ORIGINAL

ORIGINAL (Red)

EPA - LANSDOWNE PROJECT

PHASE II

SOIL CHARACTERIZATION REPORT

FOR

28 LEWIS AVENUE

Prepared by:

John O. Hamm

Performed by:

CHEM-NUCLEAR SYSTEMS, INC.
140 Stoneridge Drive
Columbia, SC 29210
(803)779-0900
(803)256-3228 Fax

ORIGINAL

28 LEWIS - SOIL
9/17/92

TABLE OF CONTENTS

1.0 TITLE 3

2.0 BACKGROUND 3
- 2.1 Site History 3
- 2.2 Soil Characterization 3

3.0 SURVEY METHODOLOGIES 3
- 3.1 Property Grid 4
- 3.2 Direct Gamma Surveys 4
- 3.3 Soil Specific Activity Sampling 4
- 3.4 Down Hole Gamma Logging 5

4.0 SURVEY RESULTS 5
- 4.1 Property Gridding 5
- 4.2 Direct Gamma Survey 5
- 4.3 Soil Samples 5
- 4.4 Down Hole Gamma Logging Results 6

5.0 CONCLUSIONS 8

ATTACHMENT A 9

ATTACHMENT B 10

LIST OF TABLES

TABLE 4.1 7

ORIGINAL (Red)

28 LEWIS - SOIL
9/17/92

1.0 TITLE

Soil Characterization Report for 28 Lewis Avenue.

2.0 BACKGROUND

2.1 Site History

The property required radiological characterization of the grounds, which was performed with the intent of determining the extent of soil requiring removal to release the grounds for unrestricted use.

The contamination consists of natural radium and it's parent and daughter products. The source of the contamination is a radium extraction process which operated in Lansdowne between the years of 1915 and 1922. The sites were contaminated during the years 1915 to 1922, when tailings from the radium extraction process were used as back fill and included in building masonry and plaster in place of sand. Site characterization consisted of determining the level of radioactive contamination in the soil. Surveys also included sample analysis to determine specific activity to satisfy safety, transportation, and disposal requirements.

2.2 Soil Characterization

The property was identified as requiring characterization on September 4, 1992 when samples were obtained from 28 Lewis Avenue in the course of characterizing 34 Lewis Avenue. The results of these samples were documented in "Addendum to Soil Characterization Report For 34 Lewis Avenue (28 Lewis Avenue)".

The CWM survey team arrived at the property on September 15, 1992 at approximately 9:00 AM, received a brief on the property and commenced surveying in accordance with the Health and Safety Plan and the Operations Plan. Surveys were completed September 16, 1992 at approximately 11:00 AM.

3.0 SURVEY METHODOLOGIES

Surveys and sampling activities were conducted in accordance with EPA - Lansdowne Site Health and Safety plan and the EPA - Lansdowne Operations Plan. A brief description of the methods utilized is included below:

ORIGINAL (Red)

3.1 Property Grid

The property was gridded to provide a means of identifying sample locations and to allow grid reestablishment with reasonable accuracy. The grid is anchored by a permanent structural reference point, typically the left front corner of the structure viewed from the street.

3.2 Direct Gamma Surveys

Direct gamma rate surveys were performed to identify localized hot spots and to help define the boundaries of potentially contaminated areas. At each grid point and any hot spot a 0.1 minute gamma scaler count was performed and the results logged on the survey form. Any point which exceeded average background plus two standard deviations was considered potentially contaminated. These surveys were performed to identify locations requiring soil sampling.

Direct gamma rate surveys and scaler counts were performed using a 2" x 2" NaI detector with an appropriate instrument.

3.3 Soil Specific Activity Sampling

Each hot spot and each grid point identified as being potentially contaminated was sampled for gamma spectroscopic analysis. Additionally each grid point bounding potentially contaminated areas was sampled for gamma spectroscopic analysis.

Each point described above was sampled by drilling a 3" diameter x 24" deep bore hole using a split spoon sampler. The soil plug removed from the split spoon sampler was segregated into four samples by depth. Each sample was analyzed for ^{226}Ra specific activity using a GeLi gamma spectroscopy system.

ORIGINAL
(Red)

3.4 Down Hole Gamma Logging

Down hole gamma logging of each bore hole was performed using a 2" x 2" NaI detector with an appropriate instrument in scaler mode. Each bore hole was counted for 0.1 minute at each point down hole starting at 0" (surface directly over bore hole) and each six inch increment to the bottom of the hole.

A field check was performed on the bottom (18" - 24") soil sample from each bore hole using a 2" x 2" NaI detector with an appropriate instrument in scaler mode for a 0.1 minute count. If the sample exceeded average background plus two standard deviations, the bore hole was sampled again to a total depth of 48".

4.0 SURVEY RESULTS

4.1 Property Gridding

The property was gridded using the Southeast corner of the house as the zero reference. The grid map is included with the Contamination/Radiation report contained in Attachment A.

NOTE: **Grid points #150 through #159 are gridded from the Southeast corner of the house at 34 Lewis Avenue.**

4.2 Direct Gamma Survey

Direct gamma surveys were performed using a Ludlum Model 2221 with a 44-10 2" x 2" Na-I detector. The direct gamma readings were obtained at each grid point on the property. The results of this survey are shown on the Contamination/Radiation report contained in Attachment A.

4.3 Soil Samples

Four soil samples were collected from each point determined to be potentially contaminated and the surrounding grid points. The samples were counted with a high purity germanium detector. Due to the difficulties involved with maintaining a constant sample geometry, the results are only accurate within the percent error listed on the report. The results of these samples are shown in the Contamination/Radiation report contained in Attachment A. A brief summary of these samples is provided in Table 4.1.

ORIGINAL
(Red)

TABLE 4.1
SOIL SAMPLES

28 LEWIS AVENUE

SAMPLE IDENTIFICATION	SAMPLE DEPTH inches	SAMPLE WEIGHT grams	SPECIFIC ACTIVITY ρCi/gm	ERROR %
#152/22S,10W	0"-6"	547	16.8	17
#153/22S,20W	0"-6"	642	15.3	17
#154/22S,30W	0"-6"	688	6.8	25
#156/21S,50W	0"-6"	661	36.9	10
	6"-12"	772	74.3	10
#159/21S,60W	0"-6"	683	25.4	11
	6"-12"	845	51.0	11
	12"-18"	775	12.0	26

NOTE: **Zero reference for these grid points is the Southeast corner of the house at 34 Lewis Avenue.**

ORIGINAL (Red)

28 LEWIS - SOIL
9/17/92

5.0 CONCLUSIONS

The conclusions below assume that contaminated soils will be removed to the vertical and horizontal boundaries formed by the clean samples adjacent to the contaminated area. It is recommended that after removal and prior to back filling, additional sampling be performed to ensure removal was adequate.

In some cases the removal recommended below will expose soils that, while below the limits for their depth, are at elevated activities above background and may require radiological controls while exposed.

Based on characterization results the following area(s) (but not limited to) must be removed to allow for release of the grounds for unrestricted use:

NOTE: **All grid locations specified below will be from zero reference at 28 Lewis Avenue.**

AREA(S) REQUIRING REMOVAL

o - The area enclosed by grid points #51/30N,10E, #59/70W,30N and the north property line to a depth of 24 inches. This is an area of approximately 480 ft^2 and is under the asphalt driveway.

