Former Karnish Instruments Characterization Surveys And Remedial Action Options

City of Lock Haven, Clinton County, PA

Prepared for: Pennsylvania Department of Environmental Protection

PADEP Requisition No. 4-055
URS Project No. 41785927

March 2008

FORMER KARNISH INSTRUMENTS CHARACTERIZATION SURVEYS AND REMEDIAL ACTION OPTIONS CITY OF LOCK HAVEN CLINTON COUNTY, PA

Prepared for:
Pennsylvania Department of Environmental Protection

PADEP Requisition No. 4-055

Prepared by:
URS Corporation
Foster Plaza Four
501 Holiday Drive, Suite 300
Pittsburgh, PA 15220

URS Corporation Project No. 41785927

March 2008

Table of Contents

APPENDICES

List of Figures

1.0 Introduction

This report presents characterization survey data and summaries of the Former Karnish Instruments Site (Site). The Site consists of two locations where Karnish Instruments formerly conducted business. The initial location for Karnish Instrument is currently identified by a concrete pad situated in an empty lot immediately west of the entrance to the Piper Memorial Airport, between 1132 and 1166 Water Street. The second location is currently occupied by Ron's Rental on the first floor and apartments on the second and is situated at 210 Third Avenue.

Characterization surveys were performed at both sites during the Phase I Characterization Survey on November 12 through 16, 2007. The Phase I survey included:

- 100 % coverage gross gamma surveys of both open land areas
- Systematic and biased soil core boring sampling and analytical analysis
- Limited interior exposure rate measurements within the Ron's Rental Building
- Limited smear samples of removable contamination within the Ron's Rental Building
- Limited radon in air testing within the Ron's Rental Building

Based on the results of the Phase I surveys, additional surveys were planned and carried out in the Phase II Characterization Survey on January 28 through February 1, 2008. The Phase II survey included:

- 100% coverage gross gamma surveys of the Ron's Rental Building floor surfaces.
- 70 measurements of total and removable, alpha and beta contamination on the interior of the Ron's Rental Building
- Systematic exposure rate surveys at 1-meter above the floor surfaces within the interior of the Ron's Rental Building

In addition, the State of Pennsylvania conducted additional radon in air testing within the interior of the Ron's Rental Building. This report includes a summary of all of the characterization surveys results.

Based on the results of the characterization surveys, remedial action options for the unrestricted release of the Site are also presented in this report, with the associated costs.

Since the sites are impacted with radium-226 (Ra-226), the following acceptance criteria for unrestricted use, recommended by the PaDEP Bureau of Radiation Protection, were used to evaluate remedial actions considered within this report. The soil acceptance criteria is 5 pico-Curie per gram (pCi/g) of Ra-226 above background consistent with EPA/CERCLA guidance. The values for Ra-226 surface contamination provided in USNRC RG-1.86 were used: 100 disintegrations per minute per 100 centimeters squared (dpm/100cm^2) of total contamination and 20 dpm/100cm^2 of removable contamination.

2.0 Characterization Surveys

The characterization surveys are categorized by location and type and were designed/performed using the guidance of NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). The location is either exterior open land areas or interior building surfaces. For exterior open land areas, 100% coverage, gross gamma walk-over surveys in units of counts per minute (cpm) and systematic soil core boring samples were used to characterize the soil. The entire core samples were scanned for gross gamma activity (cpm) and 6-inch segments were selected for gamma spectroscopy analysis to identify Ra-226.

Interior building floor surfaces were characterized by 100% coverage gross gamma surveys and biased measurements of total and removable, alpha and beta surface contamination (dpm/100cm^2). In addition, measurements of exposure rate in units of micro-Roentgen per hour (μR/hr) were made at 1-meter above both exterior and interior surfaces and standard 2-day radon samples were taken. Finally, other biased locations such as cinderblock walls and work benches were also surveyed.

2.1 Exterior Characterization Surveys

The exterior open land characterization surveys included 100% coverage gross gamma, walk-over surveys and soil core boring samples. The core boring samples were scanned for gross gamma activity and selected 6-inch segments were analyzed by a static count of gross gamma activity and by gamma spectroscopy for Ra-226 activity.

2.1.1 Piper Airport

The open land area adjacent to the Piper Airport was a flat rectangular plot (approximately 130 feet by 240 feet), defined on two sides by city streets. A small concrete slab was located within the parcel. The parcel was covered by thick grass and bordered by one large tree.

A 100% coverage gross gamma walk survey indicated one area of elevated radioactivity (relative to background) adjacent to the small concrete slab. The results of the walkover survey are presented on Figure 1.

Systematic core boring samples were taken across the parcel. The locations of the borings are indicated on Figure 2. In addition, biased core samples were taken in the elevated area identified by the 100% gross gamma walk over survey. A total of 16 core samples were taken to a depth of 8-feet initially and scanned for gross gamma activity. If the results of the scan indicated gross gamma count rates greater than background near the bottom of the core an additional 4-foot segment was drawn and scanned. None of the core locations required additional coring. In addition to the scan, 1-minute static counts of the highest segment(s) of the core were performed and the results are presented in Appendix A.

The highlighted values of the core borings indicate the segment retained for further analysis. Eight 6-inch segments of the core were also forwarded to an off site laboratory for gamma spectroscopy analysis. The Ra-226 result in units of pico-Curie per gram (pCi/g) are also presented in Appendix A and in Appendix C.

The results of the scan and sampling survey of the Piper Airport open land parcel indicate a small surface area (30 feet by 15 feet) at a depth of 0-12 inches of elevated soil adjacent to the concrete slab (Figure 3). The analytical analyses indicate Ra-226 activity concentrations ranging from background (approximately 1 pCi/g) to 323 pCi/g. All of the additional area of the parcel indicates background radioactivity. The total volume of soil estimated for removal is less than one standard intermodal volume of 17 in place cubic yards.


East Water Street
Proctor Street
Piper Memorial Airport
353 Proctor Street
Lock Haven, PA 17745
Legend
< 14,000 cpm
14,000 - 25,000 cpm
25,000 - 50,000 cpm
50,000 - 75,000 cpm
75,000 - 100,000 cpm
> 100,000 cpm
0 30 60 120 180 240
Feet
Walkover Statistics
6,408 pts collected
Min Count Rate 2,316 cpm
Max Count Rate 168,844 cpm
Mean 9,332 cpm
St Dev 11,320 cpm

Figure 1

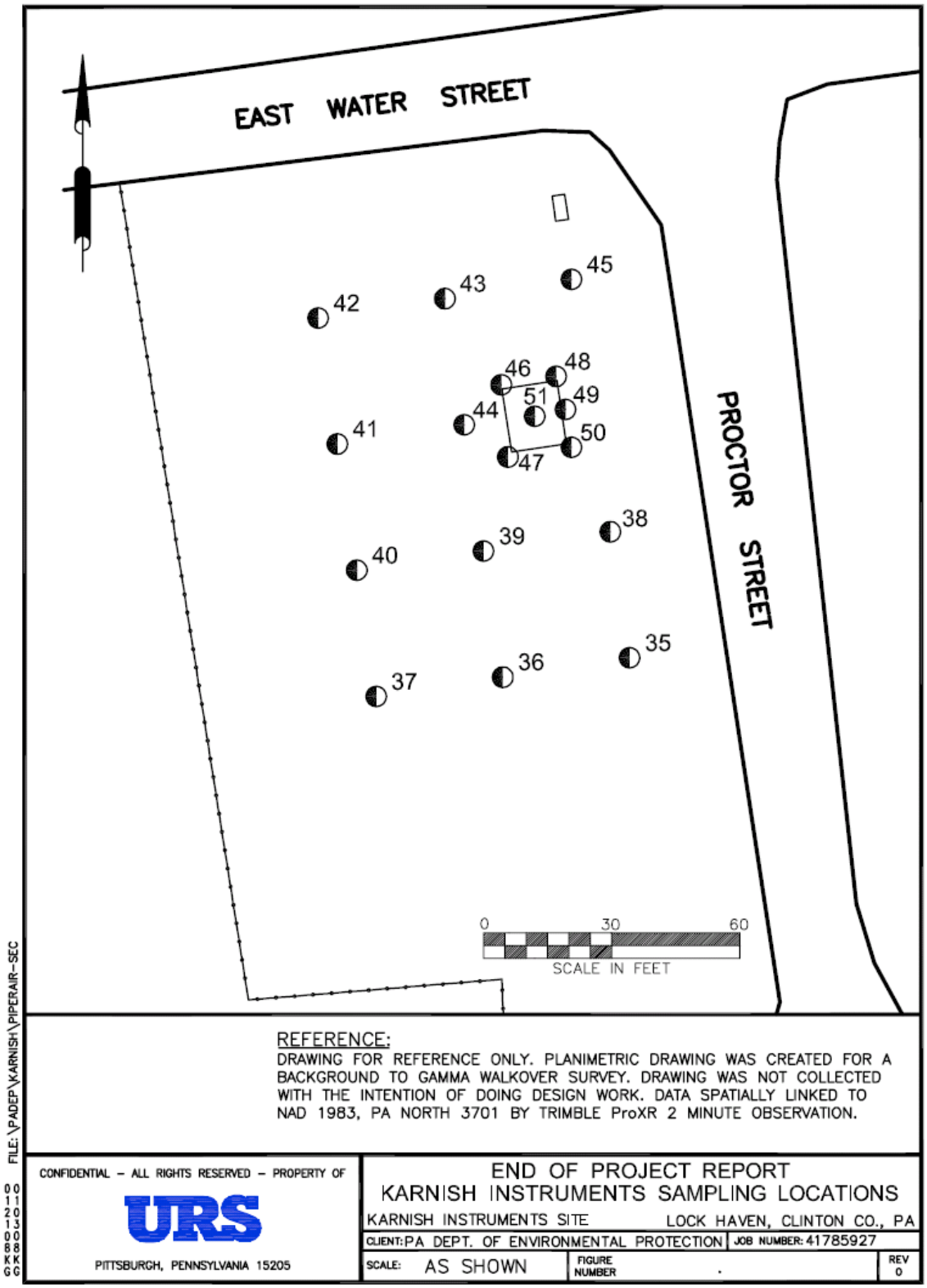

EAST WATER STREET
PROCTOR STREET
42
43
45
46
48
51
49
44
41
50
47
40
39
38
37
36
35
0
30
60
SCALE IN FEET
REFERENCE:
DRAWING FOR REFERENCE ONLY. PLANIMETRIC DRAWING WAS CREATED FOR A BACKGROUND TO GAMMA WALKOVER SURVEY. DRAWING WAS NOT COLLECTED WITH THE INTENTION OF DOING DESIGN WORK. DATA SPATIALLY LINKED TO NAD 1983, PA NORTH 3701 BY TRIMBLE ProXR 2 MINUTE OBSERVATION.
FILE: \PADEP\KARNISH\PIPERAIR-SEC
CONFIDENTIAL – ALL RIGHTS RESERVED – PROPERTY OF
URS
PITTSBURGH, PENNSYLVANIA 15205
END OF PROJECT REPORT
KARNISH INSTRUMENTS SAMPLING LOCATIONS
KARNISH INSTRUMENTS SITE
LOCK HAVEN, CLINTON CO., PA
CLIENT: PA DEPT. OF ENVIRONMENTAL PROTECTION
JOB NUMBER: 41785927
SCALE: AS SHOWN
FIGURE NUMBER
REV 0

Figure 2

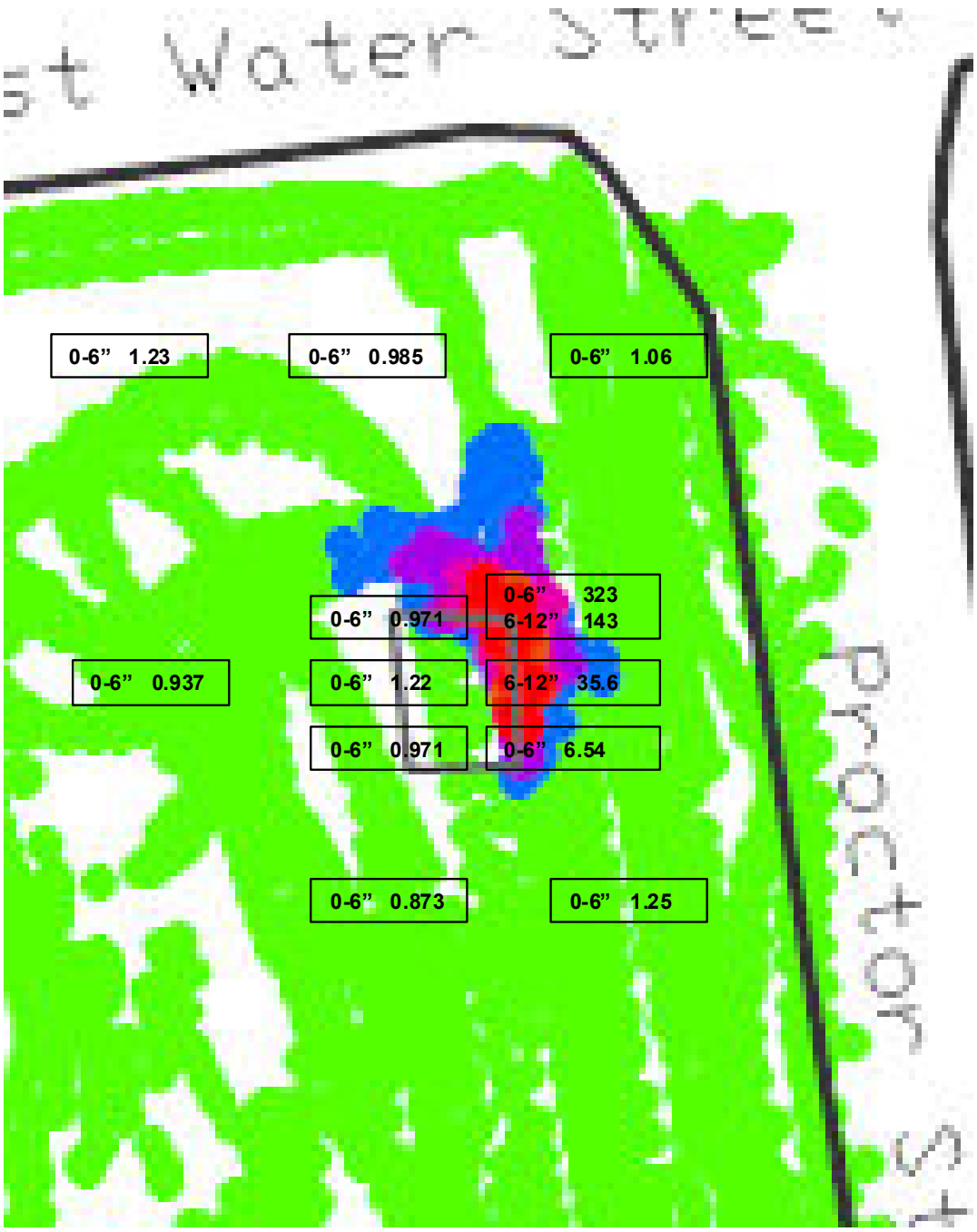

0-6" 1.23
0-6" 0.985
0-6" 1.06
0-6" 323
0-6" 0.971
6-12" 143
0-6" 0.937
0-6" 1.22
6-12" 35.6
0-6" 0.971
0-6" 6.54
0-6" 0.873
0-6" 1.25

Figure 3

2.1.2 Ron's Rental

The open land area surrounding the Ron's Rental building is relatively flat rectangular plot, defined on two sides by city streets. The Ron's Rental Building sits within the parcel. The parcel was covered by grass in some areas and by a gravel parking lot south of the building.

A 100% coverage gross gamma walk survey indicated several areas of elevated radioactivity (relative to background). The results of the walkover survey are presented on Figure 4. The legend lists the color and its associated counts per minute (cpm) exposure rate. The two Carolina blue areas indicate where the exposure rate exceeded the maximum instrument reading.

Systematic core boring samples were taken across the parcel. The locations of the borings are indicated on Figure 5. In addition, biased core samples were taken in the elevated area identified by the 100% gross gamma walk over survey. A total of 34 core samples were taken to a depth of 8-feet initially and scanned for gross gamma activity. If the results of the scan indicated gross gamma count rates greater than background near the bottom of the core an additional 4-foot segment was drawn and scanned. Three of the core locations required additional coring. In addition to the scan, 1-minute static counts of the highest segment(s) of the core were performed and the results are presented in Appendix B, Table B-1.

Twenty two 6-inch segments of the core were also forwarded to an off site laboratory for gamma spectroscopy analysis. The Ra-226 result in units of pico-Curie per gram (pCi/g) are also presented in Appendix B, Table B-1 and in Appendix C.

The results of the scan and sampling survey of the Ron's Rental open land parcel indicate several surface areas at depths up to 8-feet of elevated soil (Figure 3 and Table B-1)). The analytical analyses indicate Ra-226 activity concentrations ranging from background (approximately 1 pCi/g) to 8,110 pCi/g. The total volume of soil estimated for removal is 340 in place cubic yards.

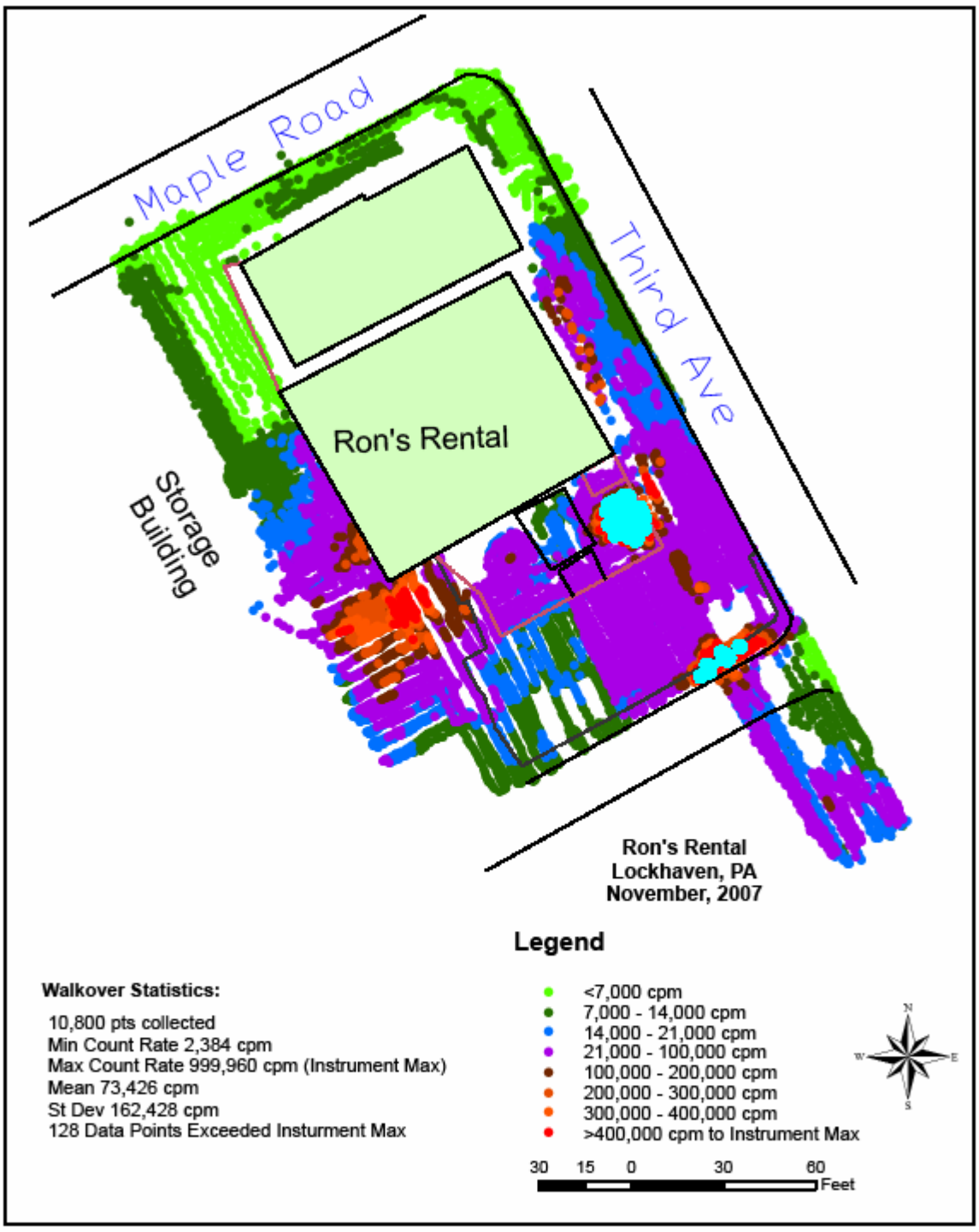

Maple Road
Third Ave
Ron's Rental
Storage Building
Ron's Rental
Lockhaven, PA
November, 2007
Legend
<7,000 cpm
7,000 - 14,000 cpm
14,000 - 21,000 cpm
21,000 - 100,000 cpm
100,000 - 200,000 cpm
200,000 - 300,000 cpm
300,000 - 400,000 cpm
>400,000 cpm to Instrument Max
30 15 0 30 60
Feet
Walkover Statistics:
10,800 pts collected
Min Count Rate 2,384 cpm
Max Count Rate 999,960 cpm (Instrument Max)
Mean 73,426 cpm
St Dev 162,428 cpm
128 Data Points Exceeded Insturment Max

