 008	GRAM
85002382	SLKB-22	0	0	45	0 0-5	+/-	0 005	GRAM
85002383	SLKB-23	0	0	37	0 1 2	+/-	0 015	GRAM
85002384	CONT 1	0	0	61	0.053	+/-	0 070	GRAM
85002385	CONT 2	0	0	67	3 331	+/-	0.248	GRAM
85002386	BLANK	0	0	31	0.001	+/-	0 001	GRAM
85002387	SLKB-24	0	0	54	0 0 3	+/-	0 007	GRAM
85002388	SLKB-25	0	0	43	0.073	+/-	0 009	GRAM
[redacted]								
85002390	SLKB-27	0	0	47	0 073	+/-	0 009	GRAM
85002391	SLKB-28	0	0	51	0 065	+/-	0 008	GRAM
85002392	SLKB-29	0	0	46	0 072	+/-	0.009	GRAM
85002393	SLKB-30	0	0	28	0 043	+/-	0 008	GRAM
85002394	SLKB-31	0	0	35	0 101	+/-	0 011	GRAM
85002395	SLKB-32	0	0	22	0 085	+/-	0 011	GRAM
85002396	SLKB-33	0	0	37.	0 065	+/-	0 008	GRAM
85002397	SLKB-34	0	0	34	0 067	+/-	0 009	GRAM
85002398	SLKB-98	0	0	40	0 725	+/-	0 059	GRAM
85002399	SLKB-36	0	0	33	0 371	+/-	0 034	GRAM
85002400	SLKB-37	0	0	40	0 065	+/-	0 008	GRAM

SLWM60

47

HEALTH, SAFETY AND ENVIRONMENT LABORATORIES
AUTOMATED INFORMATION SYSTEM
ANALYTICAL REPORT

ANNUAL SOILS -- NOT BLANK CORRECTED

DATA VALIDATED AND APPROVED BY

SAMPLE NUMBER	LOCATION	ROCK MASS	SOIL MASS	% RCC	PCI/UNIT PU239	UNIT
85002401	SLKB-38	0	0	34	0 055 +/- 0 011	GRA
85002402	SLKB-39	0	0	61	0 073 +/- 0 009	GRA
85002403	SLKB-40	0	0	67	0 088 +/- 0 010	GRA
85002404	SLKB-41	0	0	76	0 077 +/- 0.010	GRA
85002405	SLKB-42	0	0	45	0 092 +/- 0 010	GRA
85002406	SLKB-43	0	0	67	0 131 +/- 0.01	GRA
85002407	SLKB-44	0	0	52	0 255 +/- 0 026	GRA
85002408	SLKB-45	0	0	40	0 477 +/- 0.531	GRA
85002409	SLKB-46	0	[illegible]	[illegible]	[illegible]	[illegible]
85002410	CONT.3	0	0	83	0 938 +/- 0 078	GRA
85002411	CONT.4	0	0	76	3.627 +/- 0 365	GRAM
85002412	BLANK	0	0	68	0 003 +/- 0 002	GRAM

48

ANALYTICAL REPORT

ROCKWELL INTERNATIONAL
ENERGY SYSTEMS GROUP
P O BOX 464
GOLDEN COLORADO 80401

GENERAL LABORATORY
BUILDING 881

DISTRIBUTION

G H Setlock HS&E T452B

File

LAB NUMBER M84-2694
DATE 3-20-85
ACCOUNT NO 417

APPROVED
G C DeLullo

SAMPLE DESCRIPTION

32 soil samples analyzed by gamma spectroscopy for Cs-137 content

ANALYSIS RESULTS

Sample ID	Cs-137 (pCi/g)
KB1-1	$(4\ 20 \pm 1\ 92) \times 10^{-1}$
KB1-2	$(4\ 91 \pm 1\ 46) \times 10^{-1}$
KB1-3	$(4\ 68 \pm 1\ 41) \times 10^{-1}$
KB1-4	$(2\ 47 \pm 1\ 24) \times 10^{-1}$
KB1-5	$(6\ 68 \pm 1\ 18) \times 10^{-1}$
KB1-6	$(5\ 32 \pm 1\ 54) \times 10^{-1}$
KB1-7	$(8\ 94 \pm 1\ 42) \times 10^{-1}$
KB1-8	$(9\ 11 \pm 1\ 71) \times 10^{-1}$
KB1-9	$(1\ 45 \pm 0\ 18)$
KB1-10	$(1\ 22 \pm 0\ 14)$
KB2-1	<0 100
KB2-2	<0 100
KB2-3	$(2\ 93 \pm 1\ 12) \times 10^{-1}$
KB2-4	<0 100
KB2-5	$(6\ 49 \pm 1\ 35) \times 10^{-1}$
KB2-6	$(6\ 59 \pm 1\ 28) \times 10^{-1}$
KB2-7	$(6\ 33 \pm 1\ 24) \times 10^{-1}$
KB2-8	$(5\ 19 \pm 1\ 21) \times 10^{-1}$