NOTE: **It is recommended that this soil removal be performed in conjunction with the soil removal at 34 Lewis Avenue.**

ORIGINAL (Red)

ATTACHMENT A

CONTAMINATION/RADIATION REPORT

FOR

28 LEWIS AVENUE

(15 Pages)

ORIGINAL

CONTAMINATION/RADIATION SURVEY REPORT

HOUSE ADDRESS: 28 Lewis Ave | DATE 9-15-92 | TIME START 0850 | TIME COMP. 1000 | PAGE 1 OF 15

ACTIVITY/LOCATION: EPA - LANSDOWNE | SURVEYOR: B. Rankin | PHONE: N/A

PROJECT NUMBER: 48094 | P. Manning, P. Shonkwiler

MAP ID: N/A | Survey Number: N/A

DAILY WEEKLY MONTHLY TYPE: CONTAMINATION AND DAILY WEEKLY MONTHLY TYPE: RADIATION SURVEY

COMMENTS: ① Results are recorded in counts / 1/10 minute

SOURCECHECK DATA	
ESP-2	Na-I
BKGD= \	BKGD= 1895
EFF= N/A	TENNELEC
CF=	SEE CAL DATA
LLD= \	MICRO-R
MDA=	SEE CAL DATA

CONTAMINATION SURVEY INSTRUMENT TYPE/TAG NO	TENNELEC N/A	ESP-2 #:	N/A
RADIATION SURVEY INSTRUMENT TYPE/TAG NO	micro-R #: N/A	NaI #:	68780

RADCON REVIEW: John O Hanson | DATE: 9/17/92

SWIPE/PROBE NO	Na-I ~~NET~~ Gross ① CPM	ALPHA SMEAR CORR 100 cm²	BETA-GAMMA FIXED - SMEAR CORR PROBE	CORR 100 cm²	micro R/hr	GAMMA SPEC pCi/g	ITEM OR LOCATION
1	1258	N/A	N/A	N/A	N/A	See Log Sheet	See Map
2	1544						
3	871						
4	704						
5	1107						
6	1183						
7	1236						
8	1353						
9	1398						
10	1365						
11	1019						
12	1095						
13	867						
14	922						
15	853						
16	951						
17	877	↓	↓	↓	↓	↓	↓
18	865	N/A	N/A	N/A	N/A	See Log Sheet	See Map
19	945						
20	1146						
21	1250						
22	1237						
23	1262						
24	1112						
25	1144						
26	1230						
27	1191						
28	1229						
29	1289						
30	1154						
31	1261						
32	1137						
33	1353						
34	1280						
35	1289						
36	1384						
37	1386						
38	1096						
39	1290						
40	1540	↓	↓	↓	↓	↓	↓

* THE KNOWING & WILLFUL RECORDING OF FALSE, FICTICIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.

CONTAMINATION/RADIATION SURVEY REPORT
CONTINUATION SHEET

ORIGINAL (Red)

HOUSE ADDRESS: 28 Lewis Ave

TO: PROJECT NUMBER: 48094 | ACTIVITY/LOCATION: EPA — LANSDOWNE | MAP ID: N/A | PAGE 2 OF 15

COMMENTS: (1) Results recorded in counts / 1/10 minute

SURVEYOR: B. Rankin, P. Manning, P. Shonkwiler | Survey Number: N/A | DATE: 9-15-92

Radcon Review: John O Hamm | Date: 9/17/92

NOTE: THE KNOWING & WILLFUL RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.

SWIPE/PROBE NO.	Na-I NET (Gross) CPM (1)	ALPHA SMEAR CCPM/100 cm²	BETA-GAMMA FIXED - SMEAR CCPM/PROBE	BETA-GAMMA FIXED - SMEAR CCPM/100 cm²	micro R/hr	GAMMA SPEC pCi/g	ITEM OR LOCATION
41	1264	N/A	N/A	N/A	N/A	See Log Sheet	See Map
42	1532						
43	1675						
44	1393						
45	1363						
46	1391						
47	1238						
48	1390						
49	1549						
50	1740						
51	1759						
52	2376						
53	2854						
54	2659						
55	2816						
56	2127						
57	1779						
58	1522						
59	1199						
60	1099						
61	1182						
62	1406						
63	1255						
64	1791						
150	1803						
151	2291						

SWIPE/PROBE NO.	Na-I NET (Gross) CPM (1)	ALPHA SMEAR CCPM/100 cm²	BETA-GAMMA FIXED - SMEAR CCPM/PROBE	BETA-GAMMA FIXED - SMEAR CCPM/100 cm²	micro R/hr	GAMMA SPEC pCi/g	ITEM OR LOCATION
152	3479	N/A	N/A	N/A	N/A	See Log Sheet	See Map
153	5488						
154	4944						
155	4217						
156	6267						
157	5105						
158	3641						
159	1302						
75	1579						
76	1712						
77	1496						

NOT USED

NO - Not Detectable

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ORIGINAL (Red)

SHEET 3 of 15

CLIENT/SUBJECT 28 Lewis Ave. W.O. NO.

TASK DESCRIPTION Overhead View 1 block = 4'x4' TASK NO.

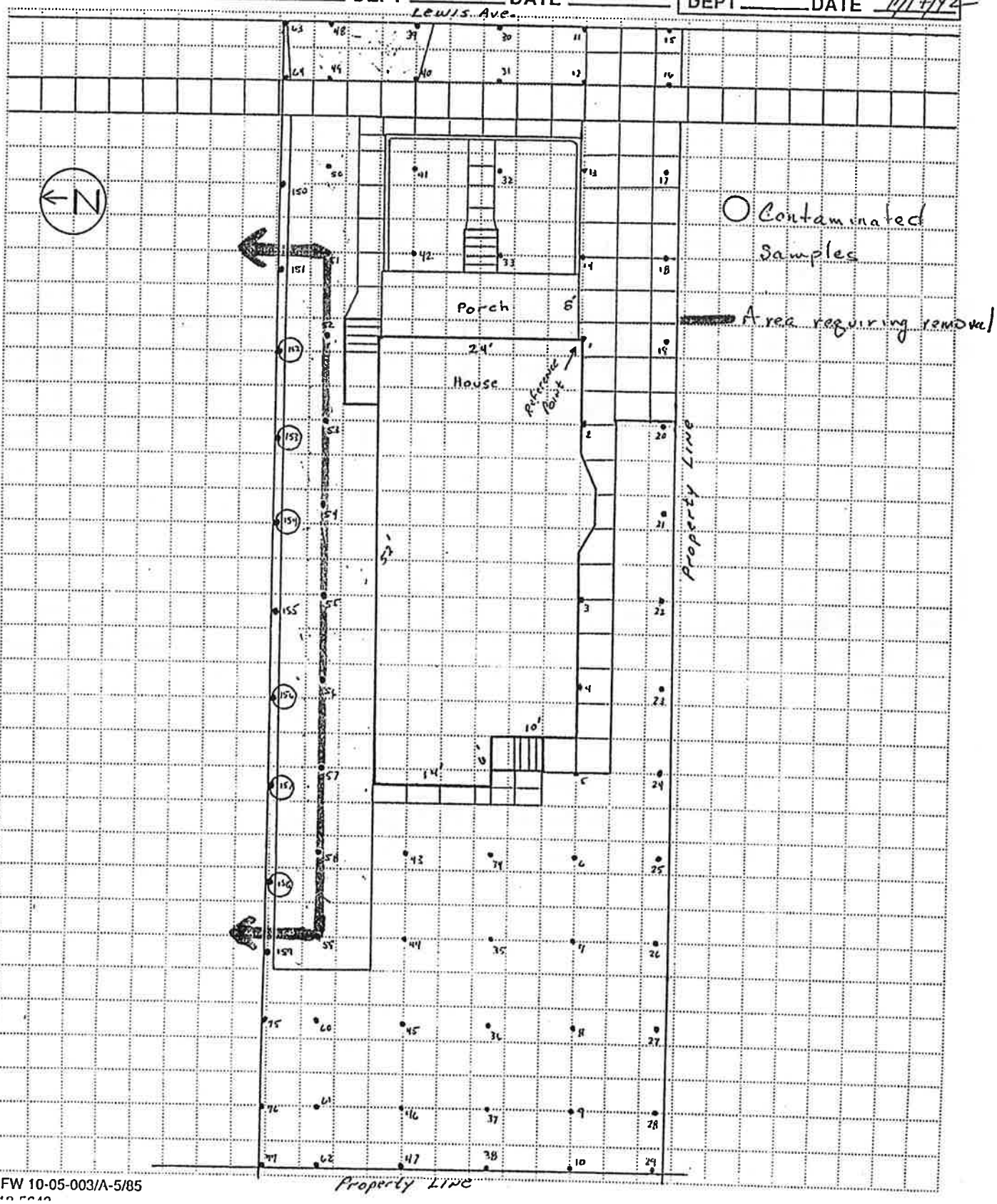
PREPARED BY Bill Rankin DEPT 572 DATE 9-15-92