Figure 4

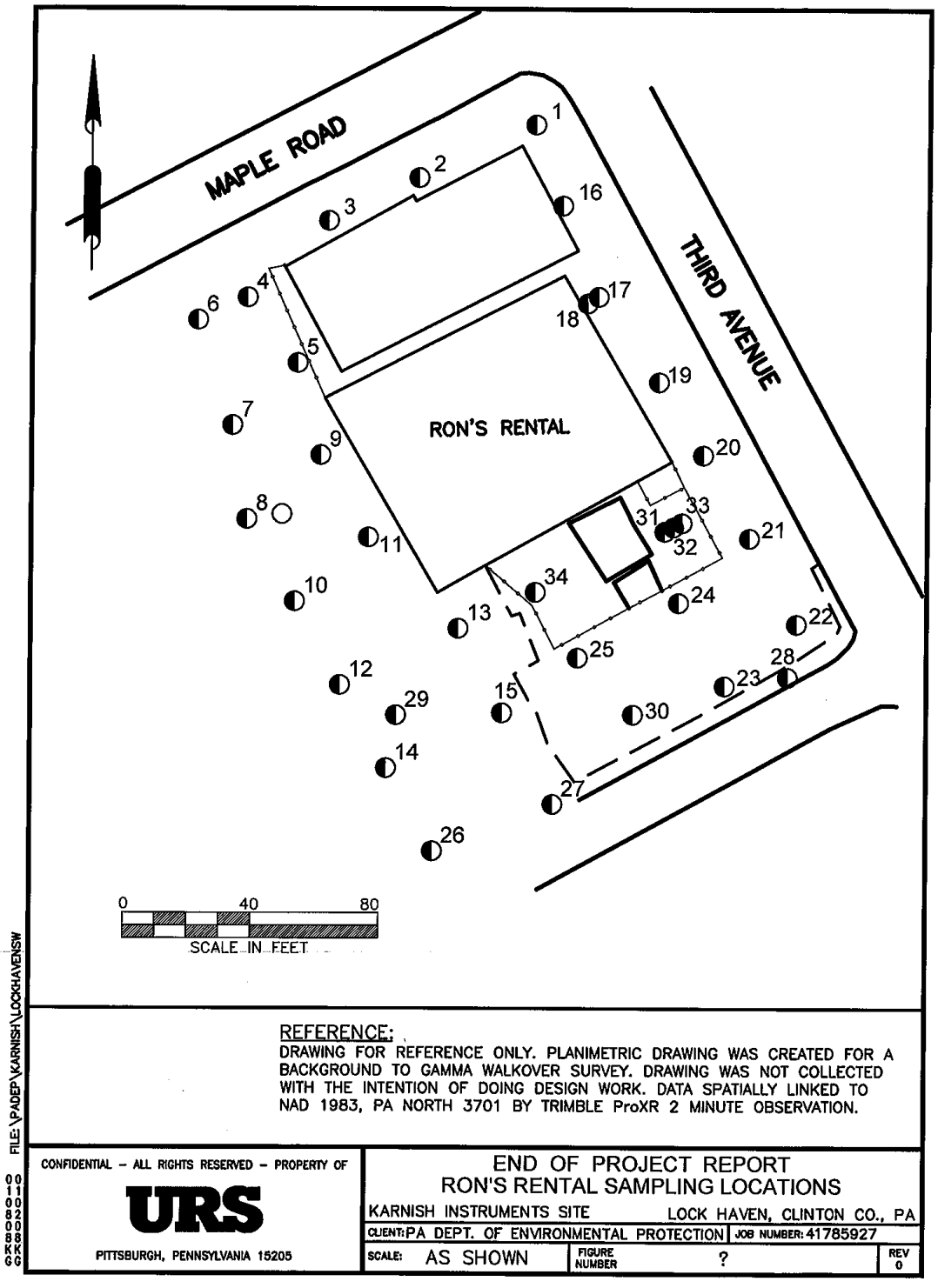

MAPLE ROAD
THIRD AVENUE
RON'S RENTAL
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
0
40
80
SCALE IN FEET
REFERENCE:
DRAWING FOR REFERENCE ONLY. PLANIMETRIC DRAWING WAS CREATED FOR A BACKGROUND TO GAMMA WALKOVER SURVEY. DRAWING WAS NOT COLLECTED WITH THE INTENTION OF DOING DESIGN WORK. DATA SPATIALLY LINKED TO NAD 1983, PA NORTH 3701 BY TRIMBLE ProXR 2 MINUTE OBSERVATION.
FILE: \PADEP\KARNISH\LOCKHAVEN\SW
CONFIDENTIAL – ALL RIGHTS RESERVED – PROPERTY OF
URS
PITTSBURGH, PENNSYLVANIA 15205
END OF PROJECT REPORT
RON'S RENTAL SAMPLING LOCATIONS
KARNISH INSTRUMENTS SITE
LOCK HAVEN, CLINTON CO., PA
CLIENT: PA DEPT. OF ENVIRONMENTAL PROTECTION
JOB NUMBER: 41785927
SCALE: AS SHOWN
FIGURE NUMBER ?
REV 0

Figure 5

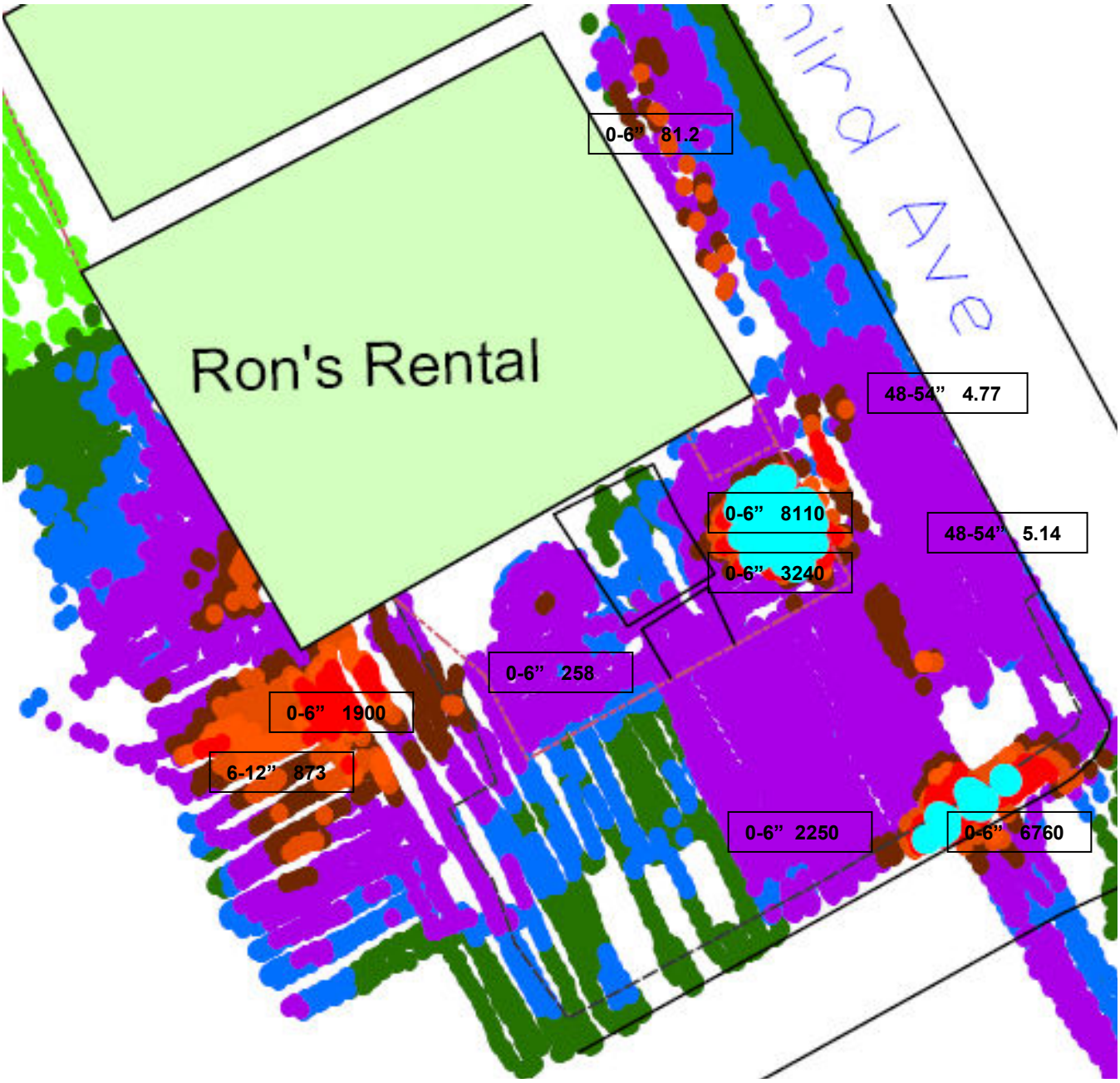

Ron's Rental
0-6" 81.2
48-54" 4.77
0-6" 8110
48-54" 5.14
0-6" 3240
0-6" 258
0-6" 1900
6-12" 873
0-6" 2250
0-6" 6760

Figure 6

2.2 Interior Characterization Surveys

Interior characterization surveys within the Ron's Rental Building included the following:

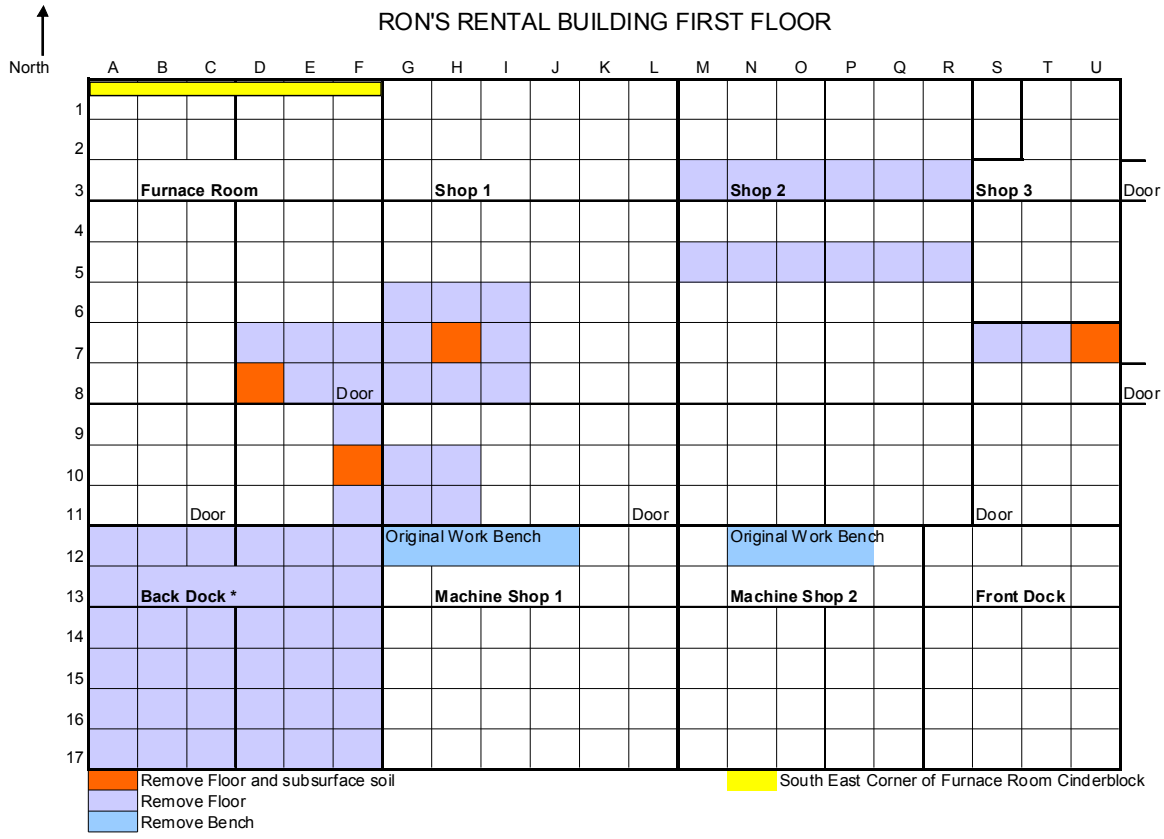
- A systematic, 100% coverage gross gamma scan of the floor surfaces to identify elevated areas.
- Systematic measurements of ambient gamma exposure rate at 1-meter above floor surfaces
- Seventy survey points on floor and wall surfaces were measured for:
  - Total alpha contamination (dpm/100cm^2)
  - Total beta contamination (dpm/100cm^2)
  - Removable alpha contamination (dpm/100cm^2)
  - Removable beta contamination (dpm/100cm^2)
- Eight core boring samples through the floor of the Ron's Rental Building to evaluate the depth of contamination and identify possible subsurface (beneath the concrete slab floor) contamination
- Radon in air measurements by two day charcoal canister samples.

A 1-meter by 1-meter grid system, as presented in Figure 7, was used to perform all of the systematic 100 % gross gamma scans of floor surfaces and of the ambient gamma exposure rates at 1-meter above the floor surface measurements. The results of these surveys and the locations of the 70 survey points (for total and removable contamination measurements) and the eight core borings are presented in the individual room survey maps within Appendix D.

The results of the total and removable, alpha and beta surface contamination measurements are presented in Appendix E. The majority of the results exceed the RG-1.86 total and removable contamination acceptance criteria of 100 and 20 dpm/100cm^2 respectively. The calculated removable fraction for both alpha and beta surface contamination is less than 2%, a factor of 5 below the assumed removable fraction of 10% used for standard dose assessments.

The results of the core sample scans are presented in Appendix F. Cores through areas of high surface contamination were generally contaminated through out the 4-inch depth of the concrete core. Subsurface contamination was identified at three of the core locations.

The results of the initial radon in air samples and the subsequent radon in air samples are presented in Appendix G.



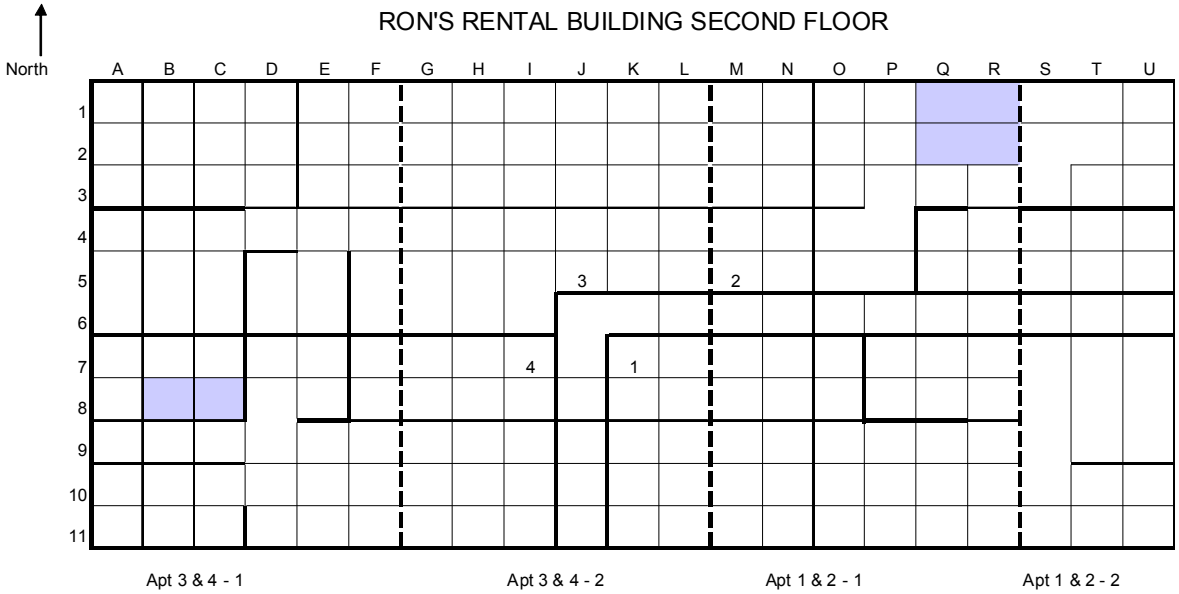


Figure 7

2.3 Installation of Control Measures Around Outside Areas

URS placed orange construction fence around the identified area of elevated activity located in the southeast corner of the Ron's Rental property to minimize access into this area by pedestrians and vehicles.

Figure 8

2.4 Metals Analysis

URS also performed metals analysis on samples sent to Lionsville Laboratories. Six (6) sample results contained levels of contaminants above the Medium-Specific Concentrations (MSC). Two (2) of the samples were from Ron's Rental property, SB13 and SB33, and four (4) of the samples were located at the Airport Property, SB43, SB48, SB49, and SB50.

A summary of the two (2) soil samples indicating elevated levels of metals at the Ron's Rental property is provided below.

- Soil sample SB1300 represents SB13 at 0 to 6-inches below grade. The soil boring is located on the southwest corner of the Ron's Rental building. This sample contained levels of Arsenic (12.7 mg/kg) and Chromium (160 mg/kg) in excess of the Residential MSC but below Non-Residential MSC.

- Soil sample SB3300 represents SB33 at 0 to 6-inches below grade. The soil boring is located on the southeast corner of the Ron's Rental building. This sample contained levels of Lead (587 mg/kg) in excess of the Residential MSC but below Non-Residential MSC.

A summary of the four (4) soil samples indicating elevated levels of metals at the Airport Property is provided below.

- Soil sample SB4354 represents SB43 at 54 to 60-inches below grade. The soil boring is located northwest of the concrete pad. This sample contained levels of Lead (1,320 mg/kg) in excess of the Residential MSC and Non-Residential, 0-2' MSC but below Non-Residential, 2-15' MSC.

- Soil sample SB4800 represents SB48 at 0 to 6-inches below grade. The soil boring is located on the northeast corner of the concrete pad. This sample contained levels of Arsenic (13.9 mg/kg) in excess of the Residential MSC but below Non-Residential MSC.

- Soil sample SB4906 represents SB49 at 6 to 12-inches below grade. The soil boring is located on the eastern edge of the concrete pad. This sample contained levels of Arsenic (17.3 mg/kg) in excess of the Residential MSC but below Non-Residential MSC.

- Soil sample SB5000 represents SB50 at 0 to 6-inches below grade. The soil boring is located on the southeast corner of the concrete pad. This sample contained levels of Arsenic (15.2 mg/kg) in excess of the Residential MSC but below Non-Residential MSC.

Chromium and Lead levels contained in the samples located on the Ron's Rental property may possibly produce TCLP levels in excess of the 5.0 mg/l LDR for both of these metals. If this is the case, a mixed waste may be shipped off-site from the Ron's Rental property at these locations.

2.5 Volatile Organic Screening

During the November 2007 site investigation activities, URS monitored for volatile organic compounds. As a soil core was extracted during soil boring procedures around the Ron's Rental and Airport properties, URS utilized a Photo Ionization Detector (PID) to scan the soil cores. No volatile organics were detected in the field. Therefore none of the samples shipped off-site for analysis were analyzed for volatile organics. Based on experience and history from the November 2007 investigation, URS did not perform volatile organic monitoring during the January 2008 investigation.

3.0 Remedial Action Options

URS has subdivided the remedial action evaluation into three discussions, exterior soil removal, minimal remediation activity pertaining to the Ron's Rental structure, and complete demolition of the Ron's Rental structure. URS believes this will provide the Department with the options and associated cost necessary to evaluate future actions for the Karnish Instrument sites. The cost estimates presented below are for order of magnitude analysis only.

In preparation of this report, URS contacted a local appraiser concerning commercial property values in the Lock Haven, Pennsylvania area. The appraiser stated that the value of an acre of vacant commercial property is approximately $30,000 and that the value of commercial building units is between $15 and $20 per square foot.

Based on the appraiser's information;

- A vacant Ron's Rental property would be valued at approximately $9,000.
- The Airport property would be valued at approximately $19,800.
- If minimal remediation activities were successful at the Ron's Rental property resulting in a functional building unit, the structure would be valued from $90,000 to $125,000.

3.1 Soil Removal – Exterior Areas

URS has identified several areas requiring soil removal at both the Ron's Rental and Airport properties. URS is recommending the removal of approximately 18 tons of contaminated soil located north and east of the concrete pad located on the Airport property (See Figure 3) and approximately 525 tons of contaminated soil from the Ron's Rental property (See Figure 4). URS has prepared our cost analysis based on the removal of 6-inches of material in areas ***not*** identified as green in the figures plus an additional 1.5-foot in those areas identified as orange and red.

Conventional construction equipment will be utilized to remove contaminated soil located in areas providing the highest elevated levels of contamination. Removal of these areas will limit exposure and reduce "shine" into other areas allowing for a more accurate soil removal process. Extent of excavation will be determined in the field using real-time readings generated by the field instrumentation. The excavation of contaminated soil will progress until background is achieved. Following removal activities, a final status survey and report will be completed.

The removal of contaminated soil at the two locations will cost approximately $950,000 to complete.

3.2 Remedial Action - Option A: Ron's Rental Structure

Option A for the remedial action of the Ron's Rental involves a "surgical" approach in the removal of identified hotspots found during the two site investigation events. The general scope of work for this approach is as follows (See Figure 7).

- Furnace Room
  - 160 square feet of concrete floor removal.
  - 550 square feet of concrete floor scabbling, approximately ¼" depth.
  - 5 tons of soil removal to a depth of 4-feet in two 10-foot square areas.
  - Drain pipe removal.
  - 20 linear feet of concrete block wall removal from floor level to a height of 4-feet.
- Back Dock
  - 390 square feet of asphalt floor removal.
- Machine Shop #1
  - Work bench removal.
- Machine Shop #2
  - Work bench removal.
- Shop #1
  - 140 square feet of concrete floor removal.
  - 5 tons of soil removal to a depth of 4-feet in one 10-foot square area.
- Shop #2
  - 160 square feet of concrete floor removal.
  - 5 tons of soil removal to a depth of 4-feet in one 10-foot square area.
  - Drain pipe removal.
  - 20 linear feet of concrete block wall removal from floor level to a height of 4-feet.
- Apartment #2
  - 45 square feet of floor removal.
- Apartment #4
  - 25 square feet of floor removal.

The remedial activities will be followed by a final status survey and report, and restoration to current conditions. This approach will generate approximately 60 tons of radiological waste for transportation and disposal. The estimated cost to perform Option A is $380,000.

3.3 Remedial Action - Option B: Ron's Rental Structure

Option B for the remediation of the Ron's Rental structure involves the complete demolition of the building. Convention demolition equipment will be utilized to complete the demolition operation. URS suggest the removal of "hotspots" to reduce exposure and to promote the elimination of "shine" to better identify demolition material containing elevated activity due to contamination. As the building is demolished, the debris will be scanned to determine activity level. Based on this screening process, the material will be disposed at a licensed radiological facility or at a local construction and debris landfill. The estimated cost to complete this option includes the disposal of approximately 180 tons of radiologically contaminated material and 530 tons of construction debris. The demolition activities will be followed by a final status survey and report. The estimated cost to complete this option is $750,000.

.

4.0 Current Exposure Assessment (Immediate Health Concern)

The following is an estimate of public exposure to Ra-226 (includes radon) within Ron's Rental Building based on the results of the two characterization surveys and assuming no remedial action. Exposure assessments are used to calculate the total dose from both external (radioactive material outside of the body) and internal exposure (radioactive material inside the body) to radioactive material (in this case Ra-226).

External Exposure:

External exposure consists primarily of gamma radiation exposure, received while in proximity of radioactive material. Therefore, the potential external exposure within the Ron's Rental Building is variable, depending on where within the building the majority of time is spent by the exposed individual. Therefore, a maximum and an average external exposure are estimated for both first floor exposure and second floor exposure. An annual building occupancy of the first floor of Ron's Rental is assumed to be 2,000 hours, the average occupational year. An annual building occupancy of 2,856 hours per year is assumed for the 2nd floor apartments based on two 17-week semesters and 12 hours indoors a day.

