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M-136

Formerly Utilized Sites Remedial Action Program (FUSRAP)

ADMINISTRATIVE RECORD

for Maywood, New Jersey

U.S. Department of Energy

0489-0613.1

Bechtel

Interoffice Memorandum

To	K. R. Myers	File No.	7315/138
Subject	RI Information for 90 Avenue C Removal Action Subcontract Package	Date	April 17, 1991
		From	Nicke C. Ring
		Of	FUSRAP - EH&S
Copies to	R. C. Robertson M. E. Redmon G. Atchinson P. H. Champ R. L. Halsey	At	Oak Ridge Ext. 6-1727

Attached is the information you requested regarding contamination on the property at 90 Avenue C in Lodi, New Jersey. I have included figures indicating the location of surface and subsurface contamination in the front and back yards, and data tables for downhole gamma logs and soil sample analysis.

Please note that soil samples from 0 to 1.0 ft are considered as surface samples along with those from 0 to 0.5 ft, and the DOE guideline of 5 pCi/g is applied to these samples. The maximum concentration of thorium-232 in surface soil was 35.5 pCi/g at 0 - 1.0 ft in borehole R427 at E1500, N2085. The maximum concentration of thorium-232 in subsurface soil samples was 72.5 pCi/g at 1.0 - 2.0 ft in borehole R344 at E1478, N2103.

One sample of the wall material in the basement/foundation portion of the structural addition was collected and analyzed for uranium-238, radium-226, and thorium-232. Analysis results for that sample indicated a thorium-232 concentration of 60 pCi/g which confirms our assumption that contaminated mulch material from Maywood Chemical Works was mixed with the material used to form the walls of the basement/foundation.

If you have any questions, please let me know.

SITE HISTORY

The history of the Maywood site began with the construction of the Maywood Chemical Works (MCW) in 1895. From 1916 through 1956, MCW processed monazite sands to extract thorium and rare earths for use in the manufacture of industrial products such as mantles for gas lanterns. Wastes from these process operations were eventually disposed of in two areas surrounded by earthen dikes on property west of the plant. These areas were separated from the plant and partially covered by the construction of Route 17 in 1932. Contaminants from these wastes subsequently migrated onto adjacent properties. Contaminated materials were also disseminated to vicinity properties from the MCW in the form of fill. Although the fill consisted of tea and coca leaves, it was apparently mixed with thorium-processing wastes from the plant. In 1928, wastes were brought to several nearby areas for use as mulch and fill.

The original MCW property was comprised of several buildings, many of which have been dismantled over the years. The materials from these buildings may have been buried in onsite waste burial pits, and some materials may have been disposed of off-site.

The property owner of the residence at 90 Avenue C was an employee of MCW, and interviews with family members indicate that he brought discarded building materials and mulch to the property from MCW. It is believed that the contamination in the kitchen and upstairs of the residence result from contaminated building materials brought to the property from MCW and used in the construction of the kitchen addition. Contamination in the basement/foundation of the kitchen addition is believed to have resulted from mixing of the mulch with concrete to pour the walls. There is also soil contamination around a separate garage structure, and in the backyard of the residence that apparently resulted from the mulch material from MCW being used as fill on the property.

In addition, there is a small area of contamination in the ceiling of a room in the upstairs of the residence. Apparently a small piece, approximately 2 in. x 8 in., of wood was used as a patch during repair of the ceiling.

SUMMARY OF REMEDIAL INVESTIGATION DATA

Surface Soil Sampling

Surface soil samples were collected at eleven locations on the property. Eight of the eleven samples indicated radioactive contamination that exceeds the DOE guideline of 5 pCi/g. Locations of the samples is shown on Figure 1, and data is included Table 1.

Subsurface Soil Sampling

Eleven radiological boreholes were drilled on the property and soil samples were collected and analyzed for uranium-238, radium-226, and thorium-232. Four of the boreholes indicated the presence of

contamination either by downhole gamma logging or soil analysis. Borehole locations are shown in Figure 2, and data is included in the attached Tables 1 and 2.

In addition to the eleven radiological boreholes, two additional boreholes were drilled and soil samples collected for chemical analysis. The results of these analyses indicate no chemical contamination present on the property. The boreholes were downhole gamma logged and indicated the presence of radioactive contamination. Locations of these boreholes is shown in Figure 2.