MATH CHECK BY DEPT DATE

METHOD REV. BY DEPT DATE

APPROVED BY John O'Hanum

DEPT DATE 9/17/92



RFW 10-05-003/A-5/85

ORIGINAL (Red)

BORE HOLE LOG

PROPERTY 34 LEWIS AVE DATE 03 September 92

INSTRUMENT/SERIAL #2921/44-10/#84733 & #68780 PAGE 4 OF 15

NOTES: 1. All holes are 3 inch diameter.
2. Record unusual conditions such as water in bore hole or obstructions.

#84733 #68780

HOLE ID: 148 (24N, 32W)		HOLE ID: 156 (22S, 10W)		HOLE ID: 150 (22S, 10W)		HOLE ID: 152 (22S, 0)	
TIME DRILLED: 1401		TIME DRILLED: 1440		TIME DRILLED: 1440		TIME DRILLED: 1453	
TIME LOGGED: 1402		TIME LOGGED: 1445		TIME LOGGED: 1453		TIME LOGGED: 1501	
SOIL TYPE: CLAY/LOAM		SOIL TYPE: CLAY/LOAM		SOIL TYPE: CLAY/LOAM		SOIL TYPE: CLAY/LOAM	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE	54408	SURFACE	1614	SURFACE	1703	SURFACE	2194
0"	49057	0"	1754	0"	1851	0"	2462
6"	40816	6"	15039	6"	2026	6"	2822
12"	34165	12"	16300	12"	2302	12"	2687
18"	35137	18"	12310	18"	2346	18"	2413
24"	43247	24"	2316	24"	2300	24"	2343
30"		30"		30"		30"	
36"		36"		36"		36"	
42"		42"		42"		42"	
48"		48"		48"		48"	
Field Check	1885	Field Check	1324	Field Check	1456	Field Check	1451

REMARKS: METER S/N 84733 FAILED @ HOLE #150 - REPLACED W/ #68780 AND MODELED

Reviewed John Hamm 9/11/92 9/17/92

ORIGINAL (Red)

BORE HOLE LOG

PROPERTY 34 LEWIS AVE. DATE 03 September 92

INSTRUMENT/SERIAL # 2221/44-10/#68960 PAGE 5 OF 15

NOTES:
1. All holes are 3 inch diameter.
2. Record unusual conditions such as water in bore hole or obstructions.

HOLE ID: 152 (22S, 10W)		HOLE ID: 153 (22S, 20W)		HOLE ID: 154 (22S, 30W)		HOLE ID: 155 (22S, 40W)	
TIME DRILLED: 1510		TIME DRILLED: 1525		TIME DRILLED: 1545		TIME DRILLED: 1555	
TIME LOGGED: 1515		TIME LOGGED: 1527		TIME LOGGED: 1551		TIME LOGGED: 1602	
SOIL TYPE: CLAY/LOAM		SOIL TYPE: CLAY/LOAM		SOIL TYPE: CLAY/LOAM		SOIL TYPE: CLAY/LOAM	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE	5248	SURFACE	5361	SURFACE	4267	SURFACE	3963
0"	4933	0"	5495	0"	4077	0"	3981
6"	5186	6"	6235	6"	3379	6"	3112
12"	3543	12"	6092	12"	3126	12"	3126
18"	2869	18"	3488	18"	2716	18"	2640
24"	2430	24"	2551	24"	2460	24"	2537
30"		30"		30"		30"	
36"		36"		36"		36"	
42"		42"		42"		42"	
48"		48"		48"		48"	
Field Check	1350	Field Check	1320	Field Check	1195	Field Check	1195

REMARKS:

Reviewed [signature] 9/11/92 [signature] 9/12/92

ORIGINAL (Red)

BORE HOLE LOG

PROPERTY 34 LEWIS AVE. DATE 03 September 92

INSTRUMENT/SERIAL # 2221/44-10/# 68780 PAGE 6 OF 15

NOTES:
1. All holes are 3 inch diameter.
2. Record unusual conditions such as water in bore hole or obstructions.

HOLE ID: 156 (21S, 50W) TIME DRILLED 1620 TIME LOGGED: 1623 SOIL TYPE: CLAY/LOAM		HOLE ID: 157 (21S, 60W) TIME DRILLED: 1635 TIME LOGGED: 1641 SOIL TYPE: CLAY/LOAM		HOLE ID: 158 (21S, 70W) TIME DRILLED: TIME LOGGED: SOIL TYPE:		HOLE ID: 159 (21S, 80W) TIME DRILLED: TIME LOGGED: SOIL TYPE:	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE	6359	SURFACE	4647	SURFACE		SURFACE	
0"	6750	0"	5866	0"	N	0"	
6"	15769	6"	13157	6"		6"	
12"	19665	12"	20364	12"	A	12"	
18"	9637	18"	13010	18"		18"	
24"	4189	24"	4488	24"		24"	
30"		30"		30"		30"	
36"		36"		36"		36"	
42"		42"		42"		42"	
48"		48"		48"		48"	
Field Check	1416	Field Check	1330	Field Check		Field Check	

REMARKS:

Reviewed John O'Hanson 9/11/92 John 9/12/92

ORIGINAL (Red)

BORE HOLE LOG

PROPERTY 34 Lewis Ave

DATE 04 Sept 92

INSTRUMENT/SERIAL # 2221 w/44-10 #08780

PAGE 7 OF 15

NOTES:
1. All holes are 3 inch diameter.
2. Record unusual conditions such as water in bore hole or obstructions.

HOLE ID: 158 (70W, 21S)		HOLE ID: 159 (80W, 21S)		HOLE ID:		HOLE ID:	
TIME DRILLED 0825		TIME DRILLED: 0850		TIME DRILLED:		TIME DRILLED:	
TIME LOGGED: 0834		TIME LOGGED: 0853		TIME LOGGED:		TIME LOGGED:	
SOIL TYPE: clay/loam		SOIL TYPE: clay/loam		SOIL TYPE:		SOIL TYPE:	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE	4704	SURFACE	1617	SURFACE		SURFACE	
0"	4786	0"	1645	0"		0"	
6"	11062	6"	2695	6"	N/A	6"	
12"	13175	12"	3106	12"		12"	
18"	7513	18"	2792	18"		18"	
24"	3702	24"	2559	24"		24"	
30"		30"		30"		30"	
36"		36"		36"		36"	
42"		42"		42"		42"	
48"		48"		48"		48"	
Field Check	1287	Field Check	1281	Field Check		Field Check	

REMARKS:

Reviewed John O'Hanna 9/11/92 [illegible] 9/17/92

ORIGINAL (Red)

BORE HOLE LOG

PROPERTY 28 LENIS AVE. DATE 16 September 1992

INSTRUMENT/SERIAL # 2221/44-10/H68780 PAGE 8 OF 15

NOTES:
1. All holes are 3 inch diameter.
2. Record unusual conditions such as water in bore hole or obstructions.