Max Exposure, 1st Floor – Grid H6 (around computer bench) @ 240 uR/hr x 2,000 hrs/yr / 1,000 uR/mrem = 480 mrem/yr external dose equivalent (EDE)

Average Exposure, 1st Floor – 20 uR/hr x 2,000 hrs/yr / 1,000 uR/mrem = 40 mrem/yr EDE

Max Exposure, 2nd Floor, Apartment 2 - Table Area @ 38 uR/hr x 2856 hrs/yr / 1,000 uR/mrem = 109 mrem/yr EDE

Average Exposure, 2nd Floor – 20 uR/hr x 2,856 hrs/yr / 1,000 uR/mrem = 57 mrem/yr

Internal Exposure:

Air sample results from air sampling during characterization do not indicate any airborne Ra-226 (0 cpm alpha after two days of decay). There was appreciable radon (Rn-222) on the air sample filters counted within 1/2 hour of turning air sampler off.

Radon canister samples were placed within the interior of the Ron's Rental Building for two day periods to evaluate the airborne concentration of radon (Rn-222). The results of radon air canister sample results in units of pCi/l can be converted to mrem of internal exposure based on the following conversion. This estimation of internal exposure from radon and progeny is conservative, i.e., does not account for various factors sensitive to radon exposure:

90 pCi/l x 1 hour of exposure = 2.5 mrem (10CFR20 Appendix B, Table 1 Occupational Exposure Derived Limit for Rn-222 of 90 pCi/l equal to 1 working level)

Initial Radon Canister Results

34.7 pCi/liter (Ron's Rental 1st floor)

33.7 pCi/liter (Ron's Rental 1st floor)

The subsequent radon results were consistent with the previous results for the first floor and the second floor results ranged from 15 to 74 pCi/liter.

Assuming 2,000 hours of exposure (one occupational year), a conservative estimate of the internal exposure on the 1st floor of the Ron's Rental Building would be:

2000 hrs x 33.7 pCi/l x (2.5 mrem / 90 pCi/l-hour) = 1872 mrem/yr from radon exposure

APPENDIX A

PIPER AIRPORT

SOIL BORINGS GROSS GAMMA SURVEY

AND

CORE SAMPLE ANALYTICAL (GAMMA SPECTROSCOPY) RESULTS

Piper Airport Soil Borings Gross Gamma (cpm) and Analytical Gamma Spectroscopy (pCi/g)

Inches	Range Feet	SB-35	SB-36	SB-37	SB-38	SB-38 GS (pCi/g)
		7381 - 8971	7271 - 8488	7308 - 8891	7905 - 8484	
0-6	0.5	8046	7697	7980	7910	
6-12	1	7936		7971		
12-18	1.5					
18-24	2				7846	
24-30	2.5		7691		8187	1.25
30-36	3	7992				
36-42	3.5	8236				
42-48	4					
48-54	4.5		7993			
54-60	5		8012			
60-66	5.5					
66-72	6	8390				
72-78	6.5	8693				
78-84	7	8495		8103		
84-90	7.5			8176		
90-96	8			8309	8108	

Inches	Range Feet	SB-39	SB-39 GS (pCi/g)	SB-40	SB-41	SB-41 GS (pCi/g)
		7273 - 9097		7192 - 9090	7391 - 8286	
0-6	0.5	7472		7698	7383	
6-12	1					
12-18	1.5					
18-24	2					
24-30	2.5					
30-36	3				7840	
36-42	3.5				7993	
42-48	4	7898		7988		
48-54	4.5	7984		8088		
54-60	5					
60-66	5.5					
66-72	6					
72-78	6.5					
78-84	7				8024	0.937
84-90	7.5	8180	0.873			
90-96	8			8403		

Piper Airport Soil Borings Gross Gamma (cpm) and Analytical Gamma Spectroscopy (pCi/g)

Inches	Range Feet	SB-42	SB-42 GS (pCi/g)	SB-43	SB-43 GS (pCi/g)	SB-44	SB-44 GS (pCi/g)
		7390 - 8980		7480 - 8486		7307 - 8903	
0-6	0.5	7843		7293		8037	
6-12	1						
12-18	1.5						
18-24	2			7636			
24-30	2.5					8284	1.22
30-36	3	8103	1.23			8084	
36-42	3.5	7790					
42-48	4						
48-54	4.5						
54-60	5			7981	0.985		
60-66	5.5						
66-72	6						
72-78	6.5						
78-84	7	8043					
84-90	7.5						
90-96	8					8039	

Inches	Range Feet	SB-45	SB-45 GS (pCi/g)	SB-46	SB-46 GS (pCi/g)	SB-47	SB-47 GS (pCi/g)
		7379 - 8601		7984 - 9150		7192 - 8288	
0-6	0.5	8081		8293		7882	
6-12	1					7994	1.35
12-18	1.5						
18-24	2			8398			
24-30	2.5						
30-36	3			8240		7705	
36-42	3.5	7848				7887	
42-48	4						
48-54	4.5						
54-60	5			8398			
60-66	5.5						
66-72	6						
72-78	6.5	8284		8298			
78-84	7	8333	1.06	8547	0.971	7912	
84-90	7.5						
90-96	8						

Piper Airport Soil Borings Gross Gamma (cpm) and Analytical Gamma Spectroscopy (pCi/g)

		SB-48	SB-48 GS (pCi/g)	SB-49	SB-49 GS (pCi/g)
	Range	7945 - 16450		7503 - 8680	
Inches	Feet				
0-6	0.5	17017	323	7787	
6-12	1	12079	143	8393	35.6
12-18	1.5	8487		8007	
18-24	2	8245			
24-30	2.5				
30-36	3				
36-42	3.5			7637	
42-48	4				
48-54	4.5	8932			
54-60	5	7933			
60-66	5.5	8071			
66-72	6				
72-78	6.5				
78-84	7	7543			
84-90	7.5				
90-96	8			7696	

		SB-50	SB-50 GS (pCi/g)	SB-51	SB-51 GS (pCi/g)
	Range	7285 - 8240		7120 - 8690	
Inches	Feet				
0-6	0.5	7900	6.54	Concrete	
6-12	1	7898		7791	
12-18	1.5			7984	1.26
18-24	2				
24-30	2.5				
30-36	3	7696			
36-42	3.5				
42-48	4				
48-54	4.5			7805	
54-60	5				
60-66	5.5	7793			
66-72	6				
72-78	6.5				
78-84	7				
84-90	7.5				
90-96	8			7584	

APPENDIX B

RON'S RENTAL

SOIL BORINGS GROSS GAMMA SURVEY

AND

CORE SAMPLE ANALYTICAL (GAMMA SPECTROSCOPY) RESULTS

Ron's Rental Soil Borings Gross Gamma (cpm) and Analytical Gamma Spectroscopy (pCi/g)

Inches	Range Feet	SB-1 7300 - 8900	SB-2 7300-9300	SB-3 6919 -9450	SB-4 6424 - 8902
0-6	0.5		7745		
0-12	1		8180		
12-18	1.5		8004		
18-24	2		7910		
24-30	2.5		8303		
30-36	3		8818		
36-42	3.5		8890		
42-48	4		8795		
48-54	4.5		8712		
54-60	5		8707		8040
60-66	5.5		8520		8483
66-72	6		8520		8082
72-78	6.5	8188	8792	8639	8407
78-84	7	8247	8923	8818	8664
84-90	7.5				
90-96	8				

Inches	Range Feet	SB-5 6825-9358	SB-6 6930 - 8430	SB-7 6777 - 8590	SB-8 6193 - 8638	SB-8 GS (pCi/g)
0-6	0.5					
0-12	1					
12-18	1.5					
18-24	2					
24-30	2.5					
30-36	3					
36-42	3.5		7811			
42-48	4	8538	8058			
48-54	4.5	9022	8566			
54-60	5	9280	8400			
60-66	5.5	8547	8222			
66-72	6	8465				
72-78	6.5	8316		8191		
78-84	7	8090		8001	7894	
84-90	7.5			8170	7991	
90-96	8			8463	7990	0.939

Ron's Rental Soil Borings Gross Gamma (cpm) and Analytical Gamma Spectroscopy (pCi/g)

Inches	Range Feet	SB-9	SB-9 GS (pCi/g)	SB-10	SB-10 GS (pCi/g)	SB-11
		6891-9460		6789 - 8991		7076 - 9491
0-6	0.5					
0-12	1					
12-18	1.5					
18-24	2					
24-30	2.5					
30-36	3					
36-42	3.5					
42-48	4					
48-54	4.5					
54-60	5					
60-66	5.5					
66-72	6					
72-78	6.5					
78-84	7			7970		
84-90	7.5			8318		
90-96	8			8336	1.01	
96-102	8.5					
102-108	9					
108-114	9.5					
114-120	10					
120-126	10.5	8892				
126-132	11	9446				8524
132-138	11.5	9485	0.688			9072
138-144	12	9424				9369

Ron's Rental Soil Borings Gross Gamma (cpm) and Analytical Gamma Spectros

Inches	Range Feet	SB-12	SB-12 GS (pCi/g)	SB-13	SB-13 GS (pCi/g)
		6720 - 7921		7037 - 47935	
0-6	0.5			58647	1900
0-12	1			18041	
12-18	1.5			8793	
18-24	2			7299	
24-30	2.5			6637	
30-36	3			7189	
36-42	3.5			8086	
42-48	4			9025	
48-54	4.5			9076	
54-60	5			7888	
60-66	5.5	7577		7684	
66-72	6	7548		7690	
72-78	6.5	7803	0.868	7586	
78-84	7	7445		7974	
84-90	7.5			8208	
90-96	8			10031	
96-102	8.5			20800	52.5
102-108	9			9113	
108-114	9.5			8680	
114-120	10			8626	
120-126	10.5			8715	
126-132	11			8976	
132-138	11.5				
138-144	12				

Ron's Rental Soil Borings Gross Gamma (cpm) and Analytical Gamma Spectroscopy (pCi/g)

Inches	Range Feet	SB-14	SB-14 GS (pCi/g)	SB-15	SB-15 GS (pCi/g)	SB-16
		7474 - 11020		6252 - 8412		6383 - 9353
0-6	0.5					
0-12	1					
12-18	1.5	9011				
18-24	2	10098	38.8			
24-30	2.5	8271				
30-36	3					
36-42	3.5					
42-48	4					
48-54	4.5					
54-60	5					
60-66	5.5					
66-72	6			8315		
72-78	6.5			8644	0.888	8582
78-84	7			8175		8812
84-90	7.5			8136		8997
90-96	8					
96-102	8.5					
102-108	9					
108-114	9.5					
114-120	10					
120-126	10.5					
126-132	11					
132-138	11.5					
138-144	12					

Ron's Rental Soil Borings Gross Gamma (cpm) and Analytical Gamma Spectroscopy (pCi/g)

Inches	Range Feet	SB-17	SB-18	SB-18 GS (pCi/g)	SB-19	SB-19 GS (pCi/g)
		7588 - 8684	7392 - 10136		7430 - 8446	
0-6	0.5		11435	81.2		
0-12	1		7586			
12-18	1.5		7418			
18-24	2					
24-30	2.5					
30-36	3	8392				
36-42	3.5					
42-48	4					
48-54	4.5					
54-60	5					
60-66	5.5					
66-72	6	8589			8442	
72-78	6.5	8798			8737	
78-84	7				9239	0.954
84-90	7.5				9178	
90-96	8				8988	
96-102	8.5					
102-108	9					
108-114	9.5					
114-120	10					
120-126	10.5					
126-132	11					
132-138	11.5					
138-144	12					

Ron's Rental Soil Borings Gross Gamma (cpm) and Analytical Gamma Spectros

Inches	Range Feet	SB-20	SB-20 GS (pCi/g)	SB-21	SB-21 GS (pCi/g)
		7375 - 9206		7200 - 8490	
0-6	0.5				
0-12	1				
12-18	1.5				
18-24	2				
24-30	2.5				
30-36	3				
36-42	3.5				
42-48	4	8491		8508	
48-54	4.5	9891	4.77	8923	5.14
54-60	5	8493		8416	
60-66	5.5	8138			
66-72	6	8494			
72-78	6.5	8531			
78-84	7	8121		8097	
84-90	7.5	8584		8349	
90-96	8			8327	

Inches	Range Feet	SB-22	SB-22 GS (pCi/g)	SB-23	SB-23 GS (pCi/g)
		7380 - 8806		6503 - 8542	
0-6	0.5	8876	4.03		
0-12	1	7478			
12-18	1.5				
18-24	2				
24-30	2.5				
30-36	3				
36-42	3.5				
42-48	4				
48-54	4.5			8447	
54-60	5			8190	
60-66	5.5	8076			
66-72	6	8376			
72-78	6.5	8305			
78-84	7	8445		8196	
84-90	7.5	8298		8316	
90-96	8	8215		8521	0.90

Ron's Rental Soil Borings Gross Gamma (cpm) and Analytical Gamma Spectroscopy (pCi/g)

Inches	Range Feet	SB-24	SB-24 GS (pCi/g)	SB-25	SB-26	SB-26 GS (pCi/g)
		7603 - 8703		6305 - 8306	6784 - 8603	
0-6	0.5	9003	15.60		7432	6.96
0-12	1	7529			7190	
12-18	1.5					
18-24	2					
24-30	2.5					
30-36	3					
36-42	3.5					
42-48	4					
48-54	4.5				8320	
54-60	5					
60-66	5.5					
66-72	6					
72-78	6.5					
78-84	7			8426		
84-90	7.5	8396		8697	8493	
90-96	8	8686	3.11	8520	8617	

Inches	Range Feet	SB-27	SB-27 GS (pCi/g)	SB-28	SB-28 GS (pCi/g)	SB-28 Recount for depth
		7186 - 8596		8540 - 12074		
0-6	0.5	8489		270749	6760	Sample
0-12	1	7536		99994		19924
12-18	1.5			24985		15396
18-24	2			13129		15197
24-30	2.5					13932
30-36	3					14075
36-42	3.5					13798
42-48	4	8994	1.11			14379
48-54	4.5	8171				24903
54-60	5					15032
60-66	5.5					13447
66-72	6					13520
72-78	6.5					13395
78-84	7					13233
84-90	7.5					13335
90-96	8	8773		8771		13507

SB-28 Recount - Different background just for relative reference

Ron's Rental Soil Borings Gross Gamma (cpm) and Analytical Gamma Spectroscopy (pCi/g)

Inches	Range Feet	SB-29	SB-29 GS (pCi/g)	SB-29 Recount for depth	SB-30	SB-30 GS (pCi/g)	SB-30 Recount for depth
		7904 - 48037			8703 - 41270		
0-6	0.5	47001			56514	2250	Sample
0-12	1	51085	873	Sample	25408		Missing
12-18	1.5	26943		31499	10691		14407
18-24	2	13731		29896			14216
24-30	2.5			17688			13885
30-36	3			13801			13798
36-42	3.5			13222			14480
42-48	4			13571	11789		15801
48-54	4.5			Missing			19479
54-60	5			Missing			14812
60-66	5.5	19812		21190			14198
66-72	6			19703			14230
72-78	6.5			15131			14030
78-84	7			13715			13816
84-90	7.5			13435			13554
90-96	8			13608			14027

Inches	Range Feet	SB-31	SB-31 GS (pCi/g)	SB-31 Recount for depth	SB-32	SB-32 GS (pCi/g)	SB-32 Recount for depth
		9492 - 160190			8611 - 69690		
0-6	0.5	399677	8110	Sample	139689	3240	Sample
0-12	1	81501		69444	28532		16692
12-18	1.5	22225		20892	12084		13990
18-24	2	15421		16390			13639
24-30	2.5			14896			13499
30-36	3			14946			13734
36-42	3.5			16189			13940
42-48	4			25993			14684
48-54	4.5			184746			40548
54-60	5			54878			20839
60-66	5.5			26825			16194
66-72	6			20881			14619
72-78	6.5			19272			14635
78-84	7			17094			14397
84-90	7.5			17021			14299
90-96	8			14849			13848

SB-29,SB-30, SB-31 & SB-32 Recount - Different background just for relative reference

Ron's Rental Soil Borings Gross Gamma (cpm) and Analytical Gamma Spectroscopy (pCi/g

Inches	Range Feet		SB-33	SB-33 GS (pCi/g)	SB-33 Recount for depth	SB-34	SB-34 GS (pCi/g)
			8689 - 31802			9340 - 14970	
0-6		0.5	96876	1910	Sample	12485	258
6-12		1	26721	15.8*	Sample	10619	
12-18		1.5	11491		13724	10095	
18-24		2	9992		14797		
24-30		2.5	11791		18587		
30-36		3	12914		14338		
36-42		3.5			13649		
42-48		4			13570		
48-54		4.5			13888	19890	335
54-60		5			13722	11493	
60-66		5.5			13487	10286	
66-72		6					
72-78		6.5					
78-84		7					
84-90		7.5					
90-96		8					
				* Sample miss labeled			

SB-33 Recount - Different background just for relative reference

APPENDIX C

EBERLINE SERVICES

FINAL REPORT OF ANALYSIS

ANALYTICAL

GAMMA SPECTROSCOPY

Eberline Services
Final Report of Analysis

Report To:		*Work Order Details:*	
Judy Stone		*SDG:*	**07-12066**
Lionville Laboratory, Inc.		*Project:*	URS PADEP
208 Welsh Pool Road		*Analysis Category:*	ENVIRONMENTAL
Lionville, PA 19341-1313		*Sample Matrix:*	SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
07-12066-01	LCS	KNOWN	12/13/07 00:00	12/13/2007	1/8/2008	07-12066	Cobalt-60	LANL ER-130 Modified	2.52E+02	6.75E+00			pCi/g
07-12066-01	LCS	KNOWN	12/13/07 00:00	12/13/2007	1/8/2008	07-12066	Cesium-137	LANL ER-130 Modified	1.55E+02	4.31E+00			pCi/g
07-12066-01	LCS	SPIKE	12/13/07 00:00	12/13/2007	1/8/2008	07-12066	Cobalt-60	LANL ER-130 Modified	2.67E+02	1.22E+01	1.22E+01	9.35E-01	pCi/g
07-12066-01	LCS	SPIKE	12/13/07 00:00	12/13/2007	1/8/2008	07-12066	Cesium-137	LANL ER-130 Modified	1.68E+02	1.23E+01	1.23E+01	8.25E-01	pCi/g
07-12066-02	MBL	BLANK	12/13/07 00:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	1.55E-01	1.27E-01	1.27E-01	2.95E-01	pCi/g
07-12066-02	MBL	BLANK	12/13/07 00:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	9.80E-02	9.41E-02	9.41E-02	1.92E-01	pCi/g
07-12066-02	MBL	BLANK	12/13/07 00:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	3.94E-01	4.95E-01	4.95E-01	1.16E+00	pCi/g
07-12066-02	MBL	BLANK	12/13/07 00:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	1.70E-01	4.91E+00	4.91E+00	9.24E+00	pCi/g
07-12066-02	MBL	BLANK	12/13/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	2.87E-02	5.14E-02	5.14E-02	9.54E-02	pCi/g
07-12066-02	MBL	BLANK	12/13/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	8.33E-02	8.74E-02	8.74E-02	1.68E-01	pCi/g
07-12066-02	MBL	BLANK	12/13/07 00:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	9.80E-02	9.41E-02	9.41E-02	1.92E-01	pCi/g
07-12066-02	MBL	BLANK	12/13/07 00:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	4.26E-01	5.50E-01	5.50E-01	1.05E+00	pCi/g
07-12066-02	MBL	BLANK	12/13/07 00:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	-5.83E-02	1.13E-01	1.13E-01	1.88E-01	pCi/g
07-12066-03	DUP	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	5.11E+00	4.36E+00	4.36E+00	6.68E+00	pCi/g
07-12066-03	DUP	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	1.90E+03	7.47E+01	7.47E+01	3.02E+00	pCi/g
07-12066-03	DUP	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	2.35E+01	1.39E+01	1.39E+01	1.80E+01	pCi/g
07-12066-03	DUP	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	6.45E+01	1.26E+02	1.26E+02	1.91E+02	pCi/g
07-12066-03	DUP	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	3.69E+00	1.87E+00	1.87E+00	2.75E+00	pCi/g
07-12066-03	DUP	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	1.98E+03	9.95E+01	9.95E+01	3.53E+00	pCi/g
07-12066-03	DUP	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	1.90E+03	7.47E+01	7.47E+01	3.02E+00	pCi/g
07-12066-03	DUP	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	5.37E+02	4.67E+01	4.67E+01	3.66E+01	pCi/g
07-12066-03	DUP	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	8.65E+00	3.08E+00	3.08E+00	4.72E+00	pCi/g
07-12066-04	DO	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	-3.28E+00	3.91E+00	3.91E+00	6.53E+00	pCi/g
07-12066-04	DO	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	1.86E+03	7.32E+01	7.32E+01	3.00E+00	pCi/g
07-12066-04	DO	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	2.44E+01	1.39E+01	1.39E+01	1.82E+01	pCi/g
07-12066-04	DO	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	-1.21E+01	1.26E+02	1.26E+02	1.90E+02	pCi/g
07-12066-04	DO	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	7.22E-01	1.86E+00	1.86E+00	2.72E+00	pCi/g
07-12066-04	DO	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	1.96E+03	9.82E+01	9.82E+01	3.46E+00	pCi/g
07-12066-04	DO	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	1.86E+03	7.32E+01	7.32E+01	3.00E+00	pCi/g
07-12066-04	DO	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	6.72E+02	5.65E+01	5.65E+01	3.63E+01	pCi/g
07-12066-04	DO	SB13 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	9.96E+00	3.10E+00	3.10E+00	4.71E+00	pCi/g
07-12066-05	TRG	SB13 90-102	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	1.08E+00	1.15E+00	1.15E+00	1.56E+00	pCi/g
07-12066-05	TRG	SB13 90-102	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	5.25E+01	2.75E+00	2.75E+00	6.22E-01	pCi/g
07-12066-05	TRG	SB13 90-102	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	2.04E+01	4.22E+00	4.22E+00	3.69E+00	pCi/g
07-12066-05	TRG	SB13 90-102	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	4.48E+00	2.42E+01	2.42E+01	4.00E+01	pCi/g
07-12066-05	TRG	SB13 90-102	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	1.39E+00	4.02E-01	4.02E-01	5.37E-01	pCi/g
07-12066-05	TRG	SB13 90-102	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	5.04E+01	3.13E+00	3.13E+00	6.86E-01	pCi/g
07-12066-05	TRG	SB13 90-102	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	5.25E+01	2.75E+00	2.75E+00	6.22E-01	pCi/g
07-12066-05	TRG	SB13 90-102	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	2.47E+01	7.03E+00	7.03E+00	5.69E+00	pCi/g
07-12066-05	TRG	SB13 90-102	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	1.53E+00	1.01E+00	1.01E+00	1.13E+00	pCi/g
07-12066-06	TRG	SB14 18-24	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	1.75E+00	1.26E+00	1.26E+00	1.82E+00	pCi/g
07-12066-06	TRG	SB14 18-24	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	3.88E+01	2.55E+00	2.55E+00	7.11E-01	pCi/g
07-12066-06	TRG	SB14 18-24	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	9.63E+00	4.88E+00	4.88E+00	4.33E+00	pCi/g
07-12066-06	TRG	SB14 18-24	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	-1.18E+00	2.74E+01	2.74E+01	4.55E+01	pCi/g
07-12066-06	TRG	SB14 18-24	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	1.16E+00	4.20E-01	4.20E-01	5.76E-01	pCi/g
07-12066-06	TRG	SB14 18-24	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	4.15E+01	2.71E+00	2.71E+00	7.65E-01	pCi/g
07-12066-06	TRG	SB14 18-24	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	3.88E+01	2.55E+00	2.55E+00	7.11E-01	pCi/g
07-12066-06	TRG	SB14 18-24	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	3.11E+00	4.30E+00	4.30E+00	7.31E+00	pCi/g
07-12066-06	TRG	SB14 18-24	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	1.16E+00	1.03E+00	1.03E+00	1.28E+00	pCi/g
07-12066-07	TRG	SB18 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	1.55E+00	1.60E+00	1.60E+00	2.17E+00	pCi/g
07-12066-07	TRG	SB18 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	8.12E+01	4.05E+00	4.05E+00	8.58E-01	pCi/g
07-12066-07	TRG	SB18 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	1.15E+01	5.70E+00	5.70E+00	5.39E+00	pCi/g
07-12066-07	TRG	SB18 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	2.09E+01	3.47E+01	3.47E+01	5.84E+01	pCi/g
07-12066-07	TRG	SB18 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	2.14E+00	5.58E-01	5.58E-01	7.66E-01	pCi/g
07-12066-07	TRG	SB18 00-06	11/13/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	8.38E+01	5.12E+00	5.12E+00	9.81E-01	pCi/g

