915043

Interim Report
Phase II Radiation Investigation

Pfohl Brothers Landfill

Cheektowaga, New York
Site Number 9-15-043

Prepared for:

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Introduction

1.0 INTRODUCTION

The Pfohl Brothers Landfill Site is an inactive hazardous waste site located on Aero Drive in Cheektowaga, New York, adjacent to the Buffalo Airport. This site was a former municipal and industrial landfill that operated between 1932 and 1969.

In 1988, the New York State Department of Environmental Conservation authorized Camp Dresser & McKee (CDM) to initiate a remedial investigation and feasibility study of the site under the New York State "Superfund" program developed to investigate and remediate inactive hazardous waste sites in the State of New York.

During the initial "walk-over" surveys performed at the Pfohl Brothers Landfill Site in the spring of 1988, elevated levels of gamma radiation were encountered. Subsequently, in September 1988, CDM performed a radiation survey along paths in Areas B and C that had been cleared across the landfill during the previous summer. Area A was also surveyed. The results of this investigation prompted the development of a two phase radiation investigation to better define the nature and extent of the radiological contamination in Areas B and C where elevated gamma readings were found. The results of the Phase I Walk-over Gamma Radiation Survey are presented in a document entitled, "Report on the Phase I Walk-over Gamma Radiation Survey at the Pfohl Brothers Landfill", released to the public in September 1989.

The Phase I report identified over 500 locations of elevated gamma radiation at the site, most of them extemely localized to spots less than 10 square feet in area. The coordinate location, gamma radiation measurement and distinguishable physical characteristics of each area of elevated radiation were recorded. A preliminary investigation of a few of the locations revealed that the sources of the elevated measurements were materials naturally elevated in radioactivity, such as pieces of granite or coal ash, as well as industrial waste materials.

As originally planned, the Phase II investigation was intended to better characterize the nature and extent of radiological contamination by performing a subsurface investigation at identified locations of elevated gamma radiation and by sampling the source material to identify and quantify the radionuclides responsible for the elevated measurements. Since so many locations were identified during Phase I and since the source of the elevated measurements was often within the top 1 foot of soil, the Phase II radiation investigation was revised to include both a phase of exploratory sampling ("digs") of the subsurface soil beneath representative locations identified in Phase I, as well as downhole gamma logging of random boreholes installed across the site in areas of background gamma activity. This report documents the procedures used and observations noted during the Phase II investigation.

2.0 APPROACH

The Phase II Radiation Investigation consisted of shallow subsurface investigations ("digs") at approximately 170 locations of elevated gamma radiation using hand augers and shovels. These locations were chosen based on physical and radiological characteristics observed during the Phase I investigation.

To identify the locations where a Phase II investigation was to be performed, the results of the Phase I survey were plotted on a scaled site map. Locations that were near each other and appeared similar due to either the magnitude of the gamma radiation measurements or physical characteristics of the apparent source material were grouped into appropriately sized boxes. Using this method the 500 locations identified during Phase I were consolidated into approximately 120 areas with similar characteristics. These areas are shown as hatched boxes on Sheet 1 at the end of this report. Within each area, one to several locations were to be investigated depending on the size and physical characteristics of the area. Dividing the site into areas to perform an in-depth study at representative locations allowed a general understanding of the source of radiological contamination at the site to be developed in a relatively

short period of time. This approach eliminated the need to explore every location of radiological contamination.

3.0 PROCEDURES

The Phase II investigation was performed by CDM employees using the same Ludlum Model 44-10 2-inch by 2-inch sodium iodide gamma scintillation detectors utilized during the Phase I investigation. Each detector was coupled to a Ludlum Model 2220 scaler/ratemeter. In addition, a Ludlum Model 43-5 alpha scintillation detector coupled to the 2220 ratemeter was used to monitor surface and removable contamination.

Daily calibration for these sets of equipment consisted of background checks and source checks. The 44-10 detectors were checked against a cesium-137 source and the 43-5 detector was calibrated with a thorium-230 certifiable source.

The field procedures used during the Phase II investigation were as follows:

- A quick hotspot survey was performed of the area (approximately 10' x 10'). This was to confirm that there were no other elevated readings in the area.
- The highest gamma and alpha measurements and the exact location were noted in the field logbook.
- At the area with the highest gamma measurement, a shovel was used to move the material from the "hotspot" area. The type of material (soil, debris, or such) was noted in the logbook.
- The area was then rescanned. If the measurements decreased, the soil that was removed was scanned to see if the source was removed from its buried location. These gamma measurements were recorded in the logbook.
- The previous two steps were repeated until refusal or until the source of contamination was found. When the source was found, the gamma and alpha radiation contact measurements were recorded in the notebook.
- A hand auger was used to obtain soil and radiation measurements at greater depths. If the downhole gamma measurements did not increase with depth, this procedure was stopped at refusal.