HOLE ID: 51 (30N, 10E)		HOLE ID: 52 (30N, 0)		HOLE ID: 53 (30N, 10W)		HOLE ID 54 (30N 20W)	
TIME DRILLED: 0910		TIME DRILLED: 0920		TIME DRILLED: 0930		TIME DRILLED: 0940	
TIME LOGGED: 0911		TIME LOGGED: 0922		TIME LOGGED: 0936		TIME LOGGED: 0946	
SOIL TYPE: CLAY/LOAM		SOIL TYPE: CLAY/LOAM		SOIL TYPE: CLAY/LOAM		SOIL TYPE: CLAY/LOAM	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE	1978	SURFACE	2385	SURFACE	2509	SURFACE	2602
0"	1604	0"	1437	0"	1776	0"	1457
6"	1846	6"	1718	6"	1572	6"	1424
12"	2209	12"	2376	12"	2354	12"	2213
18"	2265	18"	2348	18"	2371	18"	2232
24"	2347	24"	2286	24"	2322	24"	2248
30"		30"		30"		30"	
36"		36"		36"		36"	
42"		42"		42"		42"	
48"		48"		48"		48"	
Field Check	1504	Field Check	1463	Field Check	1465	Field Check	1544

REMARKS:

Reviewed John O Hamm 9/17/92

ORIGINAL (Red)

BORE HOLE LOG

PROPERTY 28 Lewis Ave. DATE 16 Sep Tember 92

INSTRUMENT/SERIAL # 2221/4410/1168780 PAGE 9 OF 15

NOTES:
1. All holes are 3 inch diameter.
2. Record unusual conditions such as water in bore hole or obstructions.

HOLE ID: 55 (30W, 30N) TIME DRILLED 0950 TIME LOGGED: 0956 SOIL TYPE: CLAY SAND		HOLE ID: 56 (40W, 30N) TIME DRILLED: 1005 TIME LOGGED: 1007 SOIL TYPE: CLAY/SAND		HOLE ID: 57 (50W, 30N) TIME DRILLED: 1010 TIME LOGGED: 1016 SOIL TYPE: CLAY/SAND		HOLE ID: 58 (60W, 30N) TIME DRILLED: 1020 TIME LOGGED: 1025 SOIL TYPE: CLAY/SAND	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE	2127	SURFACE	1610	SURFACE	1835	SURFACE	1423
0"	1571	0"	1715	0"	1728	0"	1401
6"	1262	6"	1398	6"	2124	6"	2280
12"	1753	12"	2296	12"	2819	12"	3626
18"	2344	18"	2365	18"	2766	18"	3134
24"	2321	24"	2406	24"	2489	24"	2660
30"		30"		30"		30"	
36"		36"		36"		36"	
42"		42"		42"		42"	
48"		48"		48"		48"	
Field Check	1412	Field Check	1472	Field Check	1407	Field Check	1493

REMARKS:

Reviewed John O Hamm 9/17/92

ORIGINAL (Red)

BORE HOLE LOG

PROPERTY 28 Lewis Ave. DATE 16 September 92

INSTRUMENT/SERIAL # 2221/44-10/H68750 PAGE 10 OF 15

NOTES:
1. All holes are 3 inch diameter.
2. Record unusual conditions such as water in bore hole or obstructions.

HOLE ID: 50(70W, 70N)		HOLE ID:		HOLE ID:		HOLE ID:	
TIME DRILLED: 1030		TIME DRILLED:		TIME DRILLED:		TIME DRILLED:	
TIME LOGGED: 1434		TIME LOGGED:		TIME LOGGED:		TIME LOGGED:	
SOIL TYPE: Clay/Loam		SOIL TYPE:		SOIL TYPE:		SOIL TYPE:	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE	1320	SURFACE		SURFACE		SURFACE	
0"	1480	0"		0"		0"	
6"	1829	6"		6"	N	6"	
12"	3251	12"		12"	A	12"	
18"	3266	18"		18"		18"	
24"	2598	24"		24"		24"	
30"		30"		30"		30"	
36"		36"		36"		36"	
42"		42"		42"		42"	
48"		48"		48"		48"	
Field Check	1521	Field Check		Field Check		Field Check	

REMARKS:

Reviewed John O. Hamm 9/17/92

ORIGINAL (Red)

SOIL SAMPLE LOG

Radium-226

PROPERTY 34 Lewis Ave.

PAGE 11 OF 15

SAMPLE ID	DATE/TIME Sampled	DATE/TIME Counted	WEIGHT grams	ACTIVITY pCi/gram +/- % error	COUNT By
150 (22S, 10W) 0-6"	1440		663.9	2.6±46	LaH
150 (22S, 10W) 6-12"	1440		615.2	1.4±135	LaH
150 (22S, 10W) 12-18"	1440		780.5	2.6±52	LaH
150 (22S, 10W) 18-24"	1440		743.1	1.7±79	LaH
151 (22S, Ø) 0-6"	1433		612.6	4.8±33	LaH
151 (22S, Ø) 6-12"	1433		655.0	1.5±123	LaH
151 (22S, Ø) 12-18"	1433		791.6	1.9±75	LaH
151 (22S, Ø) 18-24"	1433		796.0	2.5±55	LaH
152 (22S, 10W) 0-6"	1370	9-9-92	547.3	10.8±17	LaH
152 (22S, 10W) 6-12"	1370		603.9	10.2±30	LaH
152 (22S, 10W) 12-18"	1370		709.9	1.8±90	LaH
152 (22S, 10W) 18-24"	1370		755.9	1.7±77	LaH

Received by: L Howe 1735.

MDA = DEPTH 0-6" @ 1.6 pCi/g

Remarks >6" @ 2.1

Reviewed John O Hamm 9/11/92 JLK 9/17/92

[illegible]

ORIGINAL (Red)

SOIL SAMPLE LOG

Radium-226

PROPERTY 34 LEWIS AVE.

PAGE 12 of 15

SAMPLE ID	DATE/TIME Sampled	DATE/TIME Counted	WEIGHT grams	ACTIVITY pCi/gram +/- % error	COUNT By
# 153 (22S, 20W) 0-6"	9/3/92 1525	9-9-92	641.8	15.3 ± 17	LdH.
153 (22S, 20W) 6-12"	1525		747.4	8.2 ± 28	LdH.
153 (22S, 20W) 12-18"	1525		774.9	3.1 ± 51	LdH.
153 (22S, 20W) 18-24"	1525		798.1	2.0 ± 78	LdH.
# 154 (22S, 30W) 0-6"	1545		687.8	6.8 ± 25	LdH.
154 (22S, 30W) 6-12"	1545		748.8	5.3 ± 40	LdH.
154 (22S, 30W) 12-18"	1545		818.9	3.5 ± 40	LdH.
154 (22S, 30W) 18-24"	1545		601.6	1.7 ± 112	LdH.
# 155 (22S, 40W) 0-6"	1555		737.7	4.9 ± 33	LdH.
155 (22S, 40W) 6-12"	1555		804.3	4.2 ± 41	LdH.
155 (22S, 40W) 12-18"	1555		668.9	3.3 ± 42	LdH.
155 (22S, 40W) 18-24"	1555		686.2	3.6 ± 40	LdH.
# 156 (21S, 50W) 0-6"	1620		660.6	36.9 ± 10	LdH.
156 (21S, 50W) 6-12"	1620		772.2	74.3 ± 10	LdH.
156 (21S, 50W) 12-18"	1620		949.8	7.6 ± 32	LdH.
156 (21S, 50W) 18-24"	1620		829.7	4.0 ± 36	LdH.
# 157 (21S, 60W) 0-6"	1635		683.1	25.4 ± 11	LdH.
157 (21S, 60W) 6-12"	1635		845.3	51.0 ± 11	LdH.
157 (21S, 60W) 12-18"	1635		774.6	12.0 ± 26	LdH.
157 (21S, 60W) 18-24"	1635		738.3	4.9 ± 35	LdH.