07-12066-08	TRG	SB20 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	1.08E+00	2.64E-01	2.64E-01	3.70E-01	pCi/g
07-12066-08	TRG	SB20 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	4.77E+00	3.63E-01	3.63E-01	1.58E-01	pCi/g
07-12066-08	TRG	SB20 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	1.41E+01	1.93E+00	1.93E+00	8.80E-01	pCi/g
07-12066-08	TRG	SB20 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	3.06E+00	5.20E+00	5.20E+00	1.00E+01	pCi/g
07-12066-08	TRG	SB20 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	1.30E+00	1.48E-01	1.48E-01	1.29E-01	pCi/g
07-12066-08	TRG	SB20 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	4.52E+00	3.34E-01	3.34E-01	1.60E-01	pCi/g
07-12066-08	TRG	SB20 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	4.77E+00	3.63E-01	3.63E-01	1.58E-01	pCi/g
07-12066-08	TRG	SB20 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	4.08E+00	1.12E+00	1.12E+00	1.90E+00	pCi/g
07-12066-08	TRG	SB20 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	1.12E+00	2.03E-01	2.03E-01	2.24E-01	pCi/g
07-12066-09	TRG	SB21 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	1.24E+00	4.82E-01	4.82E-01	8.23E-01	pCi/g
07-12066-09	TRG	SB21 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	5.14E+00	4.90E-01	4.90E-01	2.84E-01	pCi/g
07-12066-09	TRG	SB21 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	1.48E+01	2.68E+00	2.68E+00	1.48E+00	pCi/g
07-12066-09	TRG	SB21 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	4.26E+00	1.03E+01	1.03E+01	1.84E+01	pCi/g
07-12066-09	TRG	SB21 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	1.39E+00	2.26E-01	2.26E-01	2.04E-01	pCi/g
07-12066-09	TRG	SB21 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	5.36E+00	4.51E-01	4.51E-01	2.72E-01	pCi/g
07-12066-09	TRG	SB21 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	5.14E+00	4.90E-01	4.90E-01	2.84E-01	pCi/g
07-12066-09	TRG	SB21 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	1.14E+00	1.54E+00	1.54E+00	2.67E+00	pCi/g
07-12066-09	TRG	SB21 48-54	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	8.39E-01	4.01E-01	4.01E-01	5.84E-01	pCi/g
07-12066-10	TRG	SB22 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	1.24E+00	2.31E-01	2.31E-01	2.79E-01	pCi/g
07-12066-10	TRG	SB22 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	4.03E+00	3.52E-01	3.52E-01	1.50E-01	pCi/g
07-12066-10	TRG	SB22 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	8.35E+00	1.39E+00	1.39E+00	7.55E-01	pCi/g
07-12066-10	TRG	SB22 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	2.17E+00	4.84E+00	4.84E+00	9.12E+00	pCi/g
07-12066-10	TRG	SB22 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	1.37E+00	1.44E-01	1.44E-01	1.17E-01	pCi/g
07-12066-10	TRG	SB22 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	4.12E+00	2.97E-01	2.97E-01	1.44E-01	pCi/g
07-12066-10	TRG	SB22 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	4.03E+00	3.52E-01	3.52E-01	1.50E-01	pCi/g
07-12066-10	TRG	SB22 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	1.47E+00	9.79E-01	9.79E-01	1.69E+00	pCi/g
07-12066-10	TRG	SB22 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	1.05E+00	1.85E-01	1.85E-01	2.14E-01	pCi/g
07-12066-11	TRG	SB24 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	1.82E+00	3.82E-01	3.82E-01	5.16E-01	pCi/g
07-12066-11	TRG	SB24 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	1.56E+01	9.81E-01	9.81E-01	2.48E-01	pCi/g
07-12066-11	TRG	SB24 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	8.05E+00	1.56E+00	1.56E+00	1.50E+00	pCi/g
07-12066-11	TRG	SB24 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	-1.33E+00	9.31E+00	9.31E+00	1.62E+01	pCi/g
07-12066-11	TRG	SB24 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	1.97E+00	2.34E-01	2.34E-01	2.36E-01	pCi/g
07-12066-11	TRG	SB24 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	1.78E+01	9.24E-01	9.24E-01	2.94E-01	pCi/g
07-12066-11	TRG	SB24 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	1.56E+01	9.81E-01	9.81E-01	2.48E-01	pCi/g
07-12066-11	TRG	SB24 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	1.50E+00	1.85E+00	1.85E+00	3.16E+00	pCi/g
07-12066-11	TRG	SB24 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	1.47E+00	4.53E-01	4.53E-01	5.87E-01	pCi/g
07-12066-12	TRG	SB24 90-96	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	1.29E+00	4.40E-01	4.40E-01	5.82E-01	pCi/g
07-12066-12	TRG	SB24 90-96	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	3.11E+00	3.78E-01	3.78E-01	2.54E-01	pCi/g
07-12066-12	TRG	SB24 90-96	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	1.52E+01	2.53E+00	2.53E+00	1.27E+00	pCi/g
07-12066-12	TRG	SB24 90-96	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	2.91E+00	8.68E+00	8.68E+00	1.59E+01	pCi/g
07-12066-12	TRG	SB24 90-96	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	1.17E+00	2.01E-01	2.01E-01	1.89E-01	pCi/g
07-12066-12	TRG	SB24 90-96	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	2.93E+00	3.32E-01	3.32E-01	2.50E-01	pCi/g
07-12066-12	TRG	SB24 90-96	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	3.11E+00	3.78E-01	3.78E-01	2.54E-01	pCi/g
07-12066-12	TRG	SB24 90-96	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	6.91E-01	1.40E+00	1.40E+00	2.43E+00	pCi/g
07-12066-12	TRG	SB24 90-96	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	1.03E+00	3.13E-01	3.13E-01	6.05E-01	pCi/g
07-12066-13	TRG	SB26 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	1.00E+00	3.48E-01	3.48E-01	4.69E-01	pCi/g
07-12066-13	TRG	SB26 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	6.96E+00	6.52E-01	6.52E-01	2.42E-01	pCi/g
07-12066-13	TRG	SB26 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	1.15E+01	2.53E+00	2.53E+00	1.16E+00	pCi/g
07-12066-13	TRG	SB26 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	7.54E+00	7.80E+00	7.80E+00	1.59E+01	pCi/g
07-12066-13	TRG	SB26 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	1.32E+00	2.01E-01	2.01E-01	2.01E-01	pCi/g
07-12066-13	TRG	SB26 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	6.85E+00	5.46E-01	5.46E-01	2.65E-01	pCi/g
07-12066-13	TRG	SB26 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	6.96E+00	6.52E-01	6.52E-01	2.42E-01	pCi/g
07-12066-13	TRG	SB26 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	7.67E-01	1.55E+00	1.55E+00	2.68E+00	pCi/g
07-12066-13	TRG	SB26 00-06	11/14/07 00:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	9.78E-01	2.32E-01	2.32E-01	3.41E-01	pCi/g

07-12066-14	TRG	SB28 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	-4.25E+00	1.04E+01	1.04E+01	1.23E+01	pCi/g
07-12066-14	TRG	SB28 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	6.76E+03	2.49E+02	2.49E+02	5.86E+00	pCi/g
07-12066-14	TRG	SB28 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	-1.14E+01	2.26E+01	2.26E+01	3.65E+01	pCi/g
07-12066-14	TRG	SB28 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	2.61E+02	2.47E+02	2.47E+02	3.66E+02	pCi/g
07-12066-14	TRG	SB28 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	1.76E+02	1.17E+01	1.17E+01	5.82E+00	pCi/g
07-12066-14	TRG	SB28 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	7.29E+03	3.18E+02	3.18E+02	7.05E+00	pCi/g
07-12066-14	TRG	SB28 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	6.76E+03	2.49E+02	2.49E+02	5.86E+00	pCi/g
07-12066-14	TRG	SB28 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	1.72E+03	1.21E+02	1.21E+02	6.08E+01	pCi/g
07-12066-14	TRG	SB28 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	1.31E+01	5.75E+00	5.75E+00	8.72E+00	pCi/g
07-12066-15	TRG	SB29 06-12	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	1.15E+00	4.56E+00	4.56E+00	6.53E+00	pCi/g
07-12066-15	TRG	SB29 06-12	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	8.73E+02	3.85E+01	3.85E+01	2.99E+00	pCi/g
07-12066-15	TRG	SB29 06-12	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	1.41E+01	1.06E+01	1.06E+01	1.83E+01	pCi/g
07-12066-15	TRG	SB29 06-12	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	-9.05E+01	1.15E+02	1.15E+02	1.82E+02	pCi/g
07-12066-15	TRG	SB29 06-12	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	1.48E+00	7.67E-01	7.67E-01	2.53E+00	pCi/g
07-12066-15	TRG	SB29 06-12	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	8.82E+02	5.13E+01	5.13E+01	3.27E+00	pCi/g
07-12066-15	TRG	SB29 06-12	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	8.73E+02	3.85E+01	3.85E+01	2.99E+00	pCi/g
07-12066-15	TRG	SB29 06-12	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	3.69E+02	4.10E+01	4.10E+01	2.69E+01	pCi/g
07-12066-15	TRG	SB29 06-12	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	8.00E+00	3.23E+00	3.23E+00	4.69E+00	pCi/g
07-12066-16	TRG	SB30 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	3.90E+00	4.04E+00	4.04E+00	6.15E+00	pCi/g
07-12066-16	TRG	SB30 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	2.25E+03	8.78E+01	8.78E+01	2.83E+00	pCi/g
07-12066-16	TRG	SB30 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	3.65E+00	1.02E+01	1.02E+01	1.69E+01	pCi/g
07-12066-16	TRG	SB30 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	7.29E+01	1.06E+02	1.06E+02	1.78E+02	pCi/g
07-12066-16	TRG	SB30 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	2.46E+00	8.69E-01	8.69E-01	2.49E+00	pCi/g
07-12066-16	TRG	SB30 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	2.39E+03	1.20E+02	1.20E+02	3.25E+00	pCi/g
07-12066-16	TRG	SB30 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	2.25E+03	8.78E+01	8.78E+01	2.83E+00	pCi/g
07-12066-16	TRG	SB30 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	6.84E+02	5.70E+01	5.70E+01	3.37E+01	pCi/g
07-12066-16	TRG	SB30 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	1.82E+01	3.23E+00	3.23E+00	4.45E+00	pCi/g
07-12066-17	TRG	SB31 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	1.57E+01	8.68E+00	8.68E+00	1.29E+01	pCi/g
07-12066-17	TRG	SB31 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	8.11E+03	2.99E+02	2.99E+02	6.07E+00	pCi/g
07-12066-17	TRG	SB31 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	7.88E-01	2.32E+01	2.32E+01	3.76E+01	pCi/g
07-12066-17	TRG	SB31 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	6.63E+00	2.55E+02	2.55E+02	3.78E+02	pCi/g
07-12066-17	TRG	SB31 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	1.58E+02	1.09E+01	1.09E+01	6.17E+00	pCi/g
07-12066-17	TRG	SB31 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	8.54E+03	3.73E+02	3.73E+02	7.25E+00	pCi/g
07-12066-17	TRG	SB31 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	8.11E+03	2.99E+02	2.99E+02	6.07E+00	pCi/g
07-12066-17	TRG	SB31 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	1.64E+03	1.18E+02	1.18E+02	6.47E+01	pCi/g
07-12066-17	TRG	SB31 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	2.43E+01	6.17E+00	6.17E+00	9.18E+00	pCi/g
07-12066-18	TRG	SB32 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Actinium-228	LANL ER-130 Modified	3.62E+00	5.98E+00	5.98E+00	7.22E+00	pCi/g
07-12066-18	TRG	SB32 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Bismuth-214	LANL ER-130 Modified	3.24E+03	1.26E+02	1.26E+02	3.37E+00	pCi/g
07-12066-18	TRG	SB32 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Potassium-40	LANL ER-130 Modified	-5.20E+00	1.20E+01	1.20E+01	1.98E+01	pCi/g
07-12066-18	TRG	SB32 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Protactinium-234m	LANL ER-130 Modified	1.12E+02	1.39E+02	1.39E+02	2.10E+02	pCi/g
07-12066-18	TRG	SB32 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-212	LANL ER-130 Modified	5.52E-02	2.04E+00	2.04E+00	2.97E+00	pCi/g
07-12066-18	TRG	SB32 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Lead-214	LANL ER-130 Modified	3.45E+03	1.73E+02	1.73E+02	3.85E+00	pCi/g
07-12066-18	TRG	SB32 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Radium-226	LANL ER-130 Modified	3.24E+03	1.26E+02	1.26E+02	3.37E+00	pCi/g
07-12066-18	TRG	SB32 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Thorium-234	LANL ER-130 Modified	8.58E+02	7.60E+01	7.60E+01	3.43E+01	pCi/g
07-12066-18	TRG	SB32 00-06	11/14/07 10:00	12/13/2007	1/8/2008	07-12066	Thallium-208	LANL ER-130 Modified	2.44E+01	3.96E+00	3.96E+00	5.26E+00	pCi/g

Eberline Services
Final Report of Analysis

Report To:		*Work Order Details:*	
Judy Stone		*SDG:*	**07-12067**
Lionville Laboratory, Inc.		*Project:*	URS PADEP
208 Welsh Pool Road		*Analysis Category:*	ENVIRONMENTAL
Lionville, PA 19341-1313		*Sample Matrix:*	SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
07-12067-01	LCS	KNOWN	12/13/07 00:00	12/11/2007	1/8/2008	07-12067	Cobalt-60	LANL ER-130 Modified	2.52E+02	6.75E+00			pCi/g
07-12067-01	LCS	KNOWN	12/13/07 00:00	12/11/2007	1/8/2008	07-12067	Cesium-137	LANL ER-130 Modified	1.55E+02	4.31E+00			pCi/g
07-12067-01	LCS	SPIKE	12/13/07 00:00	12/11/2007	1/8/2008	07-12067	Cobalt-60	LANL ER-130 Modified	2.68E+02	1.22E+01	1.22E+01	9.20E-01	pCi/g
07-12067-01	LCS	SPIKE	12/13/07 00:00	12/11/2007	1/8/2008	07-12067	Cesium-137	LANL ER-130 Modified	1.67E+02	1.23E+01	1.23E+01	8.20E-01	pCi/g
07-12067-02	MBL	BLANK	12/13/07 00:00	12/11/2007	1/8/2008	07-12067	Actinium-228	LANL ER-130 Modified	6.00E-02	1.51E-01	1.51E-01	3.04E-01	pCi/g
07-12067-02	MBL	BLANK	12/13/07 00:00	12/11/2007	1/8/2008	07-12067	Bismuth-214	LANL ER-130 Modified	3.11E-02	8.23E-02	8.23E-02	1.61E-01	pCi/g
07-12067-02	MBL	BLANK	12/13/07 00:00	12/11/2007	1/8/2008	07-12067	Potassium-40	LANL ER-130 Modified	-3.16E-01	3.86E-01	3.86E-01	6.86E-01	pCi/g
07-12067-02	MBL	BLANK	12/13/07 00:00	12/11/2007	1/8/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	-1.70E+00	5.05E+00	5.05E+00	8.74E+00	pCi/g
07-12067-02	MBL	BLANK	12/13/07 00:00	12/11/2007	1/8/2008	07-12067	Lead-212	LANL ER-130 Modified	8.18E-02	5.16E-02	5.16E-02	1.03E-01	pCi/g
07-12067-02	MBL	BLANK	12/13/07 00:00	12/11/2007	1/8/2008	07-12067	Lead-214	LANL ER-130 Modified	-9.64E-03	7.43E-02	7.43E-02	1.32E-01	pCi/g
07-12067-02	MBL	BLANK	12/13/07 00:00	12/11/2007	1/8/2008	07-12067	Radium-226	LANL ER-130 Modified	3.11E-02	8.23E-02	8.23E-02	1.61E-01	pCi/g
07-12067-02	MBL	BLANK	12/13/07 00:00	12/11/2007	1/8/2008	07-12067	Thorium-234	LANL ER-130 Modified	9.00E-02	5.31E-01	5.31E-01	9.87E-01	pCi/g
07-12067-02	MBL	BLANK	12/13/07 00:00	12/11/2007	1/8/2008	07-12067	Thallium-208	LANL ER-130 Modified	6.11E-02	1.10E-01	1.10E-01	2.03E-01	pCi/g
07-12067-03	DUP	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Actinium-228	LANL ER-130 Modified	1.65E+00	6.25E-01	6.25E-01	8.56E-01	pCi/g
07-12067-03	DUP	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Bismuth-214	LANL ER-130 Modified	1.59E+01	9.96E-01	9.96E-01	2.81E-01	pCi/g
07-12067-03	DUP	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Potassium-40	LANL ER-130 Modified	1.61E+01	2.51E+00	2.51E+00	1.64E+00	pCi/g
07-12067-03	DUP	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	1.00E+01	1.02E+01	1.02E+01	1.78E+01	pCi/g
07-12067-03	DUP	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-212	LANL ER-130 Modified	1.63E+00	2.09E-01	2.09E-01	2.19E-01	pCi/g
07-12067-03	DUP	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-214	LANL ER-130 Modified	1.65E+01	9.91E-01	9.91E-01	2.91E-01	pCi/g
07-12067-03	DUP	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Radium-226	LANL ER-130 Modified	1.59E+01	9.96E-01	9.96E-01	2.81E-01	pCi/g
07-12067-03	DUP	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Thorium-234	LANL ER-130 Modified	2.39E+00	2.24E+00	2.24E+00	3.15E+00	pCi/g
07-12067-03	DUP	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Thallium-208	LANL ER-130 Modified	1.15E+00	2.40E-01	2.40E-01	3.96E-01	pCi/g
07-12067-04	DO	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Actinium-228	LANL ER-130 Modified	1.81E+00	4.62E-01	4.62E-01	5.80E-01	pCi/g
07-12067-04	DO	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Bismuth-214	LANL ER-130 Modified	1.58E+01	1.00E+00	1.00E+00	2.61E-01	pCi/g
07-12067-04	DO	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Potassium-40	LANL ER-130 Modified	1.68E+01	2.71E+00	2.71E+00	1.46E+00	pCi/g
07-12067-04	DO	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	6.77E+00	9.34E+00	9.34E+00	1.75E+01	pCi/g
07-12067-04	DO	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-212	LANL ER-130 Modified	1.34E+00	2.03E-01	2.03E-01	2.29E-01	pCi/g
07-12067-04	DO	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-214	LANL ER-130 Modified	1.63E+01	9.67E-01	9.67E-01	3.06E-01	pCi/g
07-12067-04	DO	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Radium-226	LANL ER-130 Modified	1.58E+01	1.00E+00	1.00E+00	2.61E-01	pCi/g
07-12067-04	DO	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Thorium-234	LANL ER-130 Modified	2.04E+00	1.98E+00	1.98E+00	3.35E+00	pCi/g
07-12067-04	DO	SB33 06-12	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Thallium-208	LANL ER-130 Modified	1.28E+00	2.73E-01	2.73E-01	4.01E-01	pCi/g
07-12067-05	TRG	SB33 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Actinium-228	LANL ER-130 Modified	1.13E+00	2.92E+00	2.92E+00	4.37E+00	pCi/g
07-12067-05	TRG	SB33 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Bismuth-214	LANL ER-130 Modified	1.91E+03	6.02E+01	6.02E+01	2.11E+00	pCi/g
07-12067-05	TRG	SB33 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Potassium-40	LANL ER-130 Modified	6.77E+00	7.69E+00	7.69E+00	1.26E+01	pCi/g
07-12067-05	TRG	SB33 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	8.49E+01	8.57E+01	8.57E+01	1.28E+02	pCi/g
07-12067-05	TRG	SB33 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-212	LANL ER-130 Modified	1.74E+01	1.79E+00	1.79E+00	2.15E+00	pCi/g
07-12067-05	TRG	SB33 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-214	LANL ER-130 Modified	1.94E+03	8.49E+01	8.49E+01	2.52E+00	pCi/g
07-12067-05	TRG	SB33 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Radium-226	LANL ER-130 Modified	1.91E+03	6.02E+01	6.02E+01	2.11E+00	pCi/g
07-12067-05	TRG	SB33 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Thorium-234	LANL ER-130 Modified	4.77E+02	3.53E+01	3.53E+01	2.44E+01	pCi/g
07-12067-05	TRG	SB33 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Thallium-208	LANL ER-130 Modified	9.13E+00	2.13E+00	2.13E+00	3.20E+00	pCi/g
07-12067-06	TRG	SB34 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Actinium-228	LANL ER-130 Modified	3.51E+00	3.73E+00	3.73E+00	4.95E+00	pCi/g
07-12067-06	TRG	SB34 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Bismuth-214	LANL ER-130 Modified	2.58E+02	1.31E+01	1.31E+01	2.11E+00	pCi/g
07-12067-06	TRG	SB34 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Potassium-40	LANL ER-130 Modified	1.18E+01	1.08E+01	1.08E+01	1.29E+01	pCi/g
07-12067-06	TRG	SB34 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	-2.49E+00	8.23E+01	8.23E+01	1.34E+02	pCi/g
07-12067-06	TRG	SB34 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-212	LANL ER-130 Modified	3.60E+00	1.21E+00	1.21E+00	1.66E+00	pCi/g
07-12067-06	TRG	SB34 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-214	LANL ER-130 Modified	2.72E+02	1.63E+01	1.63E+01	2.27E+00	pCi/g
07-12067-06	TRG	SB34 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Radium-226	LANL ER-130 Modified	2.58E+02	1.31E+01	1.31E+01	2.11E+00	pCi/g
07-12067-06	TRG	SB34 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Thorium-234	LANL ER-130 Modified	6.60E+01	1.46E+01	1.46E+01	2.18E+01	pCi/g
07-12067-06	TRG	SB34 00-06	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Thallium-208	LANL ER-130 Modified	2.28E+00	2.11E+00	2.11E+00	3.44E+00	pCi/g
07-12067-07	TRG	SB34 48-54	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Actinium-228	LANL ER-130 Modified	1.92E+00	1.60E+00	1.60E+00	2.14E+00	pCi/g
07-12067-07	TRG	SB34 48-54	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Bismuth-214	LANL ER-130 Modified	3.35E+02	1.12E+01	1.12E+01	9.54E-01	pCi/g
07-12067-07	TRG	SB34 48-54	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Potassium-40	LANL ER-130 Modified	1.87E+01	5.55E+00	5.55E+00	5.76E+00	pCi/g
07-12067-07	TRG	SB34 48-54	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	1.05E+01	3.95E+01	3.95E+01	5.97E+01	pCi/g
07-12067-07	TRG	SB34 48-54	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-212	LANL ER-130 Modified	2.80E+00	6.49E-01	6.49E-01	9.04E-01	pCi/g
07-12067-07	TRG	SB34 48-54	11/14/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-214	LANL ER-130 Modified	3.49E+02	1.54E+01	1.54E+01	1.09E+00	pCi/g