- o If the gamma measurements significantly increased with depth and no source material was found, the location was backfilled and the location flagged.

- o If elevated gamma measurements (approximately 12,000 to 25,000 cpm) existed over a large area, the soil was excavated at a few locations using a hand auger and downhole measurements were performed with the gamma probe to determine to what depth the contamination extended.

- o A description of the source material was entered in the logbook. This description included color, moisture content, texture, compaction, containerization, if any, and possibility of transport.

- o Once the source material was characterized, a sample was taken for analysis.

Samples were collected of all artifacts found during the investigations, as well as the soil around these artifacts. Samples were also collected from each different type of soil/material found i.e., red sands, coal ash. These samples were collected in prelabeled ziplock bags with the date and location noted on the bag. Some of these samples were then sent to NYSDEC and NYSDOH for analysis. All samples which were not analyzed are being stored at the site in the drum storage area.

In six locations a hand auger and shovel were not sufficient to either obtain the source material or completely remove it. In these situations, either a test pit was excavated or a "dig" was performed using a Bobcat trencher.

Subsurface gamma radiation measurements were also obtained from ten boreholes installed as part of the subsurface investigation to determine the chemical hazardous wastes at the site. While these boreholes were not placed in areas of elevated gamma radiation, the information is useful as it is the only deep (greater than 3 feet) subsurface radiation information obtained on the site. At each location, downhole gamma logging was conducted using the following procedures:

- o After the borehole was completed, a PVC pipe was inserted into the borehole to prevent collapse. If the borehole was less than 5 feet deep, the PVC pipe was not needed.

- o The gamma scintillometer was lowered down the borehole and one half minute gamma exposure rates were recorded at 6-inch intervals. This procedure was repeated until the total depth of the borehole was reached.

- o The one half minute counts were then doubled to be translated into counts per minute.

A continual gamma radiation scan was also performed during the test pit investigations conducted in the fall of 1989. As with the boreholes, these test pits were located to identify chemical hazardous waste, with areas of elevated gamma radiation specifically avoided. To comply with health and safety procedures and investigate the possibility that radiological contamination was present beneath the surface, CDM personnel scanned the contents of each backhoe bucket, as well as the new surface of each cut using the Ludlum gamma scintillation equipment. All above background gamma radiation measurements were recorded in the field notebook.

4.0 RESULTS

During the Interim Phase II Investigation, 172 source characterization investigations were conducted within the 120 areas. The results of the investigation at each location are documented in the Summary Table and displayed on Sheet 1. To assist the reader in comparing the results of this Phase II investigation with the Phase I investigation, Table 1 from the Phase I Radiation Investigation Report has been updated with the new information and is included as Attachment 2.

The results in the Summary Table are presented chronologically, in the order in which the location was investigated. The number of the hatched investigation area shown on Sheet 1 corresponds to the area number on the Summary Table. Gamma radiation measurements found at the surface and at the bottom of the hole or "dig" are noted, along with the depth of the excavation. The gamma radiation contact measurements were noted for any source material and, when available, alpha radiation measurements are also noted. The gamma radiation measurements of the soil beneath some of the discs were sometimes elevated. Laboratory analysis of this soil performed

by NYSDEC and NYSDOH will determine if contamination has leached from the discs into the surrounding soil.

For the six locations investigated with test pits or smaller bobcat "digs", the source was found and completely removed in all but one location. At location 189'S 3'W of 32+00, pieces of granite were found to be the cause of the elevated readings. After a few pieces were sampled, the remaining pieces were left in the hole.

The results of the ten downhole gamma surveys for the boreholes installed as part of the subsurface investigation are presented in Attachment 1. The gamma readings for boreholes B-3, B-5, B-7, B-9, B-10,and B-13, ranged from 1,470 counts per minute (cpm) to 8,680 cpm. These levels are within the range of background downhole gamma readings for the area surrounding the site with the low readings corresponding to less dense fill material and the higher readings appearing when native soils and silts appear in the borehole. Gamma results for borehole B-4 show readings increasing to ten feet below grade. The highest reading obtained from this borehole was 10,450 cpm. This elevated reading corresponded to a very dense stiff clay, again indicating native material. The highest readings on the site were logged in boreholes B-12 and B-14. The gamma readings of these boreholes reached as high as 13,740 cpm in B-12 and 15,940 cpm in B-14. These high readings seem to correspond in depth to regions where coal ash was identified.