Received by: LdHavier 1735.

MDA = 0-6" @ 1.6 pCi/g

Remarks >6" @ 2.1

Reviewed John O'Hanlon 9/11/92 John 9/17/92

Reviewed [illegible]

SOIL SAMPLE LOG

Radium-226

ORIGINAL (Red)

PROPERTY 34 Lewis Ave.

PAGE ~~7~~ 13 OF ~~8~~ 15

	SAMPLE ID	DATE/TIME Sampled	DATE/TIME Counted	WEIGHT grams	ACTIVITY pCi/gram ± 1/σ % error	COUNT By
H	158 (20W, 21S) 0-6"	9/4/92 0825	9/8/92	568.4	20.1 ± 13	MAC
	158 (20W, 21S) 6-12"	0825	9/8/92	590.6	30.3 ± 16	MAC
	158 (20W, 21S) 12-18"	0825	9/8/92	594.7	4.0 ± 45	MAC
	158 (20W, 21S) 18-24"	0825	9/8/92	645.5	1.5 ± 86	MAC
H	159 (80W, 21S) 0-6"	0850	9/8/92	644.0	3.6 ± 37	MAC
	159 (80W, 21S) 6-12"	0850	9/8/92	610.1	5.2 ± 38	MAC
	159 (80W, 21S) 12-18"	0850	9/8/92	742.3	2.4 ± 49	MAC
	159 (80W, 21S) 18-24"	0850	9/8/92	698.1	3.1 ± 41	MAC

Received by: [signature]

MDA = Depth 0-6" ≠ @ 1.6 pCi/g

Remarks >6" ≠ @ 2.1

Reviewed [signature] 9/11/92 John 9/17/92

Reviewed [signature]

ORIGINAL (Red)

SOIL SAMPLE LOG

Radium–226

PROPERTY 28 Lewis Ave.

	SAMPLE ID	DATE/TIME Sampled	DATE/TIME Counted	WEIGHT grams	ACTIVITY pCi/gram +/- %error	COUNT By
#	51 (30N, 10E) 0-6"	9/16/92 0910	9-16-92	839.6	.7 ± 158	MAK
	51 (30N, 10E) 6-12"	0910	9-16-92	873.8	2.1 ± 45	MAK
	51 (30N, 10E) 12-18"	0910	9-16-92	682.0	2.8 ± 40	MAK
	51 (30N, 10E) 18-24"	0910	9-16-92	458.5	2.4 ± 60	MAK
#	52 (30N, 0) 0-6"	0920	9-16-92	858.8	.8 ± 105	SdN
	52 (30N, 0) 6-12"	0920	9-16-92	735.4	1.2 ± 93	SdN
	52 (30N, 0) 12-18"	0920	9-16-92	666.5	2.7 ± 37	SdN
	52 (30N, 0) 18-24"	0920	9-16-92	680.6	1.9 ± 57	SdN
#	53 (30N, 10W) 0-6"	0930	9-16-92	828.7	1.5 ± 60	SdN
	53 (30N, 10W) 6-12"	0930	9-16-92	814.8	2.2 ± 44	SdN
	53 (30N, 10W) 12-18"	0930	9-16-92	731.3	3.0 ± 35	MAK
	53 (30N, 10W) 18-24"	0930	9-16-92	685.0	1.5 ± 74	SdN
#	54 (30N, 20W) 0-6"	0940	9-16-92	671.4	.5 ± 165	SdN
	54 (30N, 20W) 6-12"	0940	9-16-92	570.9	2.2 ± 62	SdN
	54 (30N, 20W) 12-18"	0940	9-16-92	669.0	2.3 ± 48	SdN
	54 (30N, 20W) 18-24"	0940	9-16-92	775.5	3.0 ± 33	SdN
#	55 (30W, 30N) 0-6"	0950	9-16-92	777.8	1.8 ± 50	SdN
	55 (30W, 30N) 6-12"	0950	9-16-92	759.0	1.4 ± 87	SdN
	55 (30W, 30N) 12-18"	0950	9-16-92	608.3	1.7 ± 79	SdN
	55 (30W, 30N) 18-24"	0950	9-16-92	659.9	2.1 ± 59	SdN
#	56 (40W, 30N) 0-6"	1005	9-16-92	722.5	1.9 ± 41	SdN
	56 (40W, 30N) 6-12"	1005	9-16-92	623.4	2.6 ± 53	SdN
	56 (40W, 30N) 12-18"	1005	9-16-92	765.8	1.3 ± 90	SdN
	56 (40W, 30N) 18-24"	1005	9-16-92	905.7	1.8 ± 55	SdN
#	57 (50W, 30N) 0-6"	1010	9-16-92	603.6	2.9 ± 45	MAK
	57 (50W, 30N) 6-12"	1010	9-16-92	948.8	1.9 ± 63	MAK
	57 (50W, 30N) 12-18"	1010	9-16-92	844.3	1.7 ± 64	MAK
	57 (50W, 30N) 18-24"	1010	9-16-92	515.6	1.9 ± 87	MAK
#	58 (60W, 30N) 0-6"	1020	9-16-92	770.3	1.5 ± 67	MAK
	58 (60W, 30N) 6-12"	1020	9-16-92	600.0	3.1 ± 56	MAK
	58 (60W, 30N) 12-18"	1020	9-16-92	806.6	3.1 ± 36	MAK
	58 (60W, 30N) 18-24"	1020	9-16-92	750.1	2.4 ± 44	MAK

Received by: [signature]

MDA = DEPTH 0-6" @ 1.6 pCi/g

Remarks > 6" @ 2.1

REVIEW QC/QA [signature]

Reviewed John O'Hanum 9/17/92

SOIL SAMPLE LOG

Radium–226

PROPERTY 28 Lewis Ave

SAMPLE ID	DATE/TIME Sampled	DATE/TIME Counted	WEIGHT grams	ACTIVITY pCi/gram +/– %error	COUNT By
59 (70W, 30N) 0-6"	9/14/92 1030	9-16-92	511.9	3.2±53	MAC
59 (70W, 30N) 6-12"	1030	9-16-92	572.9	4.9±31	MAC
59 (70W, 30N) 12-18"	1030	9-16-92	722.4	2.2±55	MAC
59 (70W, 30N) 18-24"	1030	9-16-92	676.7	2.1±51	MAC

Received by: [signature]

MDA = DEPTH 0-6" ≈ @ 1.6 pCi/g

Remarks >6" ≈ @ 2.1

Reviewed [signature] 9/17/92

Review RCRA [signature]

ATTACHMENT B

CONTAMINATION/RADIATION SUMMARY

FOR

28 LEWIS AVENUE

(1 Page)

EPA–LANSDOWNE PROJECT

RADIATION/CONTAMINATION SUMMARY

Location: 28 Lewis Ave.