07-12067-08	TRG	SB39 84-90	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Actinium-228	LANL ER-130 Modified	1.05E+00	3.33E-01	3.33E-01	4.09E-01	pCi/g
07-12067-08	TRG	SB39 84-90	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Bismuth-214	LANL ER-130 Modified	8.73E-01	1.79E-01	1.79E-01	1.83E-01	pCi/g
07-12067-08	TRG	SB39 84-90	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Potassium-40	LANL ER-130 Modified	1.13E+01	1.92E+00	1.92E+00	9.97E-01	pCi/g
07-12067-08	TRG	SB39 84-90	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	-2.00E+00	7.32E+00	7.32E+00	1.24E+01	pCi/g
07-12067-08	TRG	SB39 84-90	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-212	LANL ER-130 Modified	1.25E+00	2.02E-01	2.02E-01	1.43E-01	pCi/g
07-12067-08	TRG	SB39 84-90	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-214	LANL ER-130 Modified	8.69E-01	1.93E-01	1.93E-01	1.93E-01	pCi/g
07-12067-08	TRG	SB39 84-90	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Radium-226	LANL ER-130 Modified	8.73E-01	1.79E-01	1.79E-01	1.83E-01	pCi/g
07-12067-08	TRG	SB39 84-90	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Thorium-234	LANL ER-130 Modified	2.32E-01	1.05E+00	1.05E+00	1.83E+00	pCi/g
07-12067-08	TRG	SB39 84-90	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Thallium-208	LANL ER-130 Modified	8.25E-01	2.54E-01	2.54E-01	3.20E-01	pCi/g
07-12067-09	TRG	SB41 78-84	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Actinium-228	LANL ER-130 Modified	1.25E+00	1.89E-01	1.89E-01	2.52E-01	pCi/g
07-12067-09	TRG	SB41 78-84	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Bismuth-214	LANL ER-130 Modified	9.37E-01	1.35E-01	1.35E-01	1.11E-01	pCi/g
07-12067-09	TRG	SB41 78-84	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Potassium-40	LANL ER-130 Modified	1.38E+01	1.75E+00	1.75E+00	5.22E-01	pCi/g
07-12067-09	TRG	SB41 78-84	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	1.10E+01	8.06E+00	8.06E+00	6.33E+00	pCi/g
07-12067-09	TRG	SB41 78-84	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-212	LANL ER-130 Modified	1.20E+00	1.21E-01	1.21E-01	8.35E-02	pCi/g
07-12067-09	TRG	SB41 78-84	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-214	LANL ER-130 Modified	7.31E-01	1.22E-01	1.22E-01	1.08E-01	pCi/g
07-12067-09	TRG	SB41 78-84	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Radium-226	LANL ER-130 Modified	9.37E-01	1.35E-01	1.35E-01	1.11E-01	pCi/g
07-12067-09	TRG	SB41 78-84	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Thorium-234	LANL ER-130 Modified	1.10E+00	1.11E+00	1.11E+00	1.18E+00	pCi/g
07-12067-09	TRG	SB41 78-84	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Thallium-208	LANL ER-130 Modified	1.11E+00	1.66E-01	1.66E-01	1.62E-01	pCi/g
07-12067-10	TRG	SB42 30-36	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Actinium-228	LANL ER-130 Modified	1.30E+00	4.71E-01	4.71E-01	9.13E-01	pCi/g
07-12067-10	TRG	SB42 30-36	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Bismuth-214	LANL ER-130 Modified	1.23E+00	2.99E-01	2.99E-01	2.50E-01	pCi/g
07-12067-10	TRG	SB42 30-36	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Potassium-40	LANL ER-130 Modified	1.38E+01	2.51E+00	2.51E+00	1.25E+00	pCi/g
07-12067-10	TRG	SB42 30-36	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	-7.04E+00	9.63E+00	9.63E+00	1.51E+01	pCi/g
07-12067-10	TRG	SB42 30-36	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-212	LANL ER-130 Modified	1.20E+00	1.98E-01	1.98E-01	1.77E-01	pCi/g
07-12067-10	TRG	SB42 30-36	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Lead-214	LANL ER-130 Modified	1.28E+00	2.64E-01	2.64E-01	2.46E-01	pCi/g
07-12067-10	TRG	SB42 30-36	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Radium-226	LANL ER-130 Modified	1.23E+00	2.99E-01	2.99E-01	2.50E-01	pCi/g
07-12067-10	TRG	SB42 30-36	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Thorium-234	LANL ER-130 Modified	9.33E-01	1.33E+00	1.33E+00	2.35E+00	pCi/g
07-12067-10	TRG	SB42 30-36	11/15/07 10:00	12/11/2007	1/8/2008	07-12067	Thallium-208	LANL ER-130 Modified	1.11E+00	3.06E-01	3.06E-01	3.82E-01	pCi/g
07-12067-11	TRG	SB43 54-60	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Actinium-228	LANL ER-130 Modified	1.05E+00	2.69E-01	2.69E-01	3.37E-01	pCi/g
07-12067-11	TRG	SB43 54-60	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Bismuth-214	LANL ER-130 Modified	9.85E-01	1.66E-01	1.66E-01	1.80E-01	pCi/g
07-12067-11	TRG	SB43 54-60	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Potassium-40	LANL ER-130 Modified	9.39E+00	1.63E+00	1.63E+00	7.63E-01	pCi/g
07-12067-11	TRG	SB43 54-60	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	-1.52E+00	5.18E+00	5.18E+00	9.46E+00	pCi/g
07-12067-11	TRG	SB43 54-60	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-212	LANL ER-130 Modified	1.14E+00	1.57E-01	1.57E-01	1.39E-01	pCi/g
07-12067-11	TRG	SB43 54-60	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-214	LANL ER-130 Modified	1.27E+00	1.81E-01	1.81E-01	1.60E-01	pCi/g
07-12067-11	TRG	SB43 54-60	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Radium-226	LANL ER-130 Modified	9.85E-01	1.66E-01	1.66E-01	1.80E-01	pCi/g
07-12067-11	TRG	SB43 54-60	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thorium-234	LANL ER-130 Modified	2.99E-01	1.10E+00	1.10E+00	2.01E+00	pCi/g
07-12067-11	TRG	SB43 54-60	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thallium-208	LANL ER-130 Modified	9.84E-01	2.24E-01	2.24E-01	2.33E-01	pCi/g
07-12067-12	TRG	SB44 24-30	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Actinium-228	LANL ER-130 Modified	1.23E+00	4.39E-01	4.39E-01	7.32E-01	pCi/g
07-12067-12	TRG	SB44 24-30	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Bismuth-214	LANL ER-130 Modified	1.22E+00	3.96E-01	3.96E-01	6.33E-01	pCi/g
07-12067-12	TRG	SB44 24-30	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Potassium-40	LANL ER-130 Modified	1.60E+01	2.97E+00	2.97E+00	1.49E+00	pCi/g
07-12067-12	TRG	SB44 24-30	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	1.41E+01	1.11E+01	1.11E+01	1.96E+01	pCi/g
07-12067-12	TRG	SB44 24-30	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-212	LANL ER-130 Modified	1.24E+00	2.31E-01	2.31E-01	2.20E-01	pCi/g
07-12067-12	TRG	SB44 24-30	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-214	LANL ER-130 Modified	1.24E+00	3.16E-01	3.16E-01	3.31E-01	pCi/g
07-12067-12	TRG	SB44 24-30	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Radium-226	LANL ER-130 Modified	1.22E+00	3.96E-01	3.96E-01	6.33E-01	pCi/g
07-12067-12	TRG	SB44 24-30	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thorium-234	LANL ER-130 Modified	3.77E+00	3.05E+00	3.05E+00	2.34E+00	pCi/g
07-12067-12	TRG	SB44 24-30	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thallium-208	LANL ER-130 Modified	1.16E+00	3.17E-01	3.17E-01	4.47E-01	pCi/g
07-12067-13	TRG	SB45 78-84	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Actinium-228	LANL ER-130 Modified	1.27E+00	1.87E-01	1.87E-01	2.08E-01	pCi/g
07-12067-13	TRG	SB45 78-84	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Bismuth-214	LANL ER-130 Modified	1.06E+00	1.42E-01	1.42E-01	1.11E-01	pCi/g
07-12067-13	TRG	SB45 78-84	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Potassium-40	LANL ER-130 Modified	1.57E+01	1.68E+00	1.68E+00	4.89E-01	pCi/g
07-12067-13	TRG	SB45 78-84	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	2.45E+00	3.65E+00	3.65E+00	7.08E+00	pCi/g
07-12067-13	TRG	SB45 78-84	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-212	LANL ER-130 Modified	1.28E+00	1.28E-01	1.28E-01	8.36E-02	pCi/g
07-12067-13	TRG	SB45 78-84	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-214	LANL ER-130 Modified	9.77E-01	1.28E-01	1.28E-01	1.16E-01	pCi/g
07-12067-13	TRG	SB45 78-84	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Radium-226	LANL ER-130 Modified	1.06E+00	1.42E-01	1.42E-01	1.11E-01	pCi/g
07-12067-13	TRG	SB45 78-84	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thorium-234	LANL ER-130 Modified	1.39E+00	7.62E-01	7.62E-01	1.38E+00	pCi/g
07-12067-13	TRG	SB45 78-84	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thallium-208	LANL ER-130 Modified	1.16E+00	1.58E-01	1.58E-01	1.50E-01	pCi/g

07-12067-14	TRG	SB47 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Actinium-228	LANL ER-130 Modified	1.66E+00	5.47E-01	5.47E-01	6.89E-01	pCi/g
07-12067-14	TRG	SB47 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Bismuth-214	LANL ER-130 Modified	1.35E+00	3.03E-01	3.03E-01	3.43E-01	pCi/g
07-12067-14	TRG	SB47 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Potassium-40	LANL ER-130 Modified	1.81E+01	3.15E+00	3.15E+00	1.56E+00	pCi/g
07-12067-14	TRG	SB47 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	7.51E+00	1.10E+01	1.10E+01	2.17E+01	pCi/g
07-12067-14	TRG	SB47 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-212	LANL ER-130 Modified	1.42E+00	2.45E-01	2.45E-01	2.27E-01	pCi/g
07-12067-14	TRG	SB47 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-214	LANL ER-130 Modified	1.11E+00	2.61E-01	2.61E-01	3.25E-01	pCi/g
07-12067-14	TRG	SB47 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Radium-226	LANL ER-130 Modified	1.35E+00	3.03E-01	3.03E-01	3.43E-01	pCi/g
07-12067-14	TRG	SB47 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thorium-234	LANL ER-130 Modified	1.51E+00	1.71E+00	1.71E+00	3.04E+00	pCi/g
07-12067-14	TRG	SB47 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thallium-208	LANL ER-130 Modified	1.17E+00	5.02E-01	5.02E-01	7.83E-01	pCi/g
07-12067-15	TRG	SB48 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Actinium-228	LANL ER-130 Modified	2.56E-01	8.08E-01	8.08E-01	1.38E+00	pCi/g
07-12067-15	TRG	SB48 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Bismuth-214	LANL ER-130 Modified	1.43E+02	5.16E+00	5.16E+00	6.24E-01	pCi/g
07-12067-15	TRG	SB48 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Potassium-40	LANL ER-130 Modified	8.85E+00	3.96E+00	3.96E+00	3.77E+00	pCi/g
07-12067-15	TRG	SB48 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	-1.31E+01	2.45E+01	2.45E+01	4.07E+01	pCi/g
07-12067-15	TRG	SB48 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-212	LANL ER-130 Modified	1.16E+00	3.59E-01	3.59E-01	6.08E-01	pCi/g
07-12067-15	TRG	SB48 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-214	LANL ER-130 Modified	1.46E+02	6.52E+00	6.52E+00	7.65E-01	pCi/g
07-12067-15	TRG	SB48 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Radium-226	LANL ER-130 Modified	1.43E+02	5.16E+00	5.16E+00	6.24E-01	pCi/g
07-12067-15	TRG	SB48 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thorium-234	LANL ER-130 Modified	4.49E+01	9.12E+00	9.12E+00	6.52E+00	pCi/g
07-12067-15	TRG	SB48 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thallium-208	LANL ER-130 Modified	1.01E+00	2.65E-01	2.65E-01	9.05E-01	pCi/g
07-12067-16	TRG	SB48 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Actinium-228	LANL ER-130 Modified	3.43E+00	2.99E+00	2.99E+00	4.95E+00	pCi/g
07-12067-16	TRG	SB48 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Bismuth-214	LANL ER-130 Modified	3.23E+02	1.40E+01	1.40E+01	2.12E+00	pCi/g
07-12067-16	TRG	SB48 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Potassium-40	LANL ER-130 Modified	2.28E+01	1.48E+01	1.48E+01	1.23E+01	pCi/g
07-12067-16	TRG	SB48 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	-5.24E+01	8.32E+01	8.32E+01	1.32E+02	pCi/g
07-12067-16	TRG	SB48 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-212	LANL ER-130 Modified	1.50E+01	1.72E+00	1.72E+00	2.21E+00	pCi/g
07-12067-16	TRG	SB48 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-214	LANL ER-130 Modified	3.38E+02	1.99E+01	1.99E+01	2.34E+00	pCi/g
07-12067-16	TRG	SB48 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Radium-226	LANL ER-130 Modified	3.23E+02	1.40E+01	1.40E+01	2.12E+00	pCi/g
07-12067-16	TRG	SB48 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thorium-234	LANL ER-130 Modified	6.21E+01	1.45E+01	1.45E+01	1.87E+01	pCi/g
07-12067-16	TRG	SB48 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thallium-208	LANL ER-130 Modified	1.05E+00	4.74E-01	4.74E-01	3.10E+00	pCi/g
07-12067-17	TRG	SB49 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Actinium-228	LANL ER-130 Modified	1.84E+00	5.89E-01	5.89E-01	1.00E+00	pCi/g
07-12067-17	TRG	SB49 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Bismuth-214	LANL ER-130 Modified	3.56E+01	2.01E+00	2.01E+00	4.59E-01	pCi/g
07-12067-17	TRG	SB49 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Potassium-40	LANL ER-130 Modified	1.86E+01	3.54E+00	3.54E+00	2.49E+00	pCi/g
07-12067-17	TRG	SB49 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	-8.86E+00	1.67E+01	1.67E+01	2.85E+01	pCi/g
07-12067-17	TRG	SB49 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-212	LANL ER-130 Modified	1.86E+00	3.12E-01	3.12E-01	3.87E-01	pCi/g
07-12067-17	TRG	SB49 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-214	LANL ER-130 Modified	3.75E+01	2.12E+00	2.12E+00	5.00E-01	pCi/g
07-12067-17	TRG	SB49 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Radium-226	LANL ER-130 Modified	3.56E+01	2.01E+00	2.01E+00	4.59E-01	pCi/g
07-12067-17	TRG	SB49 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thorium-234	LANL ER-130 Modified	-4.63E-01	3.16E+00	3.16E+00	5.22E+00	pCi/g
07-12067-17	TRG	SB49 06-12	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thallium-208	LANL ER-130 Modified	1.31E+00	3.27E-01	3.27E-01	6.83E-01	pCi/g
07-12067-18	TRG	SB50 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Actinium-228	LANL ER-130 Modified	1.96E+00	4.52E-01	4.52E-01	5.97E-01	pCi/g
07-12067-18	TRG	SB50 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Bismuth-214	LANL ER-130 Modified	6.54E+00	5.59E-01	5.59E-01	3.23E-01	pCi/g
07-12067-18	TRG	SB50 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Potassium-40	LANL ER-130 Modified	2.14E+01	3.37E+00	3.37E+00	1.56E+00	pCi/g
07-12067-18	TRG	SB50 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Protactinium-234m	LANL ER-130 Modified	-2.81E+00	1.14E+01	1.14E+01	1.83E+01	pCi/g
07-12067-18	TRG	SB50 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-212	LANL ER-130 Modified	2.01E+00	2.66E-01	2.66E-01	2.39E-01	pCi/g
07-12067-18	TRG	SB50 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Lead-214	LANL ER-130 Modified	6.82E+00	5.12E-01	5.12E-01	2.94E-01	pCi/g
07-12067-18	TRG	SB50 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Radium-226	LANL ER-130 Modified	6.54E+00	5.59E-01	5.59E-01	3.23E-01	pCi/g
07-12067-18	TRG	SB50 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thorium-234	LANL ER-130 Modified	-5.50E-01	1.97E+00	1.97E+00	3.44E+00	pCi/g
07-12067-18	TRG	SB50 00-06	11/15/07 10:00	12/11/2007	1/9/2008	07-12067	Thallium-208	LANL ER-130 Modified	1.57E+00	3.48E-01	3.48E-01	4.20E-01	pCi/g

Eberline Services
Final Report of Analysis

Report To:		*Work Order Details:*	
Judy Stone		*SDG:*	**08-01094**
Lionville Laboratory, Inc.		*Project:*	URS / PADEP Karnish
208 Welsh Pool Road		*Analysis Category:*	ENVIRONMENTAL
Lionville, PA 19341-1313		*Sample Matrix:*	SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
08-01094-01	LCS	KNOWN	01/28/08 00:00	12/12/2007	2/19/2008	08-01094	Cobalt-60	LANL ER-130 Modified	2.52E+02	6.75E+00			pCi/g
08-01094-01	LCS	KNOWN	01/28/08 00:00	12/12/2007	2/19/2008	08-01094	Cesium-137	LANL ER-130 Modified	1.55E+02	4.31E+00			pCi/g
08-01094-01	LCS	SPIKE	01/28/08 00:00	12/12/2007	2/19/2008	08-01094	Cobalt-60	LANL ER-130 Modified	2.65E+02	1.46E+01	1.46E+01	1.05E+00	pCi/g
08-01094-01	LCS	SPIKE	01/28/08 00:00	12/12/2007	2/19/2008	08-01094	Cesium-137	LANL ER-130 Modified	1.65E+02	1.39E+01	1.39E+01	9.01E-01	pCi/g
08-01094-02	MBL	BLANK	01/28/08 00:00	12/12/2007	2/19/2008	08-01094	Radium-226	LANL ER-130 Modified	-4.60E-02	3.93E-02	3.93E-02	6.22E-02	pCi/g
08-01094-03	DUP	SB46 78-84	11/15/07 10:00	12/12/2007	2/19/2008	08-01094	Radium-226	LANL ER-130 Modified	1.03E+00	1.51E-01	1.51E-01	1.21E-01	pCi/g
08-01094-04	DO	SB46 78-84	11/15/07 10:00	12/12/2007	2/19/2008	08-01094	Radium-226	LANL ER-130 Modified	9.71E-01	1.44E-01	1.44E-01	1.21E-01	pCi/g
08-01094-05	TRG	SB38 24-30	11/15/07 10:00	12/12/2007	2/19/2008	08-01094	Radium-226	LANL ER-130 Modified	1.25E+00	2.99E-01	2.99E-01	2.57E-01	pCi/g
08-01094-06	TRG	SB19 78-84	11/14/07 10:00	12/12/2007	2/19/2008	08-01094	Radium-226	LANL ER-130 Modified	9.54E-01	1.86E-01	1.86E-01	1.48E-01	pCi/g
08-01094-07	TRG	SB23 90-96	11/14/07 10:00	12/12/2007	2/19/2008	08-01094	Radium-226	LANL ER-130 Modified	9.00E-01	2.33E-01	2.33E-01	2.50E-01	pCi/g
08-01094-08	TRG	SB27 42-48	11/14/07 10:00	12/12/2007	2/19/2008	08-01094	Radium-226	LANL ER-130 Modified	1.11E+00	2.25E-01	2.25E-01	2.61E-01	pCi/g
08-01094-09	TRG	SB15 72-78	11/13/07 10:00	12/12/2007	2/19/2008	08-01094	Radium-226	LANL ER-130 Modified	8.88E-01	1.50E-01	1.50E-01	1.28E-01	pCi/g
08-01094-10	TRG	SB8 90-96	11/13/07 10:00	12/12/2007	2/19/2008	08-01094	Radium-226	LANL ER-130 Modified	9.39E-01	1.40E-01	1.40E-01	1.17E-01	pCi/g
08-01094-11	TRG	SB51 12-18	11/15/07 10:00	12/12/2007	2/19/2008	08-01094	Radium-226	LANL ER-130 Modified	1.26E+00	3.45E-01	3.45E-01	2.87E-01	pCi/g
08-01094-12	TRG	SB10 90-96	11/13/07 10:00	12/12/2007	2/19/2008	08-01094	Radium-226	LANL ER-130 Modified	1.01E+00	1.44E-01	1.44E-01	1.14E-01	pCi/g
08-01094-13	TRG	SB12 72-78	11/13/07 10:00	12/12/2007	2/19/2008	08-01094	Radium-226	LANL ER-130 Modified	8.68E-01	2.47E-01	2.47E-01	2.14E-01	pCi/g
08-01094-14	TRG	SB9 132-138	11/13/07 10:00	12/12/2007	2/19/2008	08-01094	Radium-226	LANL ER-130 Modified	6.88E-01	1.53E-01	1.53E-01	1.38E-01	pCi/g