49

ANALYTICAL REPORT M84-2694 Date 3-20-85

Sample ID	Cs-137 (pCi/g)
KB3-1	(2 74 ± 1 07) X 10^{-1}
KB3-2	(3 18 ± 1 03) X 10^{-1}
KB3-3	(2 23 ± 1 25) X 10^{-1}
KB3-4	(3 12 ± 1 20) X 10^{-1}
KB3-5	(6 27 ± 1 49) X 10^{-1}
KB3-6	(5 12 ± 1 28) X 10^{-1}
KB3-7	(7 96 ± 1 44) X 10^{-1}
KB3-8	(3 53 ± 1 74) X 10^{-1}
KB4-1	(2 71 ± 2 86) X 10^{-1}
KB4-2	(1 51 ± 1 59) X 10^{-1}
KB4-3	(1 52 ± 1 60) X 10^{-1}
KB4-4	(3 69 ± 1 15) X 10^{-1}
KB4-5	(2 81 ± 0 09) X 10^{-1}
KB4-6	(3 99 ± 1 24) X 10^{-1}

NOTE Samples were counted for 48 hour period to acquire sufficient statistics to see the Cs-137 peak

50

ANALYTICAL REPORT

ROCKWELL INTERNATIONAL
NORTH AMERICAN SPACE OPERATIONS
P O BOX 464
GOLDEN COLORADO 80401

GENERAL LABORATORY
BUILDING 881

DISTRIBUTION

G H Setlock HS&E T452B

File

LAB NUMBER M84-3069
DATE 8-9-85
ACCOUNT NO 417

APPROVED C E Michel
C E Michel

SAMPLE DESCRIPTION

Soil Samples - SL Series 63 samples

ANALYSIS RESULTS

The determination of Cs-137 was performed by gamma spectrometry using either a low energy photon detector or a gamma-x dectector Nominal count were 48 hours for the low energy photon detector and 24 hours for the gamma-x detector The longer count time was used for the low energy photon detector since the detector efficiency for Cs-137 of 661 6 Uev is lower than the gamma-x detector at this energy The long count times were necessary to obtain reasonable counting stastics

Results are listed on the attached sheet

51

ANALYTICAL REPORT M84-3069 Date 8-9-85

Sample ID	Cs-137 Result (pCi/gm)
SL 1*	<0 13
Sl 2*	(1 31 ± 0 78) X 10^{-1}
SL 3*	(2 1 ± 0 96) X 10^{-1}
SL 4*	(1 46 ± 0 97) X 10^{-1}
SL 5	(3 30 ± 0 98) X 10^{-1}
SL 6*	(1 47 ± 0 55) X 10^{-1}
SL 7	(1 90 ± 1 00) X 10^{-1}
SL 8*	(3 69 ± 1 26) X 10^{-1}
SL 9	(5 04 ± 1 01) X 10^{-1}
SL10*	(5 42 ± 1 59) X 10^{-1}
SL11	(4 38 ± 0 89) X 10^{-1}
SL12	<0 13
SL13*	<0 13
SL14	(2 30 ± 0 45) X 10^{-1}
SL15*	(4 41 ± 0 92) X 10^{-1}
SL16	(6 07 ± 0 84) X 10^{-1}
SL17	(6 57 ± 0 90) X 10^{-1}
SL18	(4 67 ± 0 72) X 10^{-1}
SL19*	(2 08 ± 0 69) X 10^{-1}
SL20	<0 13
SL21	(7 61 ± 0 69) X 10^{-1}
SL22*	(3 59 ± 0 82) X 10^{-1}
SL23	(5 10 ± 0 85) X 10^{-1}
SL24*	(3 47 ± 1 67) X 10^{-1}
SL25	(2 35 ± 0 52) X 10^{-1}
SL26	<0 13
SL27*	(2 03 ± 0 75) X 10^{-1}
SL28	<0 13
SL29	(5 70 ± 0 73) X 10^{-1}
SL30	(4 82 ± 0 71) X 10^{-1}
SL31*	(2 43 ± 0 80) X 10^{-1}
SL32	<0 13
SL33	(1 14 ± 0 47) X 10^{-1}

Sample ID	Cs-137 Results (pCi/gm)
SL34*	<0 13
SL35	(5 37 ± 0 87) X 10^{-1}
SL36	(5 83 ± 0 67) X 10^{-1}
SL37	(1 53 ± 0 51) X 10^{-1}
SL38*	(2 57 ± 0 97) X 10^{-1}
SL39	<0 13
SL40*	(1 47 ± 0 95) X 10^{-1}
SL41	(4 15 ± 0 60) X 10^{-1}
SL42	(3 72 ± 0 58) X 10^{-1}
SL43*	<0 13
SL44	(4 53 ± 0 62) X 10^{-1}
SL45	(7 09 ± 0 80) X 10^{-1}
SL46	(1 69 ± 0 53) X 10^{-1}
SL47	(3 69 ± 0 60) X 10^{-1}
SL48	(2 69 ± 0 58) X 10^{-1}
SL49	<0 13
SL50	(2 40 ± 0 54) X 10^{-1}
SL51	(2 66 ± 0 79) X 10^{-1}
SL52	(6 37 ± 0 89) X 10^{-1}
SL53	<0 13
SL54	(6 92 ± 0 90) X 10^{-1}
SL55	(7 99 ± 0 91) X 10^{-1}
SL56*	(1 68 ± 0 99) X 10^{-1}
SLWM10*	(4 95 ± 1 01) X 10^{-1}
SLWM10A	(7 48 ± 1 06) X 10^{-1}
SLWM20	(3 14 ± 0 56) X 10^{-1}
SLWM30*	(2 36 ± 0 63) X 10^{-1}
SLWM40*	(2 44 ± 0 79) X 10^{-1}
SLWM50	<0 13
SLWM60	(4 78 ± 1 03) X 10^{-1}

* Counted using the low energy photon detector

52/52