ITEMS REQUIRING REMOVAL TO OBTAIN RELEASE	LOCALIZED? YES/NO	SUPPORTING SAMPLE DATA Sample #	pCi/g	uR/hr
Soil to a 12" depth bounded by: The property line to the north,	NO	Several		
by a line 10' East of reference, by a line 70' west of		max:	6" → 36.9	N/A
reference and by a line 30' north of reference			12" → 74.3	N/A

Completed by: Wm D Rauh Date: 9-17-92

Reviewed by: John O Hamm Date: 9/17/92

PAGE 1 of 1

ORIGINAL
(Red)

II. SOIL REMEDIATION SURVEYS

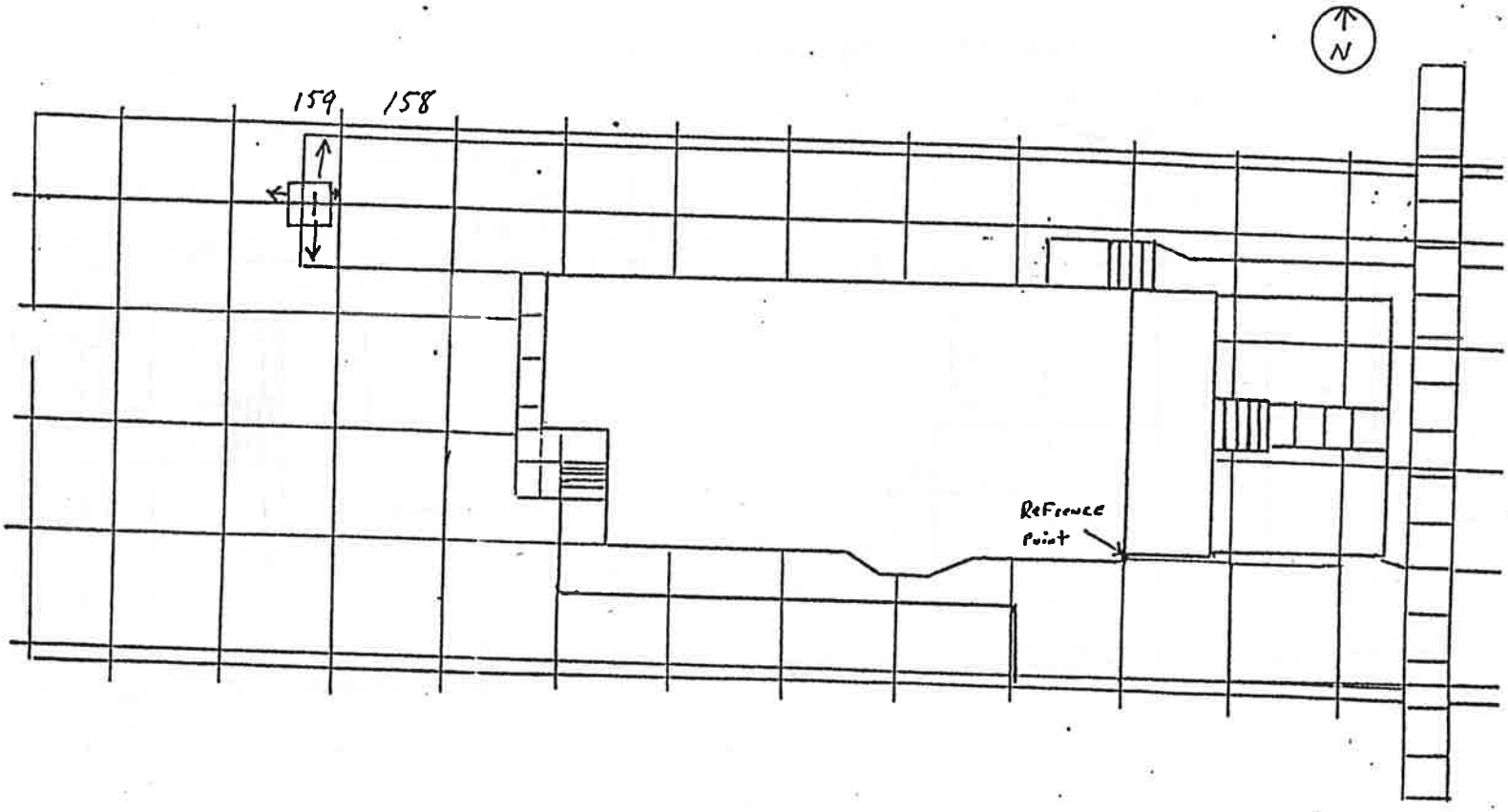
ORIGINAL (Red)

ENVIRONMENTAL TECHNOLOGY INC
LANSDOWNE/EPA
AUSTIN AVENUE RADIATION SITE (AARS)

Routine Radiation/Contamination Survey Form

Date/time 10-21-92 11330	Tech M. Chase	Instruments/#
Location/Purpose 28 Lewis		Survey # 92-757 RWP # 92-199
6" Below Surface Area Excavation		

SOIL



No. Loc.	Key Type	Depth Feet	*Ra226 pci/g +- % Error	Weight grams	Soil/Rubble Description	Smears-alpha Gross	Smears-alpha dpm	No. Loc.	Key Type	Depth Feet	Ra226 pci/g +- % Error	Weight grams	Soil/Rubble Description	Smears-alpha Gross	Smears-alpha dpm
1	E	6"	6.9±43	663.9	Grid 159										

Comments: All Samples Taken 6" Below Surface Composite Excavation

Scaler S/N	background	efficiency	MDA-dpm

* Ra226 activities (.186 Mev) / errors (+- percent %) reported wet # 90% CL

Key Type: E / I / V / C = Excavation, Info, Verification, Composite = soil/rubble, QC/QA

Air Sample Data =

= Smearable # 100cm2 unless noted

Labtech= [signature]