Indoor Sampling

A sample of the material used for the wall of the basement/foundation was collected and analyzed for uranium-232, radium-226, and thorium-232. Analysis results indicated concentrations of < 30.4, < 4.5, and 60.0 pCi/g, respectively, for these radionuclides.

Figure 3 represents indoor gamma and beta-gamma measurements obtained in the kitchen and basement/foundation addition of the residence. Gamma exposure rates were measured at 42,000 cpm or approximately 38 μR/hr at one meter above the floor in the kitchen, and 40,000 cpm or approximately 36 μR/hr at one meter above the floor in the basement/foundation addition.

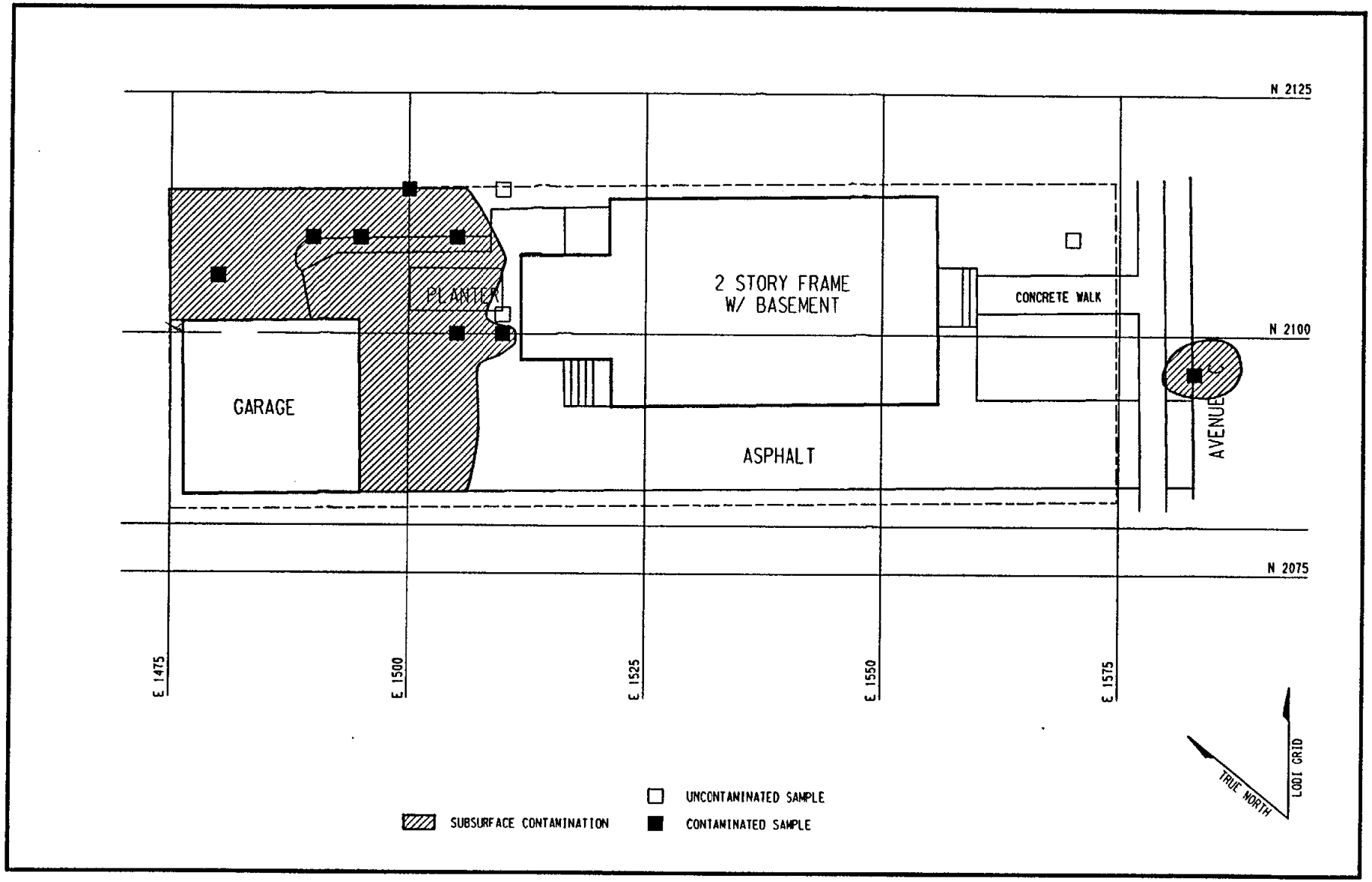
Garage

An exterior survey of the garage walls indicated two locations with elevated gamma measurements. The first, along the southwest wall near the back corner, had elevated gamma measurements of 90,000 cpm in the wall close to the ground surface. The second location, along the northwest wall near the back corner, had gamma measurements of 70,000 cpm in the wall approximately 2 ft above the ground surface. These exterior wall locations appeared to be small, isolated areas of contamination approximately 3 in. in diameter that were formed with the concrete when the wall was built.