APPENDIX D

RON'S RENTAL INTERIOR CHARACTERIZATION SURVEY RESULTS

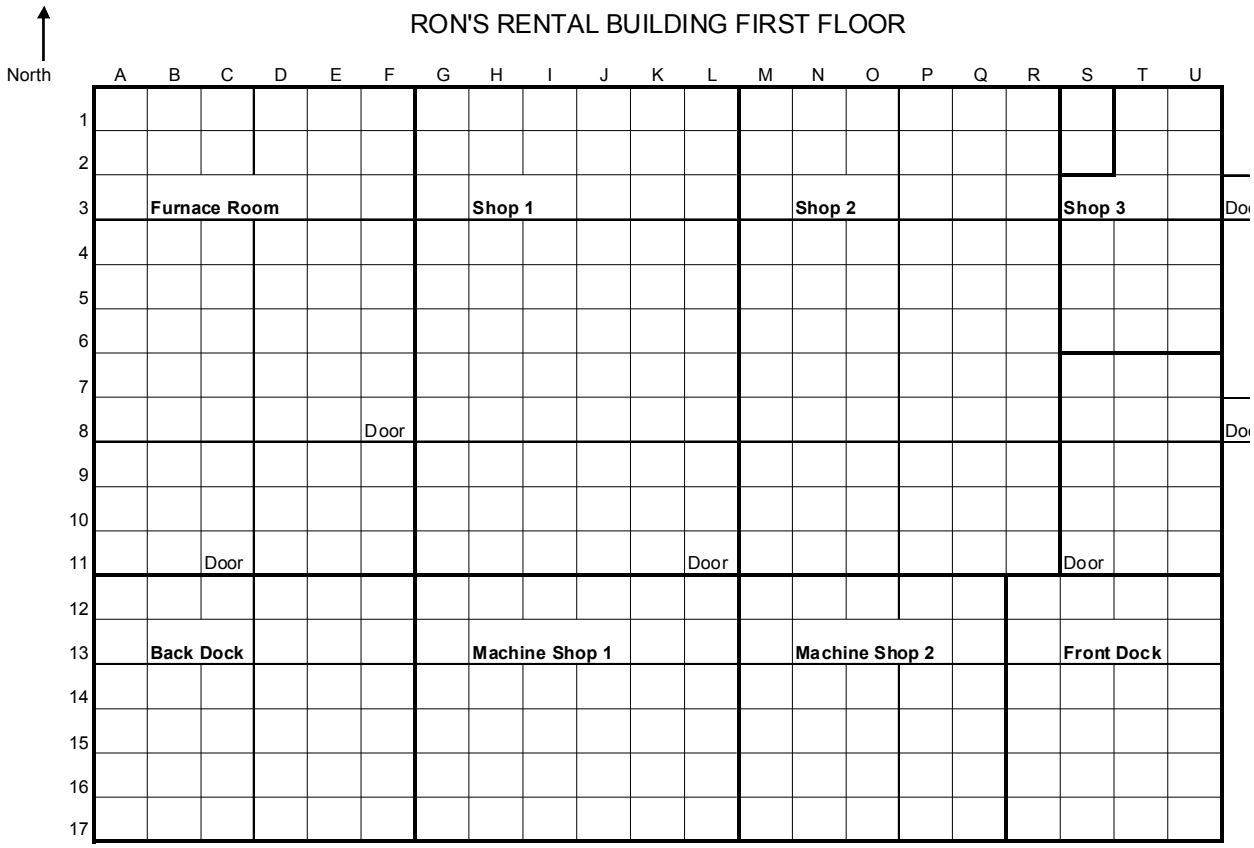
100% Coverage Gross Gamma Floor Survey Results

Gamma Exposure Rate Survey Results

Total and Removable Alpha and Beta Contamination Sample Points

Core Sample Locations

RON'S RENTAL BUILDING FIRST FLOOR



URS

FORMER KARNISH INSTRUMENTS
CHARACTERIZATION SURVEYS
REMEDIAL ACTION OPTIONS

Ron's Rental Furnace Room

North	A	B	C	D	E	F
1	17 [16] *15*	**40** 19 *15*	**36** 19 *14*	**52** 21 *15*	**34** 20 *15*	16 *15*
2	17 *15*	[15] 20 *14*	20 *14*	20 *13*	19 *13*	17 *14*
3	17 *15*	[17] 18 *16*	19 *17*	19 *18*	20 *20*	20 *22*
4	20 *17*	20 *18*	21 *17*	22 *18*	30 *18* **50**	30 *18* **53**
5	20 *19*	20 *20*	22 *20*	24 *21*	28 *22*	33 [18] *23*
6	20 *18*	25 *18*	27 *18*	30 *20*	33 *22*	33 *24*
7	32 *20*	25 *20*	30 *28*	**115** 35 *42*	**125** 60 *40*	**97** 50 *38*
8	24 *20*	26 *19*	35 *28*	**590** [19] 100 (5) *60*	**130** 100 *60*	**140** 75 *70*
9	25 *22*	28 *24*	[20] 50 (6) *45*	60 *60*	80 *80*	100 *110*
10	24 *20*	30 *25*	35 *30*	70 *60*	135 *100*	(2) 375 [1] *240*
11	23 *20*	20 *25*	35 *50*	60 *60*	80 *70*	**775** 400 *80*

Key

Grids are approximately 1-meter x 1-meter

Gamma:

Number = Average Kcpm at floor s

Bold = Max Kcpm at floor surface

Italics = uR/hr at 1-meter above su

Boxed Number is a Total and Removable Contamination Sample Point

Triangle Number is a Core Location

Gross Counts

	cpm	cpm
BKG	28	589
15	27	1,379
16	563	1,575
17	426	1,921
18	302	3,682
19	313	12,195
20	303	1,550

Ron's Rental Shop 1

North

	G	H	I	J	K	L
1	17 *14*	17 *14*	17 *14*	17 *12*	20 *14*	24 *20* **39**
2	18 *16*	20 *14*	18 *14*	19 *14*	23 *18*	30 *22* **53**
3	**35** 25 *20*	20 *18*	19 *18*	8 25 *18*	25 *18*	30 *20*
4	24 *24*	23 *20*	23 *18*	24 *20*	27 *20*	28 *20* 62/63
5	**35** 27 *30*	30 **46** *60*	27 *30*	**40** 47 30 *26*	28 *23*	28 *20* 60/61
6	110 **370**	12 13 14 530 **999** *240*	**530** 260 *90*	65 *40*	48 *30*	25 *18*
7	110 **370** *90*	**520** 405 *160*	**440** 220 *110*	**190** 120 *50*	35 *35*	25 *18*
8	**160** 95 *75*	93 *75*	90 *70* **200**	**260** *50*	35 *30*	25 *18*
9	80 *60*	70 *45*	55	35	30	28 *18*
10	66/67 **410** 102 *80*	**96** 73 *45*	60	38 *28*	30 *22*	26
11	**180** 87 *42*	**70** 53 *40*	45	40 **95** *24*	60 **220** *30*	30

Key

Grids are approximately
1-meter x 1-meter

Gamma:
Number = Average Kcpm at floor surface
Bold = Max Kcpm at floor surface
Italics = uR/hr at 1-meter above surface

Boxed Number is
a Total and Removable
Contamination Sample Point

Ron's Rental Shop 2

North	M	N	O	P	Q	R
						37
1	25	23	23	20	28	21
	18	*16*	*16*	*16*	*20*	*16*
	48					
2	27 [48]	26	24	24	25	22
	20	*18*	*18*	*20*	*18*	*16*
	44	**44**	**57**	**33**	**32**	**27**
3	30	28	25	31	30	20
	22	7 *22*	*22*	*18*	*20*	*18*
	40					
4	30	35	35	28	30	25
	20	*20*	*20*	*20*	*20*	*18*
	58	**33**	**39**	**45**	**46**	
5	28	27	25	24	26	20
	20	*20*	*20*	*20*	*18*	*18*
			44		**30**	**50**
6	25	25	11 26	25	24	24
	18	[10] *18*	*8 18*	*18* [6]	*18* [4]	*20*
		9	7	5	3	4
7	25	25	25	30	30	30
	18	*18*	*18*	*18*	*18*	*25*
8	25	25	24	25	25	28
	18	*18*	*18*	*18*	*18*	*20*
9	35	25	35	25	32	32
	20 ***62***	*20* ***120***	*21*	*18*	*18*	*20*
		72				
10	22	25	24	30	30	30
	18	*18*	*18*	*18*	*18*	*20*
11	18	22	22	35	35	26
	18	*18*	*18*	*18*	*20*	*18*

Key

Grids are approximately 1-meter x 1-meter

Gamma:
Number = Average Kcpm at floor surface
Bold = Max Kcpm at floor surface
Italics = uR/hr at 1-meter above surface

Boxed Number is a Total and Removable Contamination Sample Point

Triangle Number is a Core Location

Ron's Rental Shop 3

North	S	T	U
1	Rest	17 *14*	17 *14*
2	Room	17 *14*	17 *14*
3	D 16 *12*	**27** 18 *10*	20 *16* **29**
4	W 25 *14*	18 *14*	29 *20*
5	**29** 25 *18*	25 *18*	28 44* *20* *45*
6	27 *20* ***60***	33 *32* ***70***	***88*** 38 *40*
7	**250** 100 *60*	**330** 100 *80*	1 **500** 100 68/69 *40*
8	**75** 37 *35*	**83** 44 *32*	**90** 45 *35*
9	57 *22*	**57** 30 *18*	**33** 28 *18*
10	33 *22* ***55***	30 *20*	28 *18*
11	40 *20*	45 *20* ***65***	27 *25* ***36***

Key

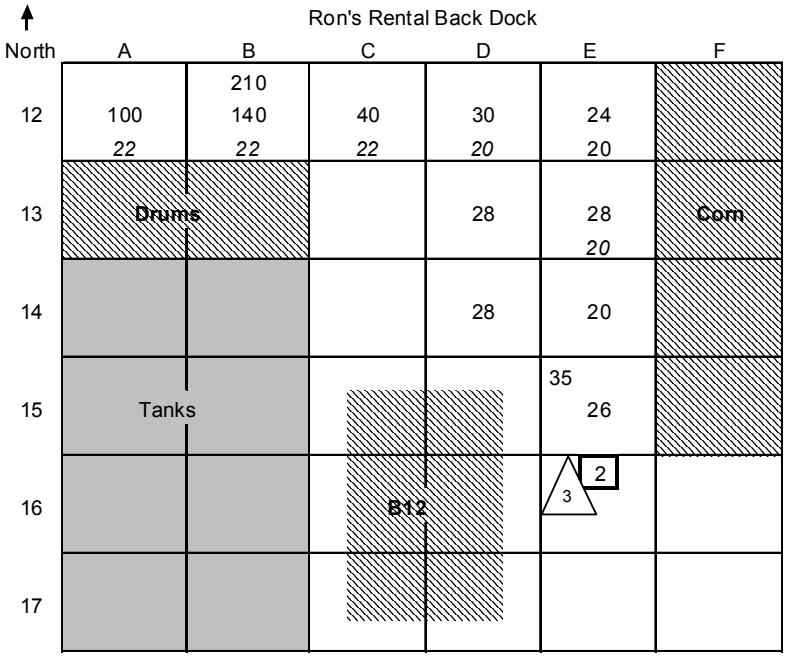
Grids are approximately
1-meter x 1-meter

Gamma:
Number = Average Kcpm at floor surface
Bold = Max Kcpm at floor surface
Italics = uR/hr at 1-meter above surface

Boxed Number is
a Total and Removable
Contamination Sample Point

Triangle Number is
a Core Location

* Smear on stairs
Under stairs

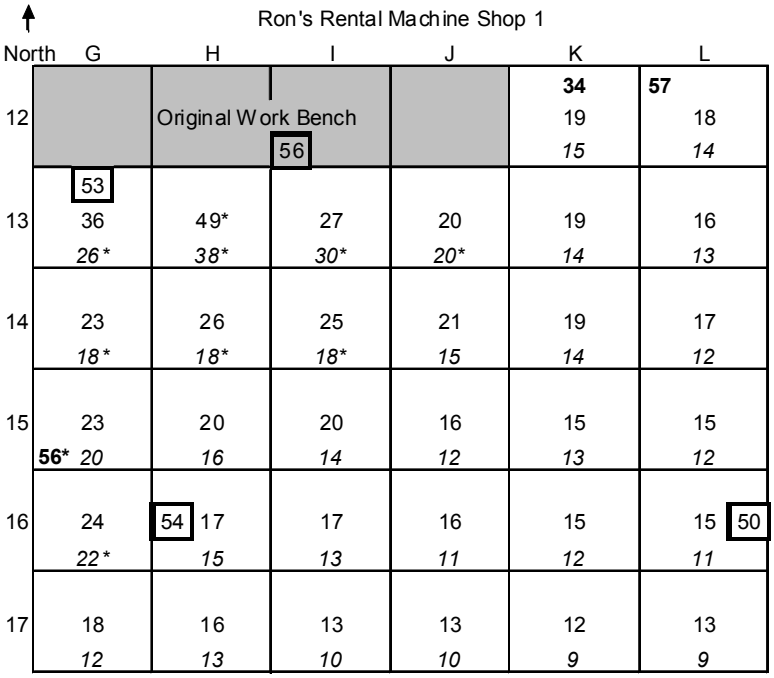


Key
Grids are approximately
1-meter x 1-meter

Gamma:
Number = Average Kcpm at floor surface
Bold = Max Kcpm at floor surface
Italics = uR/hr at 1-meter above surface

Boxed Number is
a Total and Removable
Contamination Sample Point

Triangle Number is
a Core Location



Key
Grids are approximately
1-meter x 1-meter

Gamma:
Number = Average Kcpm at floor surface
Bold = Max Kcpm at floor surface
Italics = uR/hr at 1-meter above surface

Boxed Number is
a Total and Removable
Contamination Sample Point

Machine Shop 2

North	M	N	O	P	Q
	20				
12	16	Original Work Bench			19
	13			57	*12*
	52				**33**
13	15	16	17	21	25
	13	*13*	*12*	*12*	*13*
14	15	15	15	17	17
	12	*10*	*12* 51	*13*	*10*
15	14	13	13	13	12
	11	*10*	*10*	*10* 49	*10*
	70/71				
16	14	14	13	13	11
	13	*11*	*11*	*10*	*10*
17	14	14	13	12	11
	13	*14*	*13*	*8*	*10*

Key
Grids are approximately
1-meter x 1-meter

Gamma:
Number = Average Kcpm at floor surface
Bold = Max Kcpm at floor surface
Italics = uR/hr at 1-meter above surface

Boxed Number is
a Total and Removable
Contamination Sample Point

Ron's Rental Front Dock

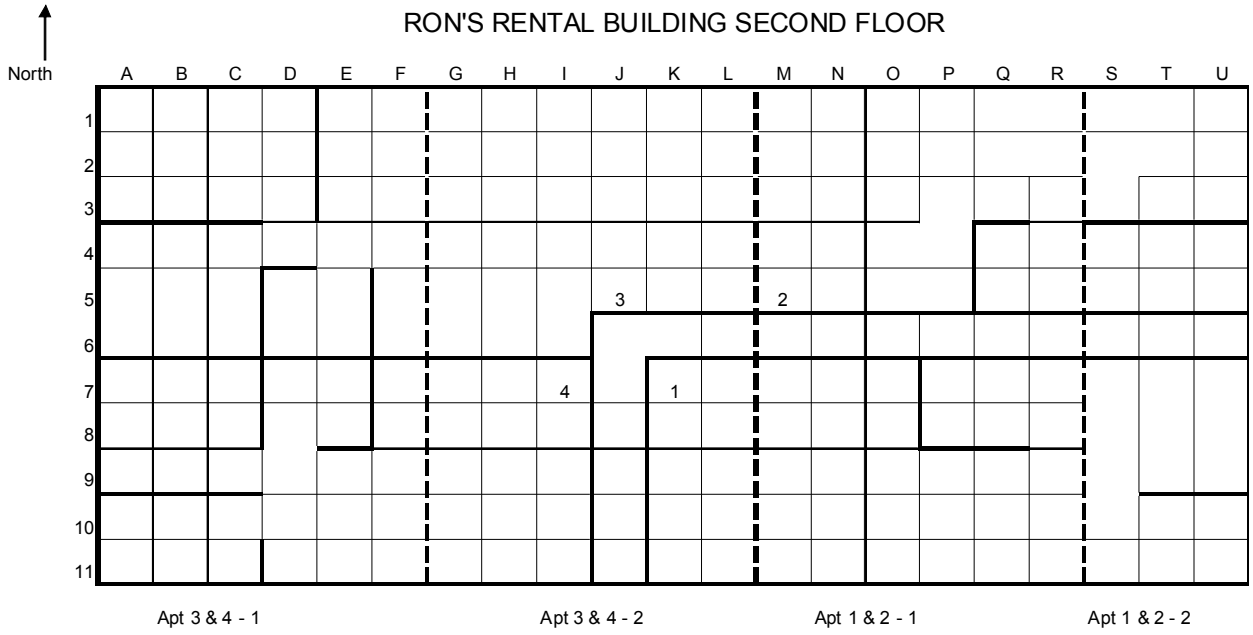
North	R	S	T	U
	26			
12	18	Oil Tank	13	13
	30		*10*	*10*
13	14	14	14	14
	55 *10*	*10*	*10*	*10*
14	13	13	13	13
	10	*10*	*10*	*10*
15	12	12	12	12
	10	*10*	*10*	*10*
16	12	12	12	12
	10	*10*	*10*	*10*
17	11	12	12	11
	10	*10*	*10*	*12**

Key
Grids are approximately
1-meter x 1-meter

Gamma:
Number = Average Kcpm at floor surface
Bold = Max Kcpm at floor surface
Italics = uR/hr at 1-meter above surface

Boxed Number is
a Total and Removable
Contamination Sample Point

* Elevated exposure from outside source


RON'S RENTAL BUILDING SECOND FLOOR
North
A B C D E F G H I J K L M N O P Q R S T U
1 2 3 4 5 6 7 8 9 10 11
3
2
4
1
Apt 3 & 4 - 1
Apt 3 & 4 - 2
Apt 1 & 2 - 1
Apt 1 & 2 - 2

Ron's Rental Apartments 3 & 4 - 1

North	A	B	C	D	E	F
1	12 *10*	13 *10*	14 *10*	17 *10*	16 *12*	19 *14*
2	13 *10*	14 *10*	18 *12*	20 *14*	23 *14*	23 *14*
3	15 *10*	15 *12*	19 *12*	24 *16*	25 *16*	20 ***25*** *18*
4	16 *12*	18 *12*	**26** 21 *14*	23 *16*	25 *18*	28 *18*
5	16 *12*	18 *14*	25 *16*	25 *16*	25 **27** 59 *20*	**40** 36 *24*
6	17 *14*	22 *14*	28 *20*	27 *20*	26 **35** *16*	20 ***40*** *28*
7	17 *16*	34 *18*	41 *24*	33 *24*	37 *20*	65 *34*
8	26 **120** *20*	41 80 **330** *36*	**66** 53 *32*	38 40 28	40 **48** 30	52 *32*
9	27 *20*	84 73 *26*	48 *30*	**54** 50 *30*	54 *34*	46 *30*
10	27 *20*	33 *24*	44 *30*	48 *28*	50 *28*	41 *28*
11	26 *18*	32 *24*	39 *28*	48 *28*	50 *28*	35 *24*

Key
Grids are approximately
1-meter x 1-meter

Gamma:
Number = Average Kcpm at floor surface
Bold = Max Kcpm at floor surface
Italics = uR/hr at 1-meter above surface

Boxed Number is
a Total and Removable
Contamination Sample Point

Ron's Rental Apartments 3 & 4 - 2

North	G	H	I	J	K	L
1	19 *12*	18 *12*	16 *14*	20 *20*	20 *20* **40**	36 *18*
2	23 *14*	18 ***23*** *14*	18 *14*	21 *20*	21 *20* ***50***	36 *18*
3	28 *18*	26 *18* [58]	20 *14*	22 *18*	22 *18*	27 *18*
4	30 **40** *24*	33 *24*	30 *22*	25 *18*	25 *18*	24 *18*
5	20 **40** *28*	30 **40** *24*	40 ***50*** *24*	28 *18*	28 *18*	25 *16*
6	65 *34*	60 *32*	44 *28*	39 ***42*** *26*	30 *22*	24 *18*
7	52 *32*	47 [39] *30*	44 *26*	[72/73] [42] **45** 39 *28*	**36** 28 *20*	24 *16*
8	46 *30*	42 *28*	39 *24*	**44** 38 *26*	**34** 29 *20*	24 *18*
9	41 *28*	41 *24*	37 *24*	**36** 30 *33*	**33** 28 *18*	24 *18*
10	35 *20*	34 *22*	34 *22*	28 *20*	**30** 25 *18*	26 *16*
11	35 *20*	34 *22*	34 *22*	25 *16*	**25** 23 *16*	23 *14*

Key
Grids are approximately
1-meter x 1-meter

Gamma:
Number = Average Kcpm at floor surface
Bold = Max Kcpm at floor surface
Italics = uR/hr at 1-meter above surface

Boxed Number is
a Total and Removable
Contamination Sample Point

Ron's Rental Apartments 1 & 2 - 1

North	M	N	O	P	Q	R
1	36 *18*	43 *18* **48**	51 *22*	77 *30*	115 *36*	105 33 *38*
2	36 *18*	43 *18* **48**	60 51 *22*	90 77 *30*	**220** 115 *36*	**220** 105 *38*
3	27 *18*	33 *18*	**52** 32 *20*	**45** 38 *22*	46 *28*	44 *28*
4	24 *18*	26 *18*	35 26 *18*	26 *18*	26 *14*	**38** 36 27 *18*
5	25 *16*	23 *16*	22 *16*	22 *16*	20 *14*	22 *18*
6	22 *16*	43 22 *16*	23 *16*	23 *16*	22 *14*	20 *14*
7	20 *16*	20 *14*	22 *14*	22 *14* 38	22 *14*	22 *14*
8	24 37 *16*	24 *16*	22 *14*	22 *14*	20 *14*	24 *16*
9	24 *16*	22 *18*	22 *14*	22 *14*	21 *14*	24 *16*
10	26 *18*	24 *16*	20 *14*	20 *14*	20 *14*	20 *14*
11	25 *16* *27*	20 *16*	20 *14*	20 *14*	17 *12*	17 *12*

Key
Grids are approximately
1-meter x 1-meter

Gamma:
Number = Average Kcpm at floor surface
Bold = Max Kcpm at floor surface
Italics = uR/hr at 1-meter above surface

Boxed Number is
a Total and Removable
Contamination Sample Point

Ron's Rental Apartments 1 & 2 - 2

North	S	T	U
1	58 *30*	16 *12*	13 *10*
2	**120** 58 *30*	15 *12*	15 *10*
3	44 *28*	15 *12*	15 *10*
4	20 *14*	17 *12*	16 *10*
5	20 *14*	20 *12*	18 *12*
6	**28** 23 *16*	**34** 29 *20*	**33** 30 *20*
7	25 *16*	27 *16*	24 *16*
8	26 *16*	26 *16*	25 *16*
9	28 *16*	30 *16*	28 *16*
10	20 *14*	20 *12*	20 *12*
11	18 *14*	17 *12*	17 *10*