HILBERT.SURVEY

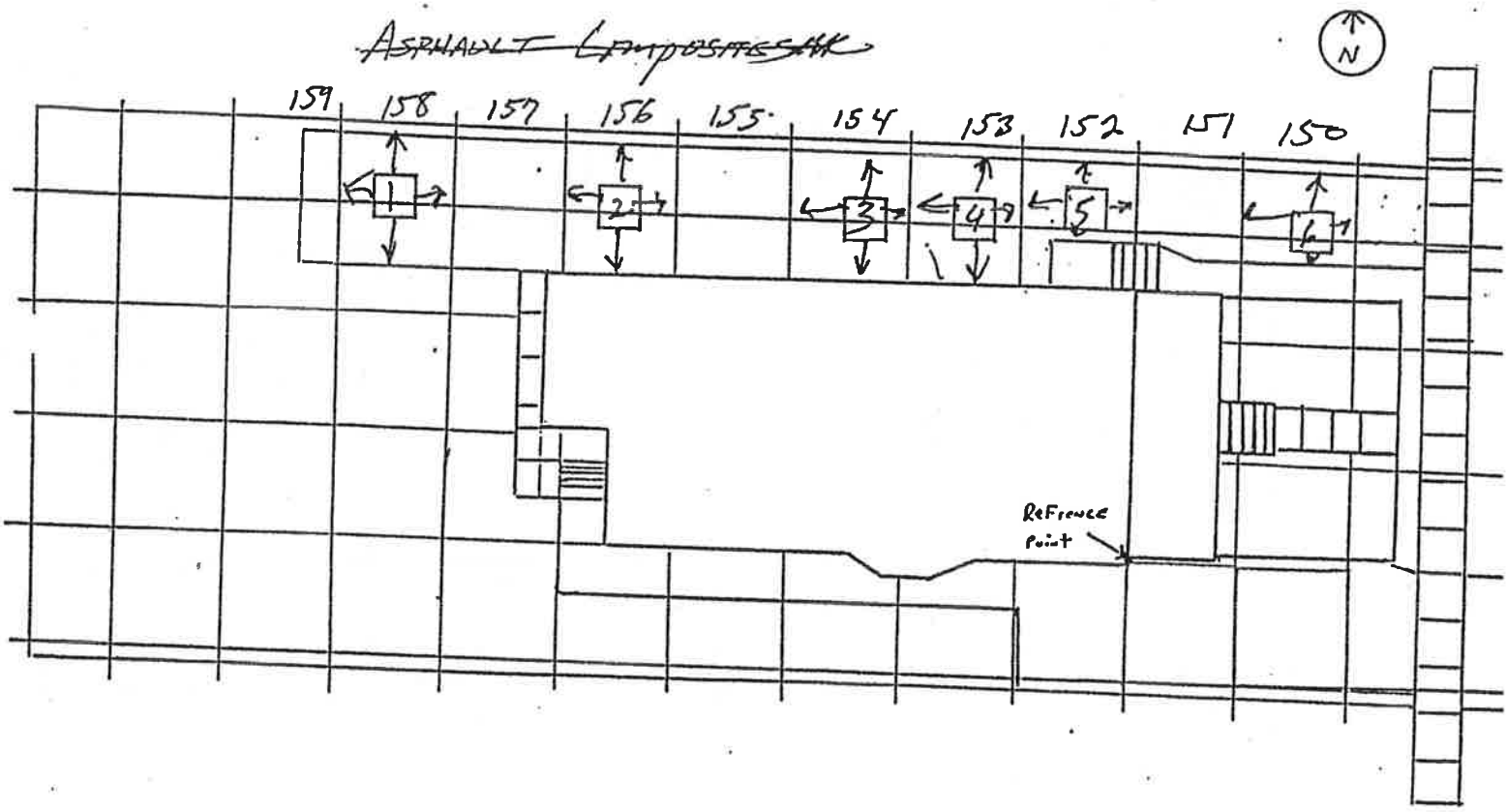
REVIEW

ORIGINAL (Red)

ENVIRONMENTAL TECHNOLOGY INC
LANSDOWNE/EPA
AUSTIN AVENUE RADIATION SITE (AARS)

Routine Radiation/Contamination Survey Form

Date/time 10-21-92 / 1130	Tech Mr Chase	Instruments/#
Location/Purpose 28 Lewis		Survey # 92-759 RWP # 92-199
All sample Excavation Soil surface		
S After Asphalt Removal		



No. Loc.	Key Type	Depth Feet	*Ra226 pci/g +- % Error	Weight grams	Soil/Rubble Description	Smears-alpha Gross	Smears-alpha dpm	No. Loc.	Key Type	Depth Feet	Ra226 pci/g +- % Error	Weight grams	Soil/Rubble Description	Smears-alpha Gross	Smears-alpha dpm
1	E	~.5	7.0±39	818.4	SOIL - under asphalt										
2	E		2.1±51	851.8											
3	E		7.7±27	863.1											
4	E		3.1±44	881.9											
5	E		12.9±44	743.4											
6	E		5.4±32	917.2											

Comments: All sample Taken after Asphalt Removal surface soil composite

Scaler S/N	background	efficiency	MDA-dpm
Air Sample Data =			

* Ra226 activities (.186 Mev) / errors (+- percent %) reported wet @ 90% CL

Key Type: E / I / V / C = Excavation, Info, Verification, Composite = soil/rubble, QC/QA

S = Smearable @ 100cm2 unless noted

Labtech= [signature]

KILBERT.SURVEY

REVIEW _____

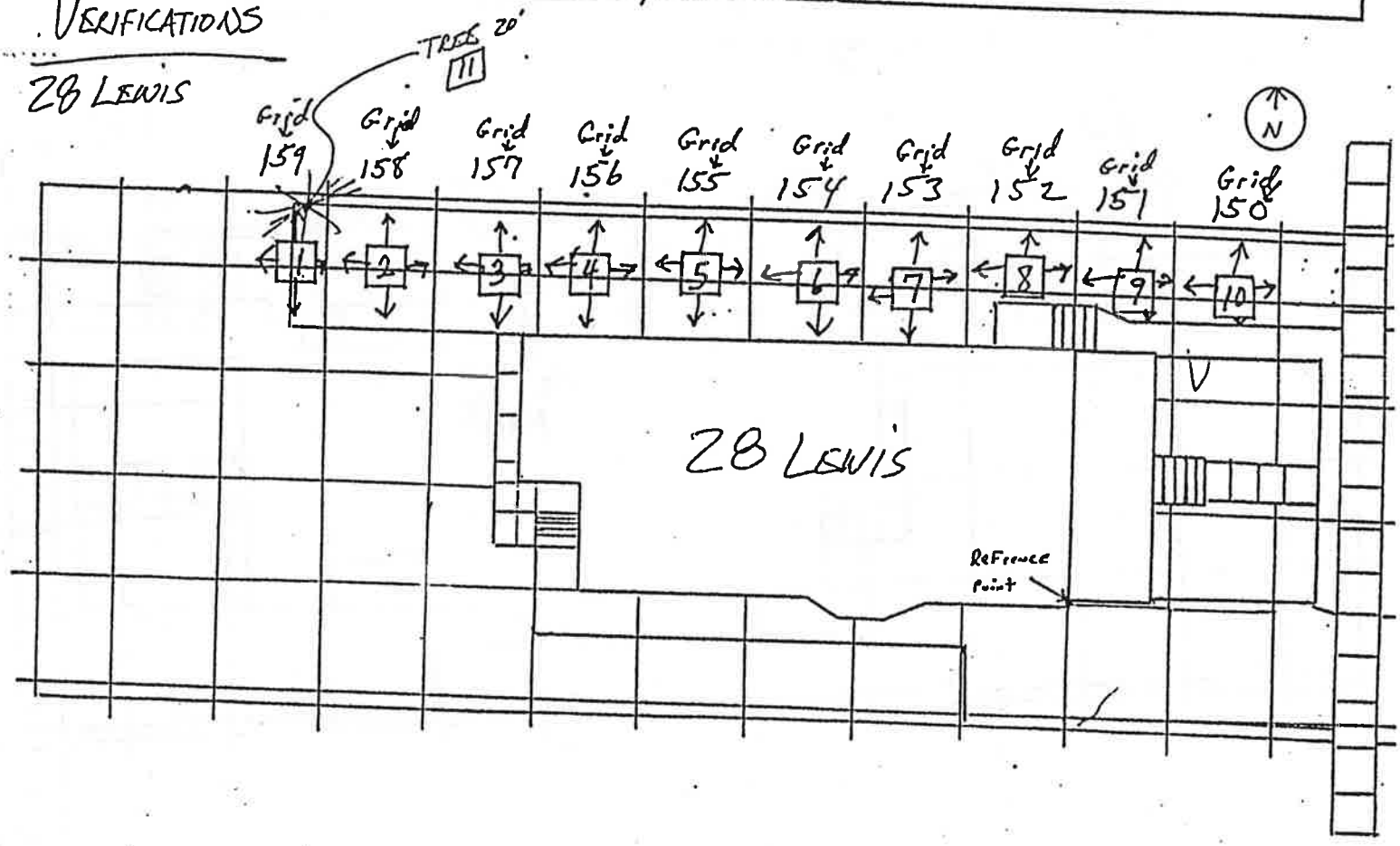
ORIGINAL (Red)

ENVIRONMENTAL TECHNOLOGY INC
LANSDOWNE/EPA
AUSTIN AVENUE RADIATION SITE (AARS)
Routine Radiation/Contamination Survey Form

Date/time 10-26-92	Tech M. Chase	Instruments/I
Location/Purpose 28 LEWIS 9" Below Surface Soil Samples		Survey # 92-775 RWP # 92-202

VERIFICATIONS

28 LEWIS



Grid points #151/30N, 10E #159/70W, 30N Are included in Grids 159 to 150

Site Loc.	Key Type	Depth Feet	Gamma pR/h ± % Error	Weight grams	Soil/rubble Description	Beta/alpha Gross	Beta/alpha Net
1	V	9"	5.0±41	708.6	Soil Samples		
2	V	9"	14.1±22	879.5	Verifications		
3	V	9"	13.2±20	879.8			
4	V	9"	12.6±20	956.3			
5	V	9"	4.9±38	947.2			
6	V	9"	7.7±30	846.5			
7	V	9"	2.7±54	1001.4			
8	V	9"	8.4±24	1072.8			
9	V	9"	4.7±36	887.5			
10	V	9"	3.5±42	1015.2			