On 4/13/91 three holes were drilled through the garage floor and soil samples were collected for analysis. Analyses results are pending for those samples. Downhole gamma logs for these holes did not indicate elevated gamma measurements.

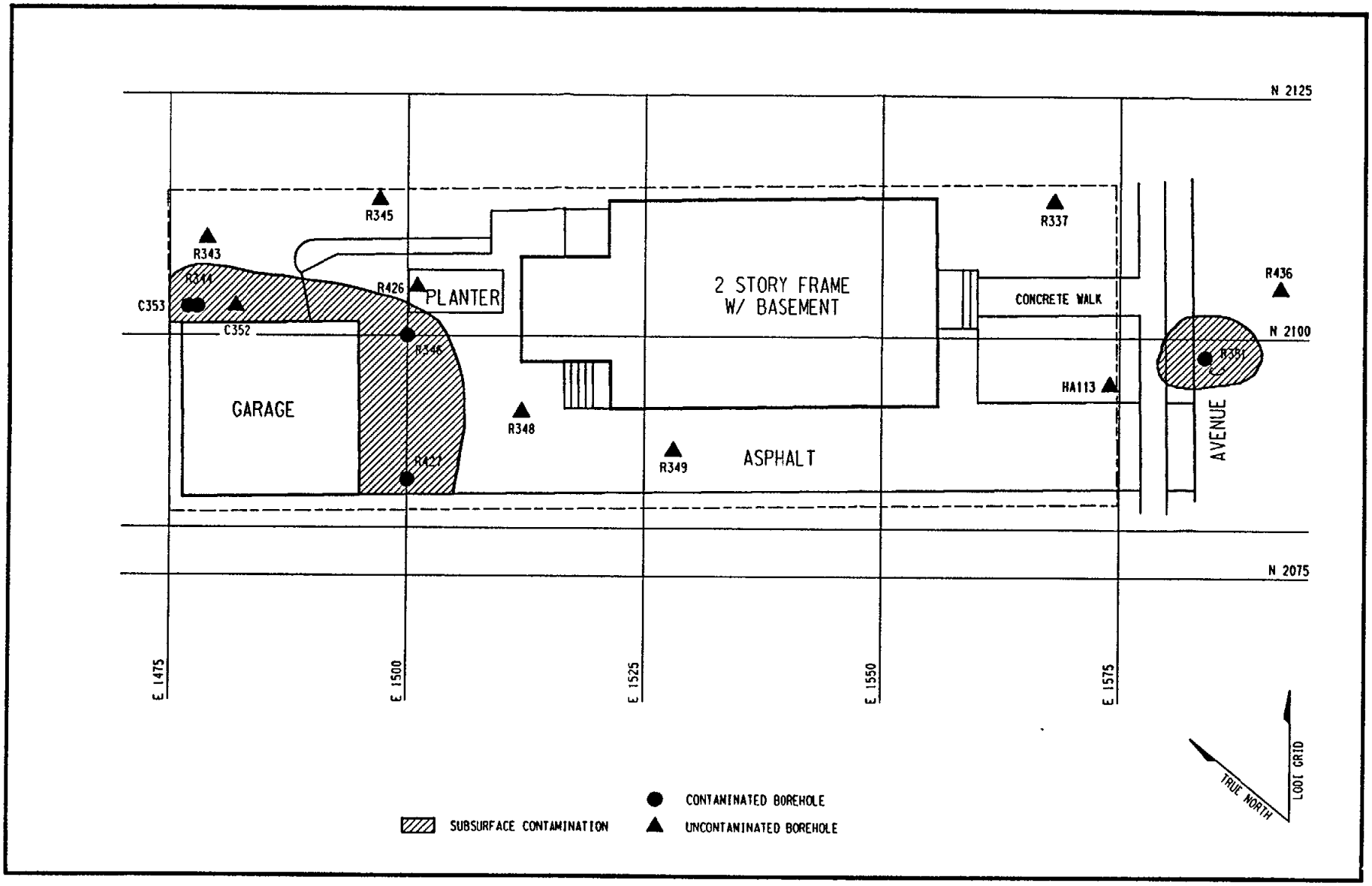
CONCLUSIONS

Contamination on this property is located within the kitchen and basement/foundation addition of the residence, and in a small ceiling repair in an upstairs room. The remaining contamination is surface and subsurface located in the backyard and in one location in front of the residence adjacent to the street. Figures 1 and 2 indicate the locations of surface and subsurface on the property.