In summary, no radiological contamination was found during the downhole gamma surveys of the ten borings installed across the site.

Above background gamma radiation readings were found at nine of the 42 test pit excavations peformed to characterize the chemical hazardous waste at the site. At five test pits (TP-11, 14, 24, 34, and 43) the readings were all less than twice the background rate, with the highest readings ranging between 10,000 and 12,000 cpm. The source of these elevated readings was determined to be discrete objects, such as bricks at TP-34, a grinding stone at TP-14 and a bottle at TP-24.

There were elevated readings to 28,000 cpm at the surface of TP-8 but no elevated subsurface readings. The surface survey just north of this location identified elevated soil material. At TP-28 one area of elevated readings (23,000-47,000 cpm) was found to a depth of five feet. The source appeared to be the white vermiculite material found throughout the surface of this area. Coal ash was found at TP-32 with readings ranging to 40,000 cpm. In TP-35, a reading of 40,000 cpm was found at four feet below grade. No source was found but it is possible that white vermiculite material or a metal artifact could have caused the reading since both were identified nearby in the Phase I radiation survey.

In summary, it can be concluded that extensive areas of radiological contamination are not likely to be found beneath areas with background gamma radiation measurements since none of the boreholes and only three of the 42 test pits identified any radiological contamination.

The source of the elevated gamma radiation readings at the site can be divided into eight general categories:

- o metallic discs, often with glass coating on one side
- o other metal artifacts (pieces of equipment or rods)
- o waste material in drums
- o white "vermiculite" material
- o rocks or coated rocks
- o construction or building material (Belgium block curbs, etc.)
- o coal ash
- o soil or sand (often red or reddish brown).

For each location investigated during Phase II investigation, the source of the elevated measurements is depicted on Sheet 1 with the appropriate symbol.

Samples of each type of source material were obtained during the source characterization investigations. The coal ash found predominantly in Area C was the only characteristic material not sampled. Coal ash is naturally high in radium-226 (Ra-226) with activities often in the range of 3 to 5 pCi/g. It was not deemed necessary to analyze this material based on past analysis of coal ash.

If a sample was obtained from a location, the number is indicated in the description column on the Summary Table. All metal artifacts found were taken as samples. Often the soil surrounding the artifact was also obtained as a sample to determine if radionuclides were leaching from the source material.

A total of 71 samples were obtained during the Phase II investigation. An additional 3 samples were collected subsequent to a meeting with NYSDEC in November of 1989. A complete list of samples collected at the site to date is presented in Table 2, Sample Inventory (Attachment 3).

Of these 74 samples, 27 were sent to NYSDEC for analysis as indicated below:

- 9 artifacts; Sample R-01 (metal bar), R-02 (metal equipment), R-03 (disc), R-19 (conductor spool), R-30, 32, 33, 42 (discs), R-66 (stopper)
- 7 samples of white material; R-06, R-15, R-29, R-35, R-47, R-60, R-75 (from drum)
- 3 samples of sand or soil; R-22, R-26, R-31 (red sands)
- 2 samples of soil surrounding discs or metal artifacts; R-24 (surrounding disc), R-49 (surrounding rods)
- 3 bags of material; R-39 (green powder), R-40, 41 (black resin)
- 1 piece of concrete coated with white material (R-61)
- 2 samples from drums (R-72, R-73)

The analytical results of these samples will be presented in a report prepared by NYSDEC and NYSDOH when they are available.

5.0 PRELIMINARY CONCLUSIONS

Contamination Distribution

Few patterns exist for locations of elevated gamma radiation identified in

Area B. In general, the white "vermiculite" material was found within 300 feet south of the creek, the only exception to this is in the center of Area B (transits 26+00 to 29+50) where the material is found from 450 to 650 feet north of Aero Drive. Several drums were found with elevated gamma readings, all of these contained the white chunks of material. Construction materials and rocks account for much of the elevated readings along the northeast edge of this area. Metallic discs and artifacts were found dispersed across Area B in a random manner, with somewhat more found in the northwest corner of the area.

The contamination in Area C was found in four general areas. Coal ash ranged from transit 18+50 to 26+00, 75 to 1,075 feet south of Aero Drive. The surface soil in this entire area was elevated to approximately 15,000 cpm. A few discs with very high gamma radiation readings were also found in this area.