Site Loc.	Key Type	Depth Feet	Gamma pR/h ± % Error	Weight grams	Soil/rubble Description	Beta/alpha Gross	Beta/alpha Net
11	V	7.5	16.1±24	580.7	Soil Composite Around Tree	grid 159	
grid 155	E	9"+	18.8±15	788.8	EXCAVATION Soil Samples	(#5)	
grid 159	E	9"+	18.0±27	651.0		(#1)	

Comments: All SAMPLES 9" below Surface Composite Soil

Scaler S/N | background | efficiency | MDA-dpm

* Radio activities (.186 MeV) / errors (+- percent 1) reported not ± 95% CL

Key Types: E/I/V/C = Excavation, Info, Verification, Composite = soil/rubble, QC/QA

Air Sample Data =

* = Removable ± 100cm2 unless noted

Labtech=

XILBERT.SURVEY

REVIEW

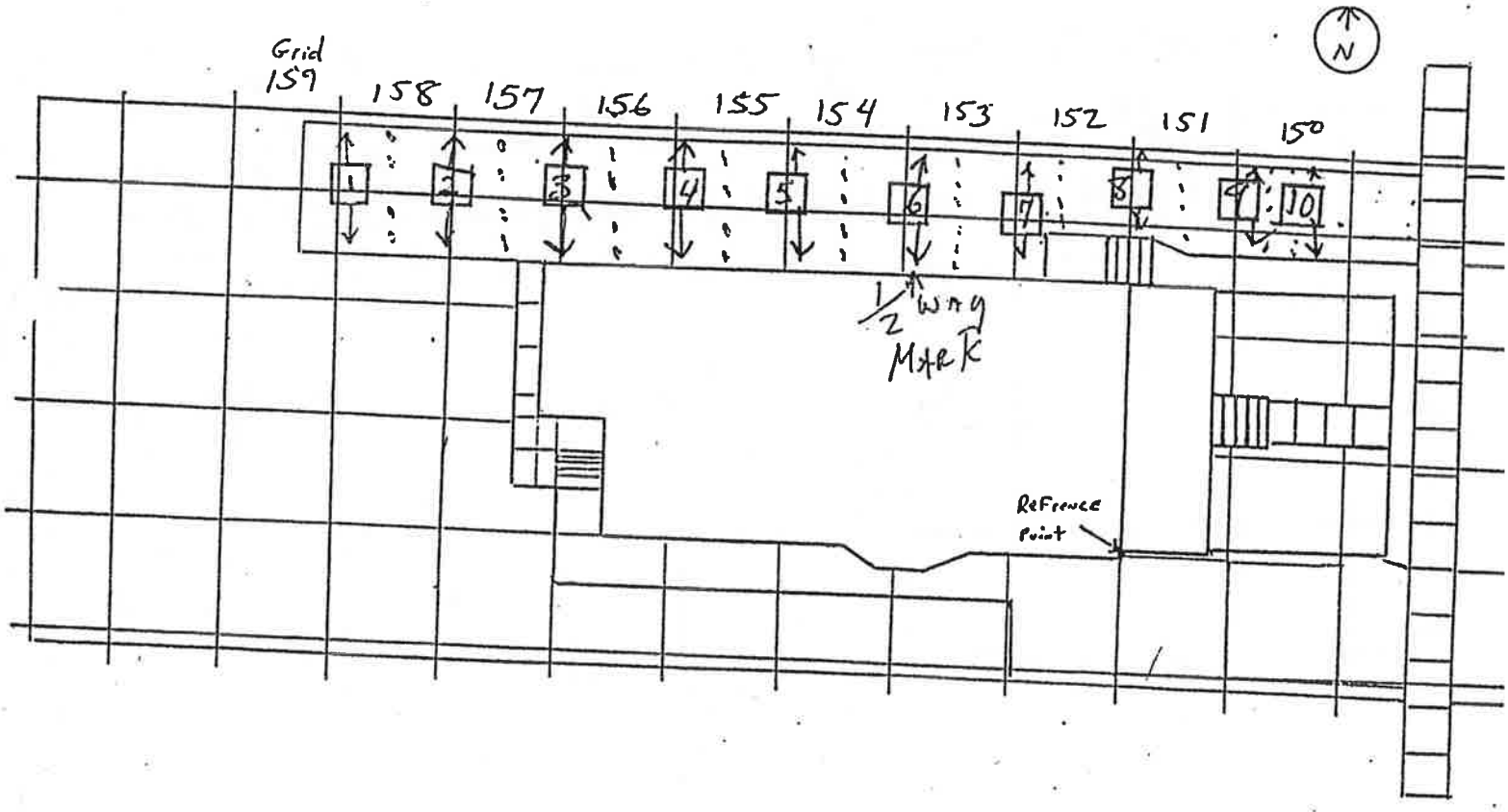
ORIGINAL (Red)

ENVIRONMENTAL TECHNOLOGY INC
LANSDOWNE/EPA
AUSTIN AVENUE RADIATION SITE (AARS)

Routine Radiation/Contamination Survey Form

Date/time 10-20-92	Tech M. Chase	Instruments/#
Location/Purpose 28 Lewis		Survey # 92-756?
Asphalt Removal Composites		RWP # 92-199

Asphalt Release Composites



No. Loc.	Key Type	Depth Feet	*Ra226 pci/g +- % Error	Weight grams	Soil/Rubble Description	Gross	dpm	No. Loc.	Key Type	Depth Feet	Ra226 pci/g +- % Error	Weight grams	Soil/Rubble Description	Gross	dpm
1	V	.5	.8±134	637.3	Asphalt composites										
2	V		.5±139	862.3											
3	V		1.1±72	731.4											
4	V		1.0±57	741.5											
5	V		.8±55	813.5											
6	V		1.1±49	885.1											
7	V		.7±82	781.9											
8	V		.4±183	840.3											
9	V		.5±101	814.7											
10	V														

Comments: Asphalt removal composite

Scaler S/N	background	efficiency	MDA-dpm

* Ra226 activities (.186 Mev) / errors (+- percent %) reported wet @ 90% CL

Key Type: E / I / V / C = Excavation, Info, Verification, Composite = soil/rubble, QC/QA

Air Sample Data =

D = Detectable @ 100cm2 unless noted

Labtech= [signature]

HILBERT.SURVEY

REVIEW

ORIGINAL
(Red)

ATTACHMENT B

GAMMA SPECTROSCOPIC ANALYSIS OF BACKFILL

ENVIRONMENTAL TECHNOLOGY INC.

Lansdowne Backfill Soil Radiological Characterization

Lansdowne/EPA

ORIGINAL (Red)

28 LEWIS AVE

Location

DATE	LOCATION / DESCRIPTION	Sample I.D.	Depth Feet	Initial Activity * Ra226- pci/g +- % Error @ 90% CL	Final Activity * Ra226- pci/g +- % Error @ 90% CL		REMARKS	Tech
	28 LEWIS AVE							
11/02/92	BACKFILL SOIL ANALYSIS	1	n/a	n/a	2.2+-83		Backfill Soil Analysis	
	FROM ROCK CANYON, INC	2			2.7+-10			

Soil Release Criteria: <= 15 cm soil depth @ 5 pci/g ave. [Ra226] > Site Bkd @ 2.1 pci/g

> 15 cm soil depth @ 15 pci/g [Ra226] ave. over approx. 100m2

* Typical HCA Ra226 LLD (.186 Mev) @ 1.6 pci/g +-% error @ 90% Confidence Level Wet