138F042.DGN F3

FIGURE 1
SURFACE SOIL SAMPLE LOCATIONS AT 90 AVENUE C, LODI, NEW JERSEY



138F042.DGN F4

FIGURE 2
BOREHOLE LOCATIONS AT 90 AVENUE C, LODI, NEW JERSEY

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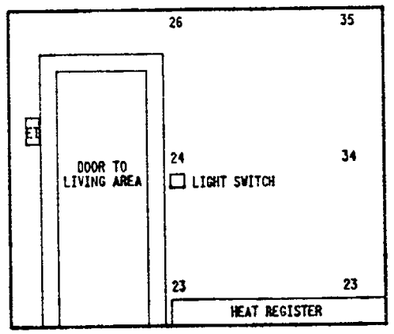
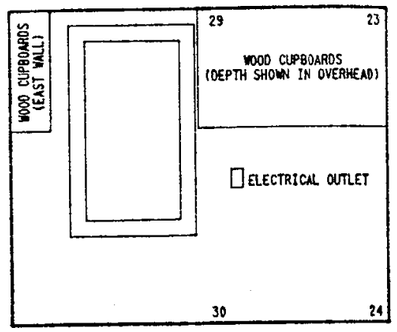
42 = MEASUREMENTS ARE COUNTS PER MINUTE x 1000

(108) = MEASUREMENTS ARE BETA-GAMMA IN COUNTS PER MINUTE

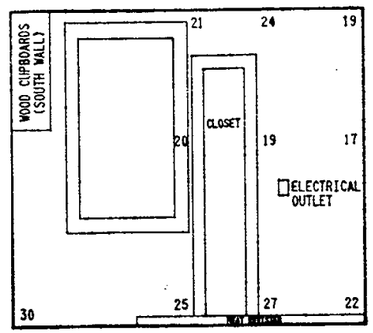
NORTH WALL



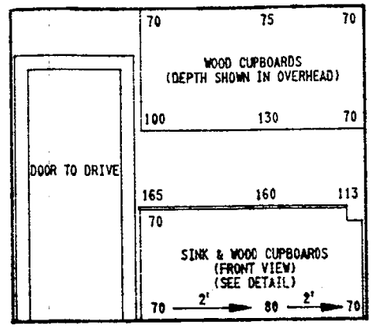
SOUTH WALL



WEST WALL



EAST WALL

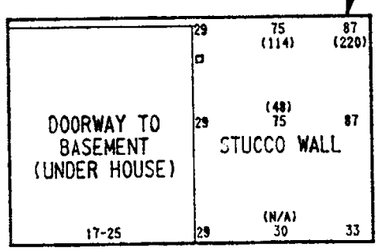


GAMMA EXPOSURE MEASUREMENT WAS 42 @ 1M ABOVE FLOOR IN FRONT OF SINK

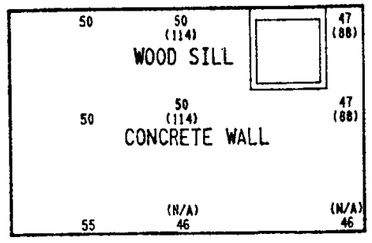
1ST FLOOR

NORTH WALL

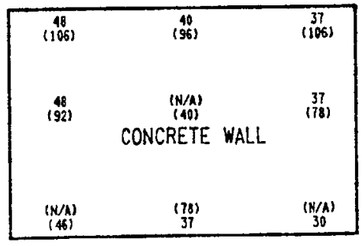
SAMPLE OF WALL MATERIAL AT THIS LOCATION WAS 60 pCi/g FOR Th-232