Key

Grids are approximately
1-meter x 1-meter

Gamma:
Number = Average Kcpm at floor surface
Bold = Max Kcpm at floor surface
Italics = uR/hr at 1-meter above surface

Boxed Number is
a Total and Removable
Contamination Sample Point

APPENDIX E

RON'S RENTAL

TOTAL AND REMOVABLE ALPHA AND BETA CONTAMINATION RESULTS

Total Contamination Meausrements
Karnish Instruments - Ron's Rental Location

Data Point Number	Location	Total Alpha Result (dpm/100cm^2)	Total Alpha 95% Unc (dpm/100cm^2)	Total Alpha MDC (dpm/100cm^2)	Total Beta Result (dpm/100cm^2)	Total Beta 95% Unc (dpm/100cm^2)	Total Beta MDC (dpm/100cm^2)
1	Core # 2 Floor Surface	9,374	427	81.3	367,424	3,032	672
2	Core # 3 Floor Surface	107,582	1,443	81.3	3,096,775	8,738	672
3	Floor Along Old Wall 1 Core # 4	1,479	174	81.3	5,656	539	672
4	Floor Along Old Wall 1A	352	91.5	81.3	2,492	461	672
5	Floor Along Old Wall 2	1,233	159	81.3	4,413	509	672
6	Floor Along Old Wall 2A	302	86.0	81.3	2,460	460	672
7	#3 Old Concrete	1,468	170	56.4	8,177	491	354
8	#3A New concrete adjacent to 3	396	91	56.4	3,834	366	354
9	#4 Old Concrete	1,292	160	56.4	7,927	485	354
10	#4A New concrete adjacent to 4	230	71	56.4	2,598	322	354
11	#3C adjacent to 3A beyond wall	321	83	56.4	2,893	333	354
12	5 - red paint concrete	2,570	224	56.4	182,319	2,127	354
13	5A - no red paint concrete	16,175	560	56.4	168,542	2,046	354
14	6 red paint concrete	432	95	56.4	142,287	1,882	354
15	10 - Furnace Room	1,337	163	56.4	7,485	473	354
16	11 - Furnace Room	2,807	234	56.4	8,740	505	354
17	12 - Furnace Room	2,117	204	56.4	10,957	556	354
18	13 - Furnace Room	1,493	172	56.4	22,236	766	354
19	14 - Furnace Room	1,549	175	56.4	76,763	1,389	354
20	15 - Furnace Room	1,498	172	56.4	8,580	501	354
21	Boiler Room on block wall ~2 ft	3,160	259	147	11,067	405	262
22	Boiler Room on block wall ~4	643,595	3,516	147	792,923	3,190	262
23	Boiler Room on block wall ~2 ft to	181,675	1,870	147	499,547	2,534	262
24	Boiler Room on block wall ~3 ft	3,955	287	147	6,283	321	262
25	Boiler Room on East wall ~4 ft to	44,230	925	147	42,820	755	262
26	Door Jamb- doorway between	85,385	1,283	147	165,413	1,463	262
27	Door between Boiler Room and	8,650	415	147	24,507	580	262
28	Door between Boiler Room and	20,910	639	147	17,520	497	262
29	Door between Shop and Parts	2,095	215	147	8,820	368	262
30	East wall of Rental Area, to the	1,730	198	147	6,933	334	262
31	Boiler Room on North wall ~4 ft	1,845	204	147	4,340	279	262
32	Parts Area rear wall to the left of	2,840	246	147	3,900	269	262

Data Point Number	Location	Total Alpha Result (dpm/100cm^2)	Total Alpha 95% Unc (dpm/100cm^2)	Total Alpha MDC (dpm/100cm^2)	Total Beta Result (dpm/100cm^2)	Total Beta 95% Unc (dpm/100cm^2)	Total Beta MDC (dpm/100cm^2)
33	22 Apt #2 Wood	302,254	2,418	92.7	1,068,285	5,146	757
35	Apt. #2 Kitchen	714	126	92.7	3,414	527	757
36	Apt. #2 Bath	664	122	92.7	2,338	501	757
37	Apt. #1 Kitchen	629	120	92.7	2,415	503	757
38	Apt. # 1 Bath	493	108	92.7	2,460	504	757
39	Apt. #4 Kitchen	649	121	92.7	4,400	549	757
40	Apt. #4 Bath	659	122	92.7	3,914	538	757
41	Apt. #4 BR #2^	-55	33	92.7	214,501	2,339	757
42	Hallway - Apt. #4	820	134	92.7	2,588	507	757
43	Hallway - Apt. #2	865	137	92.7	1,249	473	757
44	Stairs* - Indoor	513	110	92.7	15,885	764	757
45	Floor under stairs	3,733	273	92.7	19,267	311	757
46	Shop - old area	2,933	243	92.7	26,863	924	757
47	Shop - old area	1,525	178	92.7	3,798	535	757
48	Shop - old area	4,558	300	92.7	81,159	1,480	757
49	Machine shop	216	80	92.7	1,563	481	757
50	Machine shop	292	88	92.7	903	464	757
51	Machine shop	91	62	92.7	3,459	528	757
52	Machine shop	418	101	92.7	1,480	479	757
53	Machine shop	312	90	92.7	3,529	529	757
54	Machine shop	755	129	92.7	4,298	547	757
55	Front Dock	362	96	92.7	2,319	500	757
56	Bench* - Long	540,000	3,231	92.7	1,382,661	5,849	757
57	Bench* - Short	941	143	92.7	2,568	506	757
58	Apt #3 Kitchen	916	141	92.7	2,748	511	757
59	Apt #3 Bath	875	138	92.7	2,671	509	757
60	Shop vinyl before	25.2	87.7	157	102	402	689
61	Shop vinly after	126	98.1	157	628	418	689
62	Shop concrete under bench before	1,706	200	157	5,015	532	689
63	Shop concrete under bench after	1,852	207	157	5,284	538	689
64	Shop concrete under bench before	4,503	307	157	56,128	1,241	689
65	Shop concrete under bench after	4,840	317	157	53,342	1,213	689
66	Shop wall west before	1,801	205	157	7,359	583	689
67	Shop wall west after	1,660	198	157	6,456	564	689
68	Shop wall east before	2,883	251	157	15,468	735	689
69	Shop wall east after	2,143	221	157	13,886	708	689
70	Machine shop asphalt before	146	100	157	1,114	432	689
71	Machine shop asphalt after	121	97.6	157	1,204	435	689
72	Apt #4 kitchen before	428	124	157	5,284	538	689
73	Apt #4 kitchen after	226	108	157	4,657	523	689

Removable Contamination Meausrements
Karnish Instruments - Ron's Rental Location

Data Point Number	Location	Removable Alpha Result (dpm/100cm^2)	Removable Alpha 95% Unc (dpm/100cm^2)	Removable Alpha MDC (dpm/100cm^2)	Removable Beta Result (dpm/100cm^2)	Removable Beta 95% Unc (dpm/100cm^2)	Removable Beta MDC (dpm/100cm^2)
1	Core # 2 Floor Surface	83.8	31.2	21.0	212	129	206
2	Core # 3 Floor Surface	397	66.4	21.0	724	157	206
3	Floor Along Old Wall 1 Core # 4	15.4	14.9	21.0	17.1	116	206
4	Floor Along Old Wall 1A	1.14	8.21	21.0	131	124	206
5	Floor Along Old Wall 2	15.4	14.9	21.0	94.2	122	206
6	Floor Along Old Wall 2A	3.99	9.93	21.0	-11.4	115	206
7	#3 Old Concrete	-1.42	1.25	15.5	-31.7	54.6	111
8	#3A New concrete adjacent to 3	-1.42	1.25	15.5	4.87	59.6	111
9	#4 Old Concrete	-1.42	1.25	15.5	-23.6	55.7	111
10	#4A New concrete adjacent to 4	1.42	5.72	15.5	-3.25	58.5	111
11	#3C adjacent to 3A beyond wall	-1.42	1.25	15.5	-19.5	56.3	111
12	5 - red paint concrete	-1.14	8.36	23.8	65.0	121	208
13	5A - no red paint concrete	4.56	11.5	23.8	150	127	208
14	6 red paint concrete	10.3	14.0	23.8	32.5	119	208
15	10 - Furnace Room	29.9	18.6	15.5	29.2	62.7	111
16	11 - Furnace Room	7.41	12.8	23.8	73.1	122	208
17	12 - Furnace Room	4.27	8.00	15.5	13.0	60.6	111
18	13 - Furnace Room	4.27	8.00	15.5	-27.6	55.1	111
19	14 - Furnace Room	4.27	8.00	15.5	69.9	67.5	111
20	15 - Furnace Room	9.97	11.2	15.5	4.87	59.6	111
21	Boiler Room on block wall ~2 ft	107	34.5	15.5	90.2	69.8	111
22	Boiler Room on block wall ~4	2,059	150	15.5	3,368	237	111
23	Boiler Room on block wall ~2 ft to	657	84.9	15.5	911	133	111
24	Boiler Room on block wall ~3 ft	24.2	16.8	15.5	37.4	63.7	111
25	Boiler Room on East wall ~4 ft to	420	68.0	15.5	760	124	111
26	Door Jamb- doorway between	10.0	11.2	15.5	29.2	62.7	111
27	Door between Boiler Room and	38.5	20.9	15.5	45.5	64.7	111
28	Door between Boiler Room and	199	46.7	13.9	224	83	111
29	Door between Shop and Parts	712	88.3	13.9	1,142	146	111
30	East wall of Rental Area, to the	176	44.0	13.9	208	82.0	111
31	Boiler Room on North wall ~4 ft	33.3	19.4	13.9	69.5	67.5	111
32	Parts Area rear wall to the left of	221	49.3	13.9	378	96.8	111

Data Point Number	Location	Removable Alpha Result (dpm/100cm^2)	Removable Alpha 95% Unc (dpm/100cm^2)	Removable Alpha MDC (dpm/100cm^2)	Removable Beta Result (dpm/100cm^2)	Removable Beta 95% Unc (dpm/100cm^2)	Removable Beta MDC (dpm/100cm^2)
33	22 Apt #2 Wood	1,765	139	15.5	3,173	230	111
35	Apt. #2 Kitchen	78.4	29.6	15.5	143	76	111
36	Apt. #2 Bath	-1.42	1.25	15.5	1	59	111
37	Apt. #1 Kitchen	-1.42	1.25	15.5	50	65	111
38	Apt. # 1 Bath	-1.42	1.25	15.5	37	64	111
39	Apt. #4 Kitchen	1.42	5.72	15.5	5	60	111
40	Apt. #4 Bath	1.42	5.72	15.5	-7	58	111
41	Apt. #4 BR #2^	-1.42	1.25	15.5	58	66	111
42	Hallway - Apt. #4	-1.42	1.25	15.5	-48	52	111
43	Hallway - Apt. #2	-1.42	1.25	15.5	29	63	111
44	Stairs* - Indoor	-1.42	1.25	15.5	25	62	111
45	Floor under stairs	1.42	5.72	15.5	-7	58	111
46	Shop - old area	1.42	5.72	15.5	-48	52	111
47	Shop - old area	15.7	13.7	15.5	50	65	111
48	Shop - old area	4.27	8.00	15.5	41	64	111
49	Machine shop	4.84	7.96	15.5	57.3	66.1	111
50	Machine shop	10.5	11.2	15.5	49.1	65.2	111
51	Machine shop	-0.855	0.967	15.5	20.7	61.7	111
52	Machine shop	16.2	13.7	15.5	8.53	60.1	111
53	Machine shop	7.69	9.72	15.5	24.8	62.2	111
54	Machine shop	33.3	19.4	15.5	69.5	67.5	111
55	Front Dock	10.5	11.2	15.5	-40.2	53.4	111
56	Bench* - Long	8,489	305	15.5	13,887	469	111
57	Bench* - Short	27.6	17.7	15.5	85.7	69.4	111
58	Apt #3 Kitchen	4.84	7.96	15.5	45.1	64.7	111
59	Apt #3 Bath	7.69	9.72	15.5	0.406	59.0	111
60	Shop vinyl before	34.5	21.0	22.1	732	121	106
61	Shop vinly after	5.98	11.4	22.1	419	98.3	106
62	Shop concrete under bench before	17.4	16.0	22.1	1,012	138	106
63	Shop concrete under bench after	11.7	13.9	22.1	683	117	106
64	Shop concrete under bench before	34.5	21.0	22.1	703	119	106
65	Shop concrete under bench after	20.2	16.9	22.1	532	107	106
66	Shop wall west before	186	45.8	22.1	926	133	106
67	Shop wall west after	5.98	11.4	22.1	662	116	106
68	Shop wall east before	148	41.1	22.1	805	125	106
69	Shop wall east after	20.2	16.9	22.1	662	116	106
70	Machine shop asphalt before	5.98	11.4	22.1	654	116	106
71	Machine shop asphalt after	0.28	8.27	22.1	581	110	106
72	Apt #4 kitchen before	17.4	16.0	22.1	679	117	106
73	Apt #4 kitchen after	3.13	9.98	22.1	593	111	106

Removable Fraction of Total Activity
Karnish Instruments - Ron's Rental Location

Data Point Number	Location	Total Alpha Result (dpm/100cm^2)	Total Beta Result (dpm/100cm^2)	Removable Alpha Result (dpm/100cm^2)	Removable Beta Result (dpm/100cm^2)	Alpha Removable Fraction (-)	Beta Removable Fraction (-)
1	Core # 2 Floor Surface	9,374	367,424	83.8	212	0.0089	0.0006
2	Core # 3 Floor Surface	107,582	3,096,775	397	724	0.0037	0.0002
3	Floor Along Old Wall 1 Core # 4	1,479	5,656	15.4	17.1	0.0104	0.0030
4	Floor Along Old Wall 1A	352	2,492	1.14	131	0.0032	0.0525
5	Floor Along Old Wall 2	1,233	4,413	15.4	94.2	0.0125	0.0214
6	Floor Along Old Wall 2A	302	2,460	3.99	-11.4		
7	#3 Old Concrete	1,468	8,177	-1.42	-31.7		
8	#3A New concrete adjacent to 3	396	3,834	-1.42	4.87		
9	#4 Old Concrete	1,292	7,927	-1.42	-23.6		
10	#4A New concrete adjacent to 4	230	2,598	1.42	-3.25		
11	#3C adjacent to 3A beyond wall	321	2,893	-1.42	-19.5		
12	5 - red paint concrete	2,570	182,319	-1.14	65.0		
13	5A - no red paint concrete	16,175	168,542	4.56	150	0.0003	0.0009
14	6 red paint concrete	432	142,287	10.3	32.5	0.0238	0.0002
15	10 - Furnace Room	1,337	7,485	29.9	29.2	0.0224	0.0039
16	11 - Furnace Room	2,807	8,740	7.41	73.1	0.0026	0.0084
17	12 - Furnace Room	2,117	10,957	4.27	13.0	0.0020	0.0012
18	13 - Furnace Room	1,493	22,236	4.27	-27.6		
19	14 - Furnace Room	1,549	76,763	4.27	69.9	0.0028	0.0009
20	15 - Furnace Room	1,498	8,580	9.97	4.87	0.0067	0.0006
21	Boiler Room on block wall ~2 ft	3,160	11,067	107	90.2	0.0338	0.0081
22	Boiler Room on block wall ~4	643,595	792,923	2,059	3,368	0.0032	0.0042
23	Boiler Room on block wall ~2 ft to	181,675	499,547	657	911	0.0036	0.0018
24	Boiler Room on block wall ~3 ft	3,955	6,283	24.2	37.4	0.0061	0.0059
25	Boiler Room on East wall ~4 ft to	44,230	42,820	420	760	0.0095	0.0178
26	Door Jamb- doorway between	85,385	165,413	10.0	29.2	0.0001	0.0002
27	Door between Boiler Room and	8,650	24,507	38.5	45.5	0.0044	0.0019
28	Door between Boiler Room and	20,910	17,520	199	224	0.0095	0.0128
29	Door between Shop and Parts	2,095	8,820	712	1,142	0.3397	0.1295
30	East wall of Rental Area, to the	1,730	6,933	176	208	0.1016	0.0299
31	Boiler Room on North wall ~4 ft	1,845	4,340	33.3	69.5	0.0181	0.0160
32	Parts Area rear wall to the left of	2,840	3,900	221	378	0.0780	0.0970

Data Point Number	Location	Total Alpha Result (dpm/100cm²)	Total Beta Result (dpm/100cm²)	Removable Alpha Result (dpm/100cm²)	Removable Beta Result (dpm/100cm²)	Alpha Removable Fraction (-)	Beta Removable Fraction (-)
33	22 Apt #2 Wood	302,254	1,068,285	1,765	3,173	0.0058	0.0030
35	Apt. #2 Kitchen	714	3,414	78.4	143	0.1097	0.0419
36	Apt. #2 Bath	664	2,338	-1.42	1		
37	Apt. #1 Kitchen	629	2,415	-1.42	50		
38	Apt. # 1 Bath	493	2,460	-1.42	37		
39	Apt. #4 Kitchen	649	4,400	1.42	5		
40	Apt. #4 Bath	659	3,914	1.42	-7		
41	Apt. #4 BR #2^	-55	214,501	-1.42	58		
42	Hallway - Apt. #4	820	2,588	-1.42	-48		
43	Hallway - Apt. #2	865	1,249	-1.42	29		
44	Stairs* - Indoor	513	15,885	-1.42	25		
45	Floor under stairs	3,733	19,267	1.42	-7		
46	Shop - old area	2,933	26,863	1.42	-48		
47	Shop - old area	1,525	3,798	15.7	50	0.0103	0.0130
48	Shop - old area	4,558	81,159	4.27	41	0.0009	0.0005
49	Machine shop	216	1,563	4.84	57.3	0.0224	0.0366
50	Machine shop	292	903	10.5	49.1	0.0361	0.0544
51	Machine shop	91	3,459	-0.855	20.7		
52	Machine shop	418	1,480	16.2	8.53	0.0389	0.0058
53	Machine shop	312	3,529	7.69	24.8	0.0247	0.0070
54	Machine shop	755	4,298	33.3	69.5	0.0442	0.0162
55	Front Dock	362	2,319	10.5	-40.2		
56	Bench* - Long	540,000	1,382,661	8,489	13,887	0.0157	0.0100
57	Bench* - Short	941	2,568	27.6	85.7	0.0294	0.0334
58	Apt #3 Kitchen	916	2,748	4.84	45.1	0.0053	0.0164
59	Apt #3 Bath	875	2,671	7.69	0.406	0.0088	0.0002
60	Shop vinyl before	25.2	102	34.5	732		
61	Shop vinly after	126	628	5.98	419		
62	Shop concrete under bench before	1,706	5,015	17.4	1,012		
63	Shop concrete under bench after	1,852	5,284	11.7	683		
64	Shop concrete under bench before	4,503	56,128	34.5	703		
65	Shop concrete under bench after	4,840	53,342	20.2	532		
66	Shop wall west before	1,801	7,359	186	926		
67	Shop wall west after	1,660	6,456	5.98	662		
68	Shop wall east before	2,883	15,468	148	805		
69	Shop wall east after	2,143	13,886	20.2	662		
70	Machine shop asphalt before	146	1,114	5.98	654		
71	Machine shop asphalt after	121	1,204	0.28	581		
72	Apt #4 kitchen before	428	5,284	17.4	679		
73	Apt #4 kitchen after	226	4,657	3.13	593		
					Average:	0.029	0.018
					Stdev.:	0.059	0.028
					Minimum:	0.0001	0.0002
					Maximum:	0.3397	0.1295
					Median:	0.0095	0.0070

* Original wood from Karnish Instrument Shop

APPENDIX F

RON'S RENTAL
CORE SCAN RESULTS

Karnish Instruments - Ron's Rental

Core #1
Entrance

Depth (in)	Activity (Kcpm)	Alpha (cpm)	Beta (cpm)
0 - 3	20		
0 - 6	**32**		
Gravel	23		
24 - 30	20		
40 - 48	16		

Core #2
Furnace Room - East Wall

Depth (in)	Activity (Kcpm)	Alpha (cpm)	Beta (cpm)
0 - 3	20	61	
0 - 6	**90**	**502**	
-	-		
24 - 30	61		
30 - 36	19		
36 - 42	20		
42 - 48	20		
48 - 54	20		
66 - 72	17		

Core #3
Back Dock - Asphalt

Depth (in)	Activity (Kcpm)	Alpha (cpm)	Beta (cpm)
0 - 3	**75**	**909**	**45,294**
0 - 6	20	43	691
-	-		
24 - 30	16		
30 - 36	16		
36 - 42	20		
42 - 48	25		
48 - 52	18		

Core #4
Shop -

Depth (in)	Activity (Kcpm)	Alpha (cpm)	Beta (cpm)
0 - 3	**21**	54	547
0 - 6	16	43	521
Gravel	16		
24 - 30	16		
30 - 36	16		

Core #5
Furnace Room - Bias

Depth (in)	Activity (Kcpm)	Alpha (cpm)	Beta (cpm)
0 - 3	16	30	461
0 - 6	16	19	531
Gravel	**285**		
24 - 30	**335**		
30 - 36	**127**		

Core #6
Furnace Room - Bkg

Depth (in)	Activity (Kcpm)	Alpha (cpm)	Beta (cpm)
0 - 3	16	65	586
0 - 6	16	72	622
-	-		
24 - 30	17		
30 - 36	17		

Core #7
Shop

Depth (in)	Activity (Kcpm)	Alpha (cpm)	Beta (cpm)
0 - 3	16	106	982
0 - 6	16	37	621
-	-		
24 - 30	16		
30 - 36	16		
36 - 42	16		
42 - 48	16		

Core #8
Shop

Depth (in)	Activity (Kcpm)	Alpha (cpm)	Beta (cpm)
0 - 3	16	67	556
0 - 6	16		
-	-		
12 - 18	16		
18 - 24	16		

APPENDIX G

RON'S RENTAL
RADON SAMPLE RESULTS

(717) 657-7032
www.radondetek.com

TCS INDUSTRIES, INC.
RADON GAS DETECTION
4326 Crestview Road, Harrisburg, PA 17112

ANITA MUCHA
116 THOUSAND OAKS
PITTSBURGH PA 15241

****

TESTED AREA-BASEMENT PADEP Laboratory ID = 0182
FLOPPY IDENTIFIER 1TABY120

EXPOSURE START DATE/TIME	11/13/2007	13: 0	
END	11/16/2007	9: 0	EXPOSURE HOURS = 68.0
ANALYSIS	11/21/2007	10:30	DECAY HOURS = 121.5

CANISTER NUMBER: DB346F
WATER GAIN = 1.4 grams

****

RADON CONCENTRATION (WEIGHTED AVG) IN pCi/l = 33.7

****

ACTIONS SUGGESTED BY U.S. EPA, PA DER, and/or TCS for
for 20 pCi/l and MORE

Exposure levels at or above 20 pCi/l require PROMPT action. We recommend immediate short term follow up measurements with RADON DETEK canisters in main living areas. Repair home if average of the first & 2nd. test is 4 pCi/l or more. For additional info. call TCS or PA DEP. DEP's phone is 1-800-23-RADON

****

!!!! TCS RECOMMENDS -TAKE REMEDIAL ACTION IN A FEW DAYS !!!!