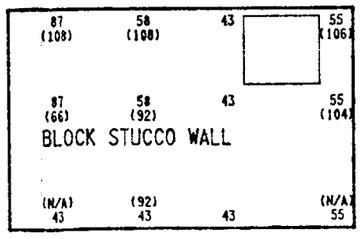
SOUTH WALL



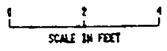
WEST WALL



EAST WALL



GAMMA EXPOSURE MEASUREMENT WAS 40 @ 1M ABOVE FLOOR IN CENTER OF BASEMENT



BASEMENT

138F075.DGN

FIGURE 3
KITCHEN AS-BUILT, 90 AVENUE "C"

TABLE 1
SURFACE AND SUBSURFACE RADIONUCLIDE CONCENTRATIONS IN SOIL

90 AVENUE C

Coordinates East	Coordinates North	Depth (ft)	Concentration (pCi/g ± 2 sigma) Uranium-238	Radium-226	Thorium-232
1480	2106	0.0 - 0.5	< 4.5	1.6 ± 0.4	17.0 ± 1.0
1490	2110	0.0 - 0.5	< 8.4	1.9 ± 1.0	5.1 ± 1.9
1495	2110	0.0 - 0.5	< 10	< 1.0	5.6 ± 1.4
1500	2115	0.0 - 0.5	< 6.7	1.1 ± 0.6	6.2 ± 1.3
1505	2100	0.0 - 0.5	< 9.2	1.4 ± 0.8	4.8 ± 1.2
1505	2110	0.0 - 0.5	< 9.8	1.5 ± 0.9	5.7 ± 1.5
1510	2100	0.0 - 0.5	< 8.8	1.2 ± 0.6	4.8 ± 1.2
1510	2102	0.0 - 0.5	< 6.1	1.2 ± 0.7	3.9 ± 1.2
1510	2115	0.0 - 0.5	< 9.1	0.9 ± 0.7	3.6 ± 1.1
1570	2110	0.0 - 0.5	< 7.2	< 0.5	1.5 ± 0.9
1583	2096	0.0 - 0.5	< 2.5	1.2 ± 0.4	6.0 ± 0.7
1478	2103	0.0 - 1.0	< 7.8	0.8 ± 0.6	9.6 ± 0.6
1478	2103	1.0 - 2.0	< 35.3	4.1 ± 0.2	72.5 ± 9.8
1478	2103	2.0 - 3.0	< 7.7	1.6 ± 0.6	3.6 ± 0.5
1478	2103	5.0 - 6.0	< 2.6	< 0.5	< 0.6
1479	2110	0.0 - 1.0	< 6.8	1.3 ± 0.3	3.5 ± 0.3
1479	2110	2.0 - 3.0	< 1.6	< 0.5	< 0.7
1479	2110	5.0 - 6.0	< 4.7	0.5 ± 0.1	0.6 ± 0.1

SURFACE AND SUBSURFACE RADIONUCLIDE CONCENTRATIONS IN SOIL

90 AVENUE C

Coordinates East	Coordinates North	Depth (ft)	Concentration (pCi/g ± 2 sigma) Uranium-238	Radium-226	Thorium-232
1492	2114	0.0 - 1.0	< 8.9	< 1.5	5.6 ± 1.4
1492	2114	2.0 - 3.0	< 3.1	< 0.6	< 0.8
1492	2114	5.0 - 6.0	< 2.8	0.6 ± 0.1	0.6 ± 0.5
1500	2085	0.0 - 1.0	< 13.6	4.2 ± 0.6	35.5 ± 7.8
1500	2085	1.0 - 2.0	< 1.9	0.6 ± 0.3	1.0 ± 0.4
1500	2085	2.0 - 3.0	< 10	0.6 ± 0.3	0.7 ± 0.4
1500	2085	3.0 - 4.0	< 3.6	4.2 ± 0.6	0.6 ± 0.3
1500	2085	4.0 - 5.0	< 3.1	0.8 ± 0.3	0.7 ± 0.3
1500	2085	5.0 - 6.0	< 2.6	< 0.5	< 0.8
1500	2100	0.0 - 1.0	< 7.5	0.7 ± 0.2	2.4 ± 0.2
1500	2100	1.0 - 2.0	< 3.6	< 0.7	< 0.9
1500	2100	2.0 - 3.0	< 3.3	< 0.7	< 0.8
1500	2100	9.0 - 10.0	< 3.4	< 0.7	< 0.9
1506	2105	0.0 - 1.0	< 6.1	0.9 ± 0.5	2.9 ± 0.7
1506	2105	1.0 - 2.0	< 2.0	0.7 ± 0.2	0.6 ± 0.3
1506	2105	2.0 - 3.0	< 3.0	0.7 ± 0.3	1.1 ± 0.7
1506	2105	3.0 - 4.0	< 3.5	< 0.7	1.0 ± 0.4
1506	2105	4.0 - 5.0	< 9.7	0.8 ± 0.3	0.4 ± 0.3
1506	2105	5.0 - 6.0	< 1.4	0.5 ± 0.4	0.8 ± 0.4
1506	2105	6.0 - 7.0	< 2.7	0.8 ± 0.3	0.6 ± 0.3
1506	2105	7.0 - 8.0	< 5.9	0.8 ± 0.2	3.1 ± 0.5
1512	2092	0.0 - 1.0	< 3.8	< 0.7	1.4 ± 0.3
1512	2092	2.0 - 3.0	< 2.5	< 0.5	< 0.6
1512	2092	5.0 - 6.0	< 2.9	< 0.5	< 0.7
1528	2088	0.0 - 1.0	< 6.0	1.7 ± 1.0	2.7 ± 1.0
1528	2088	3.0 - 4.0	< 2.5	< 0.5	< 0.7