****

POLICY AND LIMITATIONS OF LIABILITY

TCS holds all data and information confidential. We will not release it to other parties without written permission, except where required by law. Data may be used in reports without disclosure of customers name or address. TCS Industries does not accept responsibility for financial or health consequences of actions taken by the customer or his agents as a result of this analysis or sampling, or for any and all loss, charge, cost, claim, demand, fee, expense, or damage of any nature arising out of, connected with, resulting from or sustained as a result of any radon sampling requested. TCS makes no warranty of any kind, expressed or implied for the consequences of erroneous test results.

TCS INDUSTRIES, INC.

(717) 657-7032
www.radondetek.com

RADON GAS DETECTION
4326 Crestview Road, Harrisburg, PA 17112

RESULTS OTHERWISE
OPEN TOO QUICK
NOT PREPAID PROMPTLY
NO TOP
NOT SEALED
✓ NOT OPEN LONG ENOUGH

ANITA MUCHA
116 THOUSAND OAKS
PITTSBURGH PA 15241

****

TESTED AREA BASEMENT PADEP Laboratory ID = 0182
FLOPPY IDENTIFIER 2TAGY121

EXPOSURE START DATE/TIME	11/13/2007	13: 0	
END	11/15/2007	9: 0	EXPOSURE HOURS = 44.0
ANALYSIS	11/21/2007	10:29	DECAY HOURS = 145.5

CANISTER NUMBER: SGN530M
WATER GAIN = 3.6 grams

****

RADON CONCENTRATION (WEIGHTED AVG) IN pCi/l = 34.7

****

ACTIONS SUGGESTED BY U.S. EPA, PA DER, and/or TCS for
for 20 pCi/l and MORE

Exposure levels at or above 20 pCi/l require PROMPT action. We recommend immediate short term follow up measurements with RADON DETEK canisters in main living areas. Repair home if average of the first & 2nd. test is 4 pCi/l or more. For additional info. call TCS or PA DEP. DEP's phone is 1-800-23-RADON

****

!!!! TCS RECOMMENDS -TAKE REMEDIAL ACTION IN A FEW DAYS !!!!

****

POLICY AND LIMITATIONS OF LIABILITY

TCS holds all data and information confidential. We will not release it to other parties without written permission, except where required by law. Data may be used in reports without disclosure of customers name or address. TCS Industries does not accept responsibility for financial or health consequences of actions taken by the customer or his agents as a result of this analysis or sampling, or for any and all loss, charge, cost, claim, demand, fee, expense, or damage of any nature arising out of, connected with, resulting from or sustained as a result of any radon sampling requested. TCS makes no warranty of any kind, expressed or implied for the consequences of erroneous test results.

Karnish, Charcoal Canister (F&J R40VDB) test results

Location: Ron's Rental Shop, 210 Third Ave. Lock Haven, PA

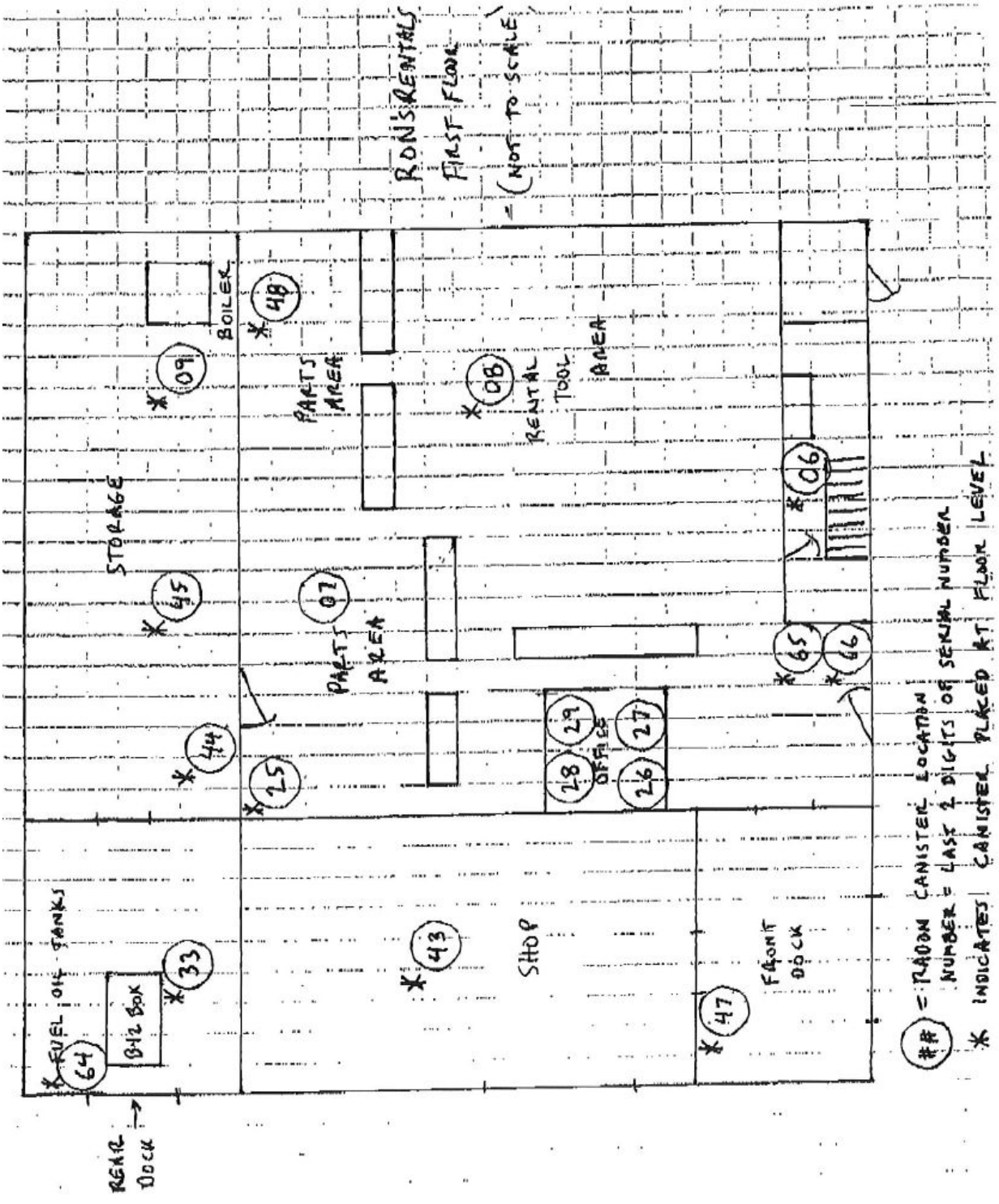
Exposure: 12/21/2007 to 12/27/2007

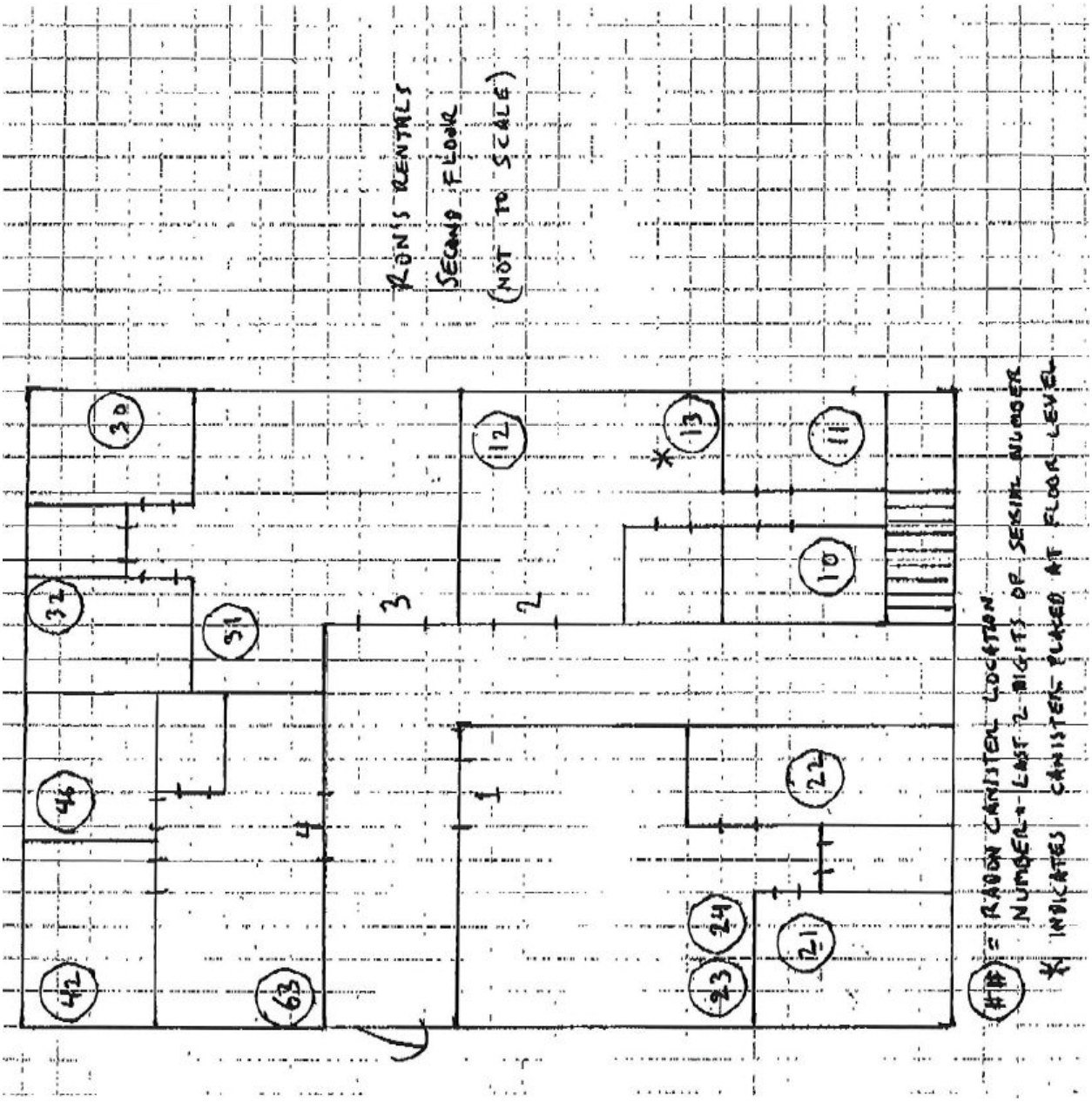
Placed by: Cheryl Sinclair

Retrieved by: Cheryl Sinclair

Analyzed by: Geno Simonetti

Serial Number	Test Result
69626	0.1 pCi/L (blank)
69627	0.1 pCi/L (blank)
69628	46.9 pCi/L (duplicate 1)
69629	44.5 pCi/L (duplicate 1)
69647	5.2 pCi/L
69643	27.1 pCi/L
69633	28.3 pCi/L
69664	23.1 pCi/L
69644	229.6 pCi/L
69645	47.0 pCi/L
69609	48.0 pCi/L
69625	51.9 pCi/L
69607	43.4 pCi/L
69608	35.6 pCi/L
69665	43.6 pCi/L (duplicate 2)
69666	40.8 pCi/l (duplicate 2)
69621	31.4 pCi/L
69622	15.1 pCi/L
69623	31.3 pCi/L (duplicate 3)
69624	30.9 pCi/L (duplicate 3)
69630	51.2 pCi/L
69631	51.5 pCi/L
69632	52.8 pCi/L
69610	40.9 pCi/L
69611	39.4 pCi/L
69612	44.4 pCi/L
69613	41.5 pCi/L
69663	63.4 pCi/L
69646	73.7 pCi/L
69642	69.5 pCi/L
69648	46.1 pCi/L
69606	41.2 pCi/L


RON'S RENTALS
FIRST FLOOR
(NOT TO SCALE)
BOILER
PARTS AREA
RENTAL TOOL AREA
STORAGE
PARTS AREA
OFFICES
SHOP
FRONT DOCK
REAR DOCK
FUEL OIL TANKS
B12 BOX
48
09
98
06
45
07
44
25
65
46
29
28
27
26
43
33
64
47
(#) = RADON CANISTER LOCATION NUMBER - LAST 2 DIGITS OF SERIAL NUMBER
* INDICATES CANISTER PLACED AT FLOOR LEVEL


RON'S RENTALS
SECOND FLOOR
(NOT TO SCALE)
30
32
31
46
42
63
12
13
11
10
3
2
4
1
22
24
23
21
#= RADON CANISTER LOCATION
NUMBER = LAST 2 DIGITS OF SERIAL NUMBER
* INDICATES CANISTER PLACED AT FLOOR LEVEL

BRP Radon Division
* Not For Public Release

Re: Radon testing at Ron's Rental shop, Lock Haven, PA

In support of the Decommissioning Section the Radon Division supplied 32 F&J R40VDB, diffusion barrier charcoal test kits for radon characterization at Ron's Rental shop. The test kits were placed by Jeff Whitehead of the BRP on 12/21/2007 and they were retrieved on 12/27/2007 by Cheryl Sinclair of the PA DEP Environmental Clean-up Group in the Williamsport office. The building was maintained under closed-building conditions during the testing. Geno Simonetti of the BRP Radon Division counted and analyzed the test kits on 12/27-28/2007.

As part of the total 32 test kits three sets of duplicates and two blanks were also incorporated into the sampling plan. The blanks, serial numbers 69626 and 69627 both showed results of 0.1 pCi/L. Blanks should exhibit results less than or equal to the MDA for the counting system. The MDA for the counting system is a function of the background count and the counting time, for our system this is typically less than 1 pCi/L. The project blanks therefore show no accumulation of radon during shipment or storage. The duplicates provide for a measure of the precision of the measurement system, and for good precision we expect to see the coefficient of variation (COV) of a set of duplicates of less than 10%. The duplicate serial numbers for this project are 69628/69629, 69665/69666, and 69623/69624, with COV's of 3.7%, 4.6%, and 0.9% respectively, all well below the 10% limit. Spikes are also performed on a monthly basis with a radon chamber in Dayton, Ohio, with individual relative errors on the order of less than +/- 10%.

Test results show some interesting findings:

The ground floor shows values ranging from 5.2 (front dock) to 230 pCi/L (furnace room). The two docks show a significant difference, with the back dock showing 23 and 28 pCi/L, and the front dock showing only 5.2 pCi/L. This difference could be due to ventilations rates, source contamination, or soil gas entry rates from below the slab. Ventilation rates may possibly be determined just by visual observation, and contamination rates have already been done in the back dock, with some significant results. No front dock smear samples seem to have been taken, nor would the radon test results suggest much of a problem.

The current round of radon test results are consistent with the previous test results of November 2007 where two charcoal canisters showed results of 34.7 and 33.7 on the ground floor. These two test results were performed by ??????????????????????????. (SEC)

The highest radon test result on the ground floor of 230 pCi/l correlates with the highest microR reading of 230 µR/hr in the furnace room. The two values of 230 are only coincidental.

Eleven test kits were placed directly on the concrete floor on the ground floor area. This was done to see if we could determine if the building radon was due to the Ra-226 surface contamination inside the building or the more typical naturally occurring Ra-226 soil gas contribution from below the building. We may not be able to be conclusive in this determination. It should be noted that test kit placement on the floor surface is contrary to placement protocol. With the one exception of the 230 pCi/L value in the furnace room the floor placement test kits are similar to the waist high placement test kits. Would this suggest that most of the surface contamination is not contributing to the building radon?

In the residential testing environment the basement radon value typically shows about twice the radon value as the floor above it. This is not the case in this survey, with second floor readings being higher than first floor readings, with the one exception of the 230 value in the furnace room. Second floor apartment values range from 15 to 74 pCi/L. This may tend to suggest that there is an additional source of radon on the second floor, other than the typical soil gas movement from soil to basement to first floor to second floor, etc. In this particular case that suspected contamination may in fact be from Ra-226. Another possibility could be radon entry via ground water use in the apartments, if in fact their water source is from a well. This could easily be tested.

The final observation is the difference in radon values in each apartment, with highest to lowest being, apartment 4, apartment 3, apartment 2, and apartment 1. This again could be an indication of variable contamination within the different apartments?

These radon values are all of a significant health concern in light of the US EPA guideline value of 4.0 pCi/L, particularly the second floor apartments where more residence time is expected.

APPENDIX H

METAL ANALYSIS

Parameter	MSC (Residential), 0-15'	MSC (Non-Res), 0-2'	MSC (Non-Res), 2-15'	SB1300	SB1390	SB1418	SB1800	SB2048	SB2148	SB2200	SB2400
Arsenic	12	53	190,000	12.7	9.5	7.4	2.9	8.8	10.6	11.5	3.7
Barium	15,000	190,000	190,000	93.8	169	124	17.9	103	108	149	39.2
Cadmium	47	210	190,000	8.8	1.2	1.1	0.57	0.06	0.05	0.06	0.27
Chromium VI	94	420	190,000	160	33.7	17.3	3.8	17.6	19.2	14.5	8.2
Lead	500	1,000	190,000	311	43.3	6.7	15	18.6	23.7	40.5	26.9
Mercury	66	840	190,000	21.9	0.52	0.3	2.3	0.1	0.12	0.1	0.18
Selenium	1,100	14,000	190,000	1.2	0.69	1.3	0.57	0.67	0.64	1.5	0.52
Silver	1,100	14,000	190,000	0.41	0.11	0.11	0.09	0.11	0.11	0.12	0.09

Parameter	MSC (Residential), 0-15'	MSC (Non-Res), 0-2'	MSC (Non-Res), 2-15'	SB2490	SB2600	SB2800	SB2906	SB3000	SB3100	SB3200	SB3300
Arsenic	12	53	190,000	7.2	3.4	8.6	7	7.4	8.3	6.5	8.7
Barium	15,000	190,000	190,000	71.6	70.2	146	85.1	90.4	108	156	368
Cadmium	47	210	190,000	0.05	0.09	6.4	5.9	31.9	18.6	30.9	23.6
Chromium VI	94	420	190,000	19	8.7	16.7	67.5	14.6	24.8	37.4	50
Lead	500	1,000	190,000	16.6	13.1	88.6	54.7	28.1	311	347	587
Mercury	66	840	190,000	0.03	0.8	1.7	1.8	1.7	12.4	12.3	15.2
Selenium	1,100	14,000	190,000	0.84	0.75	1.3	0.62	0.54	0.91	1.3	2
Silver	1,100	14,000	190,000	0.11	0.12	0.35	0.1	0.09	0.53	0.54	4.2

Parameter	MSC (Residential), 0-15'	MSC (Non-Res), 0-2'	MSC (Non-Res), 2-15'	SB3306	SB3400	SB3448	SB3984	SB4178	SB4230	SB4354	SB4424
Arsenic	12	53	190,000	9	9.7	9.1	8.8	8.5	8.9	9.5	8
Barium	15,000	190,000	190,000	99.2	50.2	106	160	125	658	216	359
Cadmium	47	210	190,000	0.05	13.1	4	0.05	0.05	0.35	0.21	0.28
Chromium VI	94	420	190,000	16.3	29.6	23.6	16	14.7	15.3	14.2	14
Lead	500	1,000	190,000	17.5	191	83	15.7	14.5	15	1320	25.6
Mercury	66	840	190,000	0.02	2	0.98	0.02	0.03	0.03	0.08	0.08
Selenium	1,100	14,000	190,000	1.6	2.5	1.2	1.1	0.79	1.4	0.97	0.72
Silver	1,100	14,000	190,000	0.11	0.13	0.11	0.11	0.1	0.1	0.1	0.11

Parameter	MSC (Residential), 0-15'	MSC (Non-Res), 0-2'	MSC (Non-Res), 2-15'	SB4578	SB4706	SB4800	SB4806	SB4906	SB5000	SB10	SB12
Arsenic	12	53	190,000	9.7	10.2	13.9	11.2	17.3	15.2	6.3	6.4
Barium	15,000	190,000	190,000	119	145	123	188	159	165	166	48
Cadmium	47	210	190,000	0.06	0.12	2.5	2.5	5.4	1.6	0.06	0.05
Chromium VI	94	420	190,000	15.9	18.8	16.6	15.9	20	20	19.1	12.8
Lead	500	1,000	190,000	15.9	34.7	130	154	148	54.8	11.2	9.1
Mercury	66	840	190,000	0.02	0.16	33.3	16.4	3.7	0.38	0.02	0.01
Selenium	1,100	14,000	190,000	0.89	0.96	1.6	1.5	2.5	2.1	0.67	0.64
Silver	1,100	14,000	190,000	0.11	0.12	0.23	0.17	0.13	0.12	0.11	0.11

Parameter	MSC (Residential), 0-15'	MSC (Non-Res), 0-2'	MSC (Non-Res), 2-15'	SB15	SB19	SB23	SB27	SB38	SB46	SB51	SB8
Arsenic	12	53	190,000	9.2	9.7	8.8	10.9	9.1	8.6	8.3	8.5
Barium	15,000	190,000	190,000	129	514	383	53.7	396	98.8	233	113
Cadmium	47	210	190,000	0.34	0.07	0.06	0.06	0.42	0.08	0.19	0.07
Chromium VI	94	420	190,000	16	14.5	14.1	17.3	14.6	13	15.4	23.9
Lead	500	1,000	190,000	20.2	76.3	13.4	20.1	46.4	13.1	19.8	14.6
Mercury	66	840	190,000	0.02	0.01	0.03	0.03	0.13	0.02	0.06	0.02
Selenium	1,100	14,000	190,000	0.66	0.63	0.61	0.68	0.77	0.68	0.81	0.59
Silver	1,100	14,000	190,000	0.11	0.1	0.1	0.11	0.11	0.11	0.12	0.1

Parameter	MSC (Residential), 0-15'	MSC (Non-Res), 0-2'	MSC (Non-Res), 2-15'	SB9
Arsenic	12	53	190,000	5.9
Barium	15,000	190,000	190,000	75.4
Cadmium	47	210	190,000	0.11
Chromium VI	94	420	190,000	15.5
Lead	500	1,000	190,000	12.4
Mercury	66	840	190,000	0.01
Selenium	1,100	14,000	190,000	0.62
Silver	1,100	14,000	190,000	0.1