SURFACE AND SUBSURFACE RADIONUCLIDE CONCENTRATIONS IN SOIL

90 AVENUE C

Coordinates		Depth	Concentration (pCi/g ± 2 sigma)		
East	North	(ft)	Uranium-238	Radium-226	Thorium-232
1558	2089	0.0 - 1.0	< 3.3	0.7 ± 0.2	1.0 ± 0.3
1558	2089	3.0 - 4.0	< 2.6	< 0.5	< 0.6
1568	2114	0.0 - 1.0	< 2.5	0.7 ± 0.3	1.3 ± 0.7
1568	2114	3.0 - 4.0	< 5.4	0.6 ± 0.2	0.9 ± 0.4
1568	2114	5.0 - 6.0	< 2.7	< 0.5	1.0 ± 0.5
1574	2095	0.0 - 0.5	< 6.7	< 1.0	< 1.5
1574	2095	1.5 - 2.0	< 3.0	< 0.5	0.7 ± 0.3
1574	2095	2.5 - 3.0	< 3.4	< 0.5	< 0.6
1584	2098	0.0 - 1.0	< 4.5	< 0.8	1.6 ± 0.3
1584	2098	1.0 - 2.0	< 7.4	1.5 ± 0.5	8.3 ± 1.9
1584	2098	5.0 - 6.0	< 2.7	< 0.5	< 0.6
1592	2105	0.0 - 2.0	< 3.2	< 0.6	< 0.9
1592	2105	2.0 - 3.0	< 4.4	1.0 ± 0.1	< 1.0

TABLE 2

DOWNHOLE GAMMA LOGGING RESULTS

90 AVENUE C

Coordinates[a] East	Coordinates[a] North	Depth[b] (ft)	Count Rate[c] (cpm)
Borehole C353[d]			
1477	2103	0.5	52000
1477	2103	1.0	50000
1477	2103	1.5	33000
1477	2103	2.0	27000
1477	2103	2.5	22000
1477	2103	3.0	17000
1477	2103	3.5	10000
1477	2103	4.0	10000
1477	2103	4.5	9000
1477	2103	5.0	9000
Borehole R344			
1478	2103	0.5	7000
1478	2103	1.0	11000
1478	2103	1.5	10000
1478	2103	2.0	10000
1478	2103	2.5	9000
1478	2103	3.0	10000
1478	2103	3.5	10000
1478	2103	4.0	10000
1478	2103	4.5	10000
1478	2103	5.0	10000
1478	2103	5.5	10000
Borehole R343			
1479	2110	0.5	16000
1479	2110	1.0	21000
1479	2110	1.5	20000
1479	2110	2.0	15000
1479	2110	2.5	10000
1479	2110	3.0	9000
1479	2110	3.5	9000
1479	2110	4.0	9000
1479	2110	4.5	9000
1479	2110	5.0	10000
1479	2110	5.5	10000

TABLE 2

DOWNHOLE GAMMA LOGGING RESULTS

90 AVENUE C

Coordinates East	Coordinates North	Depth (ft)	Count Rate (cpm)
Borehole C352			
1482	2103	0.5	11000
1482	2103	1.0	20000
1482	2103	1.5	15000
1482	2103	2.0	9000
1482	2103	2.5	10000
1482	2103	3.0	9000
Borehole R345			
1497	2114	0.5	13000
1497	2114	1.0	19000
1497	2114	1.5	15000
1497	2114	2.0	12000
1497	2114	2.5	10000
1497	2114	3.0	9000
1497	2114	3.5	10000
1497	2114	4.0	9000
1497	2114	4.5	9000
1497	2114	5.0	9000
1497	2114	5.5	9000
Borehole R427			
1500	2085	0.5	16000
1500	2085	1.0	30000
1500	2085	1.5	42000
1500	2085	2.0	42000
1500	2085	2.5	16000
1500	2085	3.0	10000
1500	2085	3.5	9000
1500	2085	4.0	10000
1500	2085	4.5	11000
1500	2085	5.0	10000
1500	2085	5.5	11000
1500	2085	6.0	14000

TABLE 2

DOWNHOLE GAMMA LOGGING RESULTS

90 AVENUE C

Coordinates East	Coordinates North	Depth (ft)	Count Rate (cpm)
Borehole R346			
1500	2100	0.5	13000
1500	2100	1.0	40000
1500	2100	1.5	30000
1500	2100	2.0	11000
1500	2100	2.5	10000
1500	2100	3.0	10000
1500	2100	3.5	9000
1500	2100	4.0	9000
1500	2100	4.5	9000
1500	2100	5.0	8000
1500	2100	5.5	7000
1500	2100	6.0	9000
1500	2100	6.5	10000
1500	2100	7.0	10000
1500	2100	7.5	11000
Borehole R426			
1501	2105	0.5	17000
1501	2105	1.0	11000
1501	2105	1.5	11000
1501	2105	2.0	15000
1501	2105	2.5	10000
1501	2105	3.0	10000
1501	2105	3.5	10000
1501	2105	4.0	10000
1501	2105	4.5	11000
1501	2105	5.0	11000
1501	2105	5.5	10000
1501	2105	6.0	9000
1501	2105	6.5	10000
1501	2105	7.0	10000
1501	2105	7.5	10000
1501	2105	8.0	10000

TABLE 2

DOWNHOLE GAMMA LOGGING RESULTS

90 AVENUE C

Coordinates East	Coordinates North	Depth (ft)	Count Rate (cpm)
Borehole R348			
1512	2092	0.5	19000
1512	2092	1.0	22000
1512	2092	1.5	20000
1512	2092	2.0	14000
1512	2092	2.5	11000
1512	2092	3.0	9000
1512	2092	3.5	9000
1512	2092	4.0	9000
1512	2092	4.5	9000
1512	2092	5.0	9000
1512	2092	5.5	9000
Borehole R349			
1528	2088	0.5	12000
1528	2088	1.0	15000
1528	2088	1.5	11000
1528	2088	2.0	10000
1528	2088	2.5	9000
1528	2088	3.0	9000
1528	2088	3.5	9000
Borehole R337			
1568	2114	0.5	7000
1568	2114	1.0	11000
1568	2114	1.5	10000
1568	2114	2.0	10000
1568	2114	2.5	9000
1568	2114	3.0	10000
1568	2114	3.5	10000
1568	2114	4.0	10000
1568	2114	4.5	10000
1568	2114	5.0	10000
1568	2114	5.5	10000

TABLE 2

DOWNHOLE GAMMA LOGGING RESULTS

90 AVENUE C

Coordinates East	Coordinates North	Depth (ft)	Count Rate (cpm)
Borehole HA113			
1574	2095	0.5	7000
1574	2095	1.0	6000
1574	2095	1.5	6000
1574	2095	2.0	6000
1574	2095	2.5	7000
1574	2095	3.0	6000
Borehole R351			
1584	2098	0.5	37000
1584	2098	1.0	24000
1584	2098	1.5	17000
1584	2098	2.0	12000
1584	2098	2.5	11000
1584	2098	3.0	13000
1584	2098	3.5	14000
1584	2098	4.0	11000
1584	2098	4.5	10000
Borehole R436			
1592	2095	0.5	6000
1592	2095	1.0	7000
1592	2095	1.5	8000
1592	2095	2.0	8000
1592	2095	2.5	7000
1592	2095	3.0	7000

aBorehole locations are shown in Figure 2.

bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

dBottom of borehole collapsed.