The second area, from transit 27+50 to 32+50, 840 to 1,240 feet south of Aero Drive, consisted of elevated sand and rocks with a drum of elevated material also found. Rocks and construction material were also the source of elevated gamma readings in the third area, from transit 31+00 to 34+00 150 feet to 650 feet south of Aero Drive; however, several locations with the white "vermiculite" material were also noted.

In the fourth area, from 34+00 to 40+00 550 to 1100 feet south of Aero Drive, the source of elevated readings was extremely variable, including rocks, white material, coal ash and metal artifacts. In general, fewer artifacts were found in Area C, but again, no pattern of contamination existed for them.

Depth of Contamination

Most investigations were ended after only one foot, since the source material was identified. The deepest investigation went to 3.5 feet. In about twenty locations no source was found and the reading at the bottom of the hole was either the highest in the hole or was still considerably elevated relative to background. The results of the gamma radiation scans

of the test pits and downhole gamma logging of the boreholes located in areas of background gamma radiation indicate that large areas of subsurface radiological contamination are not present at the site. The contamination appears to be scattered randomly throughout Areas B and C, and except for the few locations noted above, appears as isolated spots of small quantities of industrial waste.

Summary Table
Phase II Radiation Investigation
Pfohl Brothers Landfill

Area	Location	Gamma (and alpha)[1] Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
1	198'S 2'W of 24+00	85,760 (alpha=1)	22,546	0.33'	223,880 cpm (alpha=2cpm) on piece of rusted metal **SAMPLE** #R-04
2	240'S 22'W of 25+00	254,830 (alpha=8)	35,000	0.5'	2 million cpm on disc (3/4" dia.), white material mixed with soil (alpha=14cpm) **SAMPLE** #R-05
3	70'S 5'W of 25+50	177,810 (alpha=9)	100,000	1.5'	219,340 cpm (alpha=103 cpm) at 0.5', white material mixed with soil, hit water at 1.5' (oil sheen) **SAMPLE** #R-06*
4	189'S 3'W of 32+00	145,000	1,300,000 (alpha>100cpm)	3.0'	Moist dark brown organic rich soil with wood and plastic debris. Went back 11/6/89; source is granite and white material **SAMPLE** R61-63
5	115'S on 32+00	137,790 (alpha=5)	-	0.5'	1,093,860 cpm on rock, 2" x 3" x 2" possibly granite **SAMPLE** R-07
6	315'S 15'W of 32+50	61,470 (alpha-14)	32,200	2.0'	White "fertilizer" material **SAMPLE** R-08
6	315'S on 32+00	-	-	0.5'	White "fertilizer" material
7	425'S 5'E of 32+50	21,000	-	-	White "fertilizer" material with light grey sand
8	560'S 20'W of 31+50	22,590	-	0.25'	31,980 cpm on coated rock, left more rocks in hole **SAMPLE** R-09

[1] For gamma radiation measurements, 1,000 cpm = 1 uR/hr.
For alpha radiation measurements, 1 cpm = 10 dpm.
*Samples with asterisk were sent to NYSDEC for analysis.
All other samples will remain at drum storage compound.

Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
8	593'S 15'W of 31+50	42,380	9,170	2.5'	34,000 cpm on coated rock, left more rocks in hole **SAMPLE** R-10
8	613'S 1'W of 32+00	22,780	15,000	1.0'	25,000 cpm on coated rocks
9	917'S on 32+00	23,690	121,480	1.5'	Buried drum
10	1135'S on 31+50	21,370 (alpha=64)	49,320	1.0'	Light brown sandy soil, glass material with pink coating **SAMPLE** R-11
10	1165'S 5'W of 32+50	22,270	-	0.16'	31,460 cpm on white and grey rock **SAMPLE** R-12
11	200'S 10'E of 32+50	18,950	18,000	1.0'	Refusal at metal obstruction
11	235'S 20'W of 32+00	23,090 (alpha=1)	12,070	3.0'	34,950 cpm (alpha=1cpm) at 1.0', soil light in weight dark brown in color **SAMPLE** R-13
12	388'N 4'E of 26+50	99,790 (alpha=4)	1,270,000 (alpha=5)	2.0'	Debris in hole, no source found (went back with test pit 44)
13	458'N 4'E of 26+50	40,920 (alpha=9)	61,210	-	White "fertilizer" material with white sand, coated rocks at 27,000 cpm **SAMPLE** R-14
13	518'N 6'E of 26+00	37,000	22,000	1.0'	White material mixed with soil, refusal at 1 foot depth.
14	685'N 15'W of 27+00	53,000 (alpha=21)	-	1.0'	156,000 cpm at 0.5', material is white chunks surrounded by buried drum. At 1', readings no longer elevated. **SAMPLE** R-15*
15	825'N 20'W of 26+50	13,500	15,500	1.0'	Light brown soil and gravel
16	852'N 25'E of 25+50	66,000	-	-	1.8 million cpm on disc. Sent to NYSDEC for analysis 4/26/89 **SAMPLE** R-03

Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
16	842'N 5'E of 25+50	36,000	-	-	182,000 cpm on metal object, sent to NYSDEC for analysis 4/26/89 **SAMPLE** R-02
17	1116'N 3'E of 25+50	42,350	-	-	49,310 cpm on coated rock
18	1090'N 4'E of 24+50	41,290	-	-	56,360 cpm on sandstone rock **SAMPLE** R-16
19	1215'N on 23+50	127,250 (alpha=43)	-	2.25'	White material assumed to be contained in drum, at 2.0' break thru drum, readings no longer elevated **SAMPLE** R-60
20	1280'N 5'E of 23+00	17,300	10,220	1.5'	21,440 cpm on rock, white material mixed with soil
20	1245'N on 21+50	33,640	17,000	1.0'	33,640 cpm on rock, white material in hole
20	1350'N 15'E of 21+00	23,990	18,000	1.5'	27,100 cpm on chimney pipe material
21	1215'N 15'W of 21+00	58,470	27,740	1.5'	58,470 cpm on drum, subsurface investigation conducted 1.0' from drum **SAMPLE** R-72*
20	1108'N on 21+00	18,660	<18,000	0.5'	White material on ground, debris and rocks in hole
22	1070'N 22'W of 18+00	115,190	-	0.25'	788,710 cpm on tar-like material **SAMPLE** R-17
23	1065'N 15'W of 17+50	16,700	23,990	0.75'	23,990 cpm at bottom of the hole, refusal on plastic and rubber material, white material in hole
24	1220'N 8'E of 17+50	71,580	-	0.25'	309,960 cpm on disc 1" in diameter **SAMPLE** R-18

Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
25	1285'N 20'E of 17+50	438,340	-	-	1.56 million cpm on object that looks like conductor spool **SAMPLE** R-19*
26	652'N 15'E of 18+00	20,420	18,000	1.0'	23,000 cpm, soil and metal debris
27	100'N 10'W of 28+50	80,760 (alpha=5)	55,470	1.25'	Highest measurement on buried drum **SAMPLE** R-73*
28	245'N 10'E of 28+00	33,570	18,630	1.0	41,130 cpm on sandstone rocks
29	313'N 10'E of 29+00	21,370	39,620	0.5'	37,120 cpm on sandstone rock
30	135'N 20'E of 27+00	144,180	-	-	1.21 million cpm on disc, 1/2" x 1/2" **SAMPLE** R-20
31	215'N on 21+00	12,350	16,800	0.5'	Highest reading on black shale
32	220'N 10'E of 16+50	23,550	26,380	1.5'	46,320 cpm at 1.0', sand, bricks and dark brown soil **SAMPLE** R-21
33	385'N 8'W of 15+00	157,000	<50,000	1.0'	Light and dark brown soil cause of elevated readings **SAMPLE** R-22*
34	355'N 15'E of 15+00	72,180	160,000	0.5'	1.14 million cpm on disc, soil in hole 160,000 cpm. **SAMPLE** R-23 (disc) and R-24 (soil) *
35	420'N 15'W of 15+50	53,950	-	0.5'	715,170 cpm on disc **SAMPLE** R-25
36	585'N 6'E of 17+00	35,870	56,880	2.25'	80,020 cpm at 1.5', dark brown and red soil **SAMPLE** R-26*
36	590'N 20'W of 18+00	-	-	0.5'	182,510 cpm on face of clock **SAMPLE** R-27

Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
37	800'S 35'W of 24+00	13,940 (alpha=1)	16,740	4.0'	31,660 CPM (alpha=3cpm) at 2.0', coal ash and white material
37	1060'S 15'W of 25+50	15,380 (alpha=1)	18,150	3.0'	Dark brown soil with white ash, highest readings at bottom of hole.
37	996'S 5'W of 24+00	14,340	27,840	1.5'	White ash material, highest readings at bottom of hole, refusal at 1.5'-2.0' (rock)
37	860'S 20'W of 23+00	15,600	27,850	2.0'	28,110 cpm at 1.5', white ash
37	750'S 1'W of 25+00	12,300	25,710	4.5'	26,540 cpm at 1.5', brown and black soil with ash, pieces of coal
37	660'S 15'W of 22+00	19,830 (alpha-5)	33,030	2.5'	39,300 cpm at 1.5', white ash **SAMPLE** R-28
38	560'S 10'W of 21+00	14,450	22,520 (alpha=2)	3.0'	25,520 cpm at 2.0', coal ash
39	375'S 25'W of 16+50	96,400 (alpha=2)	154,880	1.5'	Off white clay (157,000 cpm, alpha=47), highest reading at bottom of hole at refusal. **SAMPLE** R-29*
40	260'S 25'E of 18+50	18,440 (alpha=2)	21,920	1.0'	Coal ash, highest reading at bottom of hole, refusal at 1.0'
41	475'S on 18+50	13,860 (alpha=0)	21,800	3.0'	27,650 cpm (alpha=3) at 2.0', coal ash
41	608'S 4'W of 19+00	11,990	21,440	2.0'	23,630 cpm at 1.5', coal ash
38	600'S 15'W of 23+00	13,600	18,790	1.5'	23,000 cpm (alpha=3) at 1.0; ash
42	510'S on 24+00	868,790	15,200	0.25'	2.58 million cpm on disc, 2" x 2" **SAMPLE** R-30

Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
38	298'S on 24+50	14,970	23,690	2.5'	25,580 cpm (alpha=3) at 1.5', ash
31	85'S 20'W of 25+00	12,910	16,170	1.0	Water at 1.0', ash in hole. Highest readings at bottom of hole.
38	250'S 20'E of 22+00	13,650	21,270	2.4'	23,900 cpm at 1.5', white ash
43	755'S 3'W of 26+00	27,120	42,310 (alpha=4)	1.0'	Pocket of red sand **SAMPLE** R-31*
44	685'S 15'W of 27+50	23,976	34,310	0.42'	Soil mixed with white and rust color material
45	615'S 15'E of 28+50	164,900	8,360	-	2.18 million cpm on disc **SAMPLE** R-32
46	846's 20'E of 29+00	25,230	53,360	-	Red sands mixed with soil
46	915'S 20'W of 29+00	27,820	6,320	2.5'	28,760 cpm on coated rock
47	915'S 5'E of 28+00	29,770	18,370	2.5'	66,890 cpm on white and red soil
47	980'S 20'E of 27+50	32,070	31,660	3.0'	66,630 cpm at 1.0' red sand and black soil
48	1142'S 5'W of 28+50	39,330	15,550	-	50,930 cpm on rock with coating
48	1096'S 5'E of 28+00	45,160	16,630	2.0'	46-50,000 cpm on rocks, white sands also in hole
49	1220'S on 30+00	19,700	-	-	Pile of granite building material
50	1120'S 10'E of 29+00	34,520	28,090	1.0'	34,160 cpm at 0.5', red sand
51	1055'S 10'E of 29+50	83,610	92,120	0.5'	93,790 cpm, red sand R-74
52	1105'S 20'E of 36+50	101,710	-	-	1.48 million cpm on disc **SAMPLE** R-33

Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
53	1000'S 15'W of 38+00	30,350	307,720	-	Green metalic material (alpha=120), white "fertilizer" material (alpha=90), much debris in hole **SAMPLE** R-34
54	892'S on 38+00	51,690	65,790	1.0'	70,150 cpm (alpha=1) at 0.5, rust color material with white "fertilizer" material
55	785'S on 38+00	30,300	45,410	0.75'	Dark brown soil with light color sands.
55	825'S 15'E of 37+50	10,840	24,640	1.5'	Ash, highest readings at bottom of hole.
56	815'S on 38+50	32,810	22,970	2.0	57,000 cpm at 0.75', white chunks of material with orange and red sands
57	760'S 6'W of 38+50	67,680	53,910	1.75'	67,460 cpm at 0.5', white material, fine sands as above **SAMPLE** R-35*
55	770'S 3'E of 37+50	62,820	27,610	1.5'	74,070 cpm at 0.5', same material as above
58	680's on 38+00	22,410	6,480	2.5'	27,000 cpm on coated rock
59	790'S 10'W of 40+00	13,300	16,000	-	19,040 cpm on rock, white sand in hole
60	545'S 3'E of 40+00	20,080	69,560	2.5'	170,150 cpm (alpha=6) at 1.5', glass with grey and white material. clay - like **SAMPLE** R-36
61	315'S 25'E of 36+50	20,800	8,590	3.0'	41,150 cpm at 1.0', red and white sand with black soil

Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
62	198'N 4'E of 37+00	31,580	48,300	-	38,220 cpm on coated rock in hole, light color sands
63	235'N on 14+50	19,990	30,000	1.0'	36,590 cpm on rocks in hole
64	200'N 10'W of 36+50	50,870	15,000	1.0'	1.2 million cpm on disc, pile of soil 20-25,000 cpm **SAMPLE** R-37
65	639'N 3'E of 36+50	30,720	94,410	0.75'	White material **SAMPLE** R-38
66	825'N on 37+50	25,650	17,700	2.0'	White material in drum. Highest reading on drum
67	760'N on 37+50	211,500	-	-	Rock with yellow staining at surface
68	703'N 2'W of 38+00	376,920	-	-	654,550 cpm on bag containing green chunks of powder **SAMPLE** R-39
69	683'N 20'E of 38+00	16,450	7,410	2.5'	26,400 cpm at 1.0', brown clay soil, found bottles and test tubes
70	100'S on 34+00	-	-	-	Area freshly cemented no elevated measurements found
71	300'S on 33+50	-	-	-	No elevated measurments found
72	620'S 20'E of 33+50	53,550	-	-	2' x 1' x 1' piece of concrete.
72	615'S 6'W of 34+50	24,000	43,370	0.16'	Piece of concrete
72	595'S 5'W of 35+00	108,300	120,300	-	Concrete material in ground
72	700'S 15'E of 34+50	45,610	37,190	1.5'	70,760 cpm, concrete chunks and fill material
73	680'S 30'E of 35+50	40,870	-	-	Piece of concrete, 6 inch cube.

Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
72	590'S on 35+50	24,800	37,000	0.5'	Rocks concrete and gravel
74	735'S on 36+50	31,400	12,530	1.0'	41,080 cpm on coated rock
75	880's on 36+00	34,770	106,900	0.25'	Highest reading on concrete
76	338'S 3'E of 29+00	14,220	16,310	3.0'	18,100 cpm at 2.5', coal ash
19	1340'N on 16+50	153,790	-	-	108,000 cpm, black soil in bag **SAMPLE** R-40*
19	1385'N 3'W of 16+50	31,390	8,880	1.5'	Highest reading at surface, soil
18	1340'N 6'W of 16+50	413,770	13,290	1.25'	1,074,680 cpm, black resin in bag **SAMPLE** R-41*
77	630'N 8'E of 40+50	16,651	10,870	0.5'	46,190 cpm on coated rock
78	1190'N 6'E of 27+00	31,920	47,360	0.75'	51,000 cpm (alpha=7), white "fertilizer" material
15	988'N 3'E of 26+50	13,170	30,840	1.0'	Black material with white ash and white "fertilizer" material, highest reading at bottom of hole.
79	570'N 20'W of 27+00	21,180	12,180	1.5'	30,250 cpm on pile of white sands
80	580'N on 26+50	36,730	15,910	0.5'	Sands and soil, highest reading at 0.25'
15	620'N on 25+00	9,420	15,050	3.5'	16,920 cpm at 3.0', brown and black soil
81	600'N 20'E of 23+50	26,730	47,250	1.25'	58,700 cpm at 1', off white sands
82	675'N 20'E of 23+00	274,870	-	-	2.32 million cpm (alpha=1) on disc; in hole alpha=2, **SAMPLE** R-42 (disc), R-43 (soil)

Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
77	610'N on 40+50	24,900	11,670	1.25'	27,200 cpm on coated rocks
83	560'N on 40+00	—	—	—	Did not find
84	590'N 12'E of 38+50	34,000	27,630	0.5'	43,760 cpm on rock
85	650'N 15'E of 35+00	20,010	10,260	2.5'	29,810 cpm on rock
86	857'N 2'E of 35+00	33,900	10,770	1.0'	White material, possibly drum
86	860'N 2'E of 34+00	33,750	26,860	1.5'	35,220 cpm at 1.0', white material
87	790'N on 33+50	41,000	31,750	1.75'	73,910 cpm at 1.0', white material
87	775'N 10'W of 33+50	28,000	26,500	1.0'	32,910 cpm at 0.5', white material
88	405'N 20'W of 33+50	75,380	93,240	0.08'	Isolated "hot spot" tar material, very hard
89	530'N 2'W of 31+00	16,010	9,540	2.5'	34,730 cpm on rock
90	652'N 2'W of 31+50	67,210	10,000	-	67,210 cpm on rock with crystals **SAMPLE** R-44
91	1070'N 35'E of 32+00	714,500	-	-	Rod, 0.5' x 0.25' diameter **SAMPLE** R-45 (rod), R-46 (soil)
92	1140'N 2'E of 31+50	18,000	13,360	2.5'	36,760 cpm on concrete cinderblock, soil is grey and brown
93	1146'N 3'E of 30+50	35,120	7,540	2.0'	High reading on coated rock at surface, white material in hole
92	1050'N on 30+50	21,590	8,650	1.25'	High reading on coated rock at surface

Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
92	960'N on 30+50	14,930	13,870	0.75'	14,000 cpm on soil with brick material, refusal at 8 inches.
94	860'N 1'W of 30+50	38,760	-	-	287,990 cpm on rock core, green color **SAMPLE** R-50 (core), R-51 (soil)
92	1148'N 3'W of 30+00	14,780	20,650	1.0	21,140 cpm on coated rock
92	1185'N 1'W of 29+50	25,660	12,650	1.5'	No source found, small rock fragments mixed with light color sands
95	1110'N 15'W of 28+50	56,300	39,930	1.5'	Highest reading on white material near drum
96	995'N 5'E of 28+00	109,660	164,700	-	400,000 cpm on approximately ten 2" x 1" metal rods, hole still elevated **SAMPLE** R-48 (rods), R-49* (soil). (went back with bobcat "dig")
15	955'N on 27+50	25,630	30,630	1.0'	50,000 cpm at 0.5', rocks and sewer drains with white cement material
15	740'N on 27+50	23,770	24,300	1.0'	30,000 cpm on red soil and rocks
97	765'N on 29+00	25,060	28,160	1.25'	34,630 cpm on white sands, red rock material in hole
98	805'N 10'W of 29+00	12,770	12,410	1.5'	17,650 cpm at 0.5', light brown sand and soil
97	650'N 2'E of 29+00	41,220	37,240	1.0'	57,200 on coated rock, white "vermiculite" material in hole
99	720'N 5'E of 29+50	178,070	1,580,000	-	No source found in hole, refusal.

Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
100	650'N 10'W of 30+00	29,490	31,600	1.0'	34,120 cpm on sandstone rock
101	570'N on 30+00	44,610	18,560	1.75'	42,380 cpm at 0.5', coated rocks and white material in hole
102	590'N 15'W of 29+50	31,400	177,190	1.5'	Highest reading at bottom of hole on white material, material, is dry and compact. **SAMPLE** R-47*
103	500'N 10'W of 27+00	21,260	20,460	0.5'	31,220 cpm on coated rock
78	1190'N 5'E of 27+00	13,310	46,670	1.0'	Highest reading at bottom of hole on white material
104	1195'N 15'W of 27+50	21,690	18,250	2.5'	28,860 cpm at 0.5', white material
105	1165'N 10'W of 27+00	23,750	13,240	1.75'	27,190 cpm at 0.5', white material
17	1085'N 5'W of 24+00	20,280	15,130	1.25'	46,340 cpm on coated rock
106	1040'N 10'E of 22+50	15,220	13,500	1.5'	17,930 cpm at 0.5', off white sands
20	1355'N 5'W of 20+00	18,630	28,730	1.5'	29,600 cpm at 1.0', light brown sandy soil
107	1440'N 20'W of 19+50	40,600	20,800	2.5'	40,600 cpm on coated rock at surface
108	1310'N 2'E of 18+50	84,000	38,190	2.0'	Highest reading at surface on drum, white material in drum R-75*
20	1190'N 15'E of 19+00	17,690	17,940	1.0'	Highest reading at bottom of hole, compact white material
109	1340'N 5'E of 18+00	27,480	14,740	1.75'	28,060 cpm at 0.5', red-brown soil with white ash

Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
110	1375'N 25'W of 17+50	306,710	7,000	0.5'	570,110 cpm on 1" x 1" x 0.33" metal square objects **SAMPLE** R-56 (metal), R-57 (soil)
111	1475'N on 16+50	15,000	7,210	1.75'	Highest reading at surface on white material, couldn't find "hot spot"
112	1338'N 10'E of 16+50	229,880	10,000	-	239,600 cpm on 3' x 0.5" diameter metal rod **SAMPLE** R-58 (rod), R-59 (soil)
113	1280'N on 16+50	28,830	4,840	3.0'	Highest reading at surface on white clay material
114	1120'N 30'E of 16+00	133,390	5,430	-	300,000 cpm on metal object **SAMPLE** R-54 (metal), R-55 (soil)
63	200'N on 13+50	13,860	31,340	0.5'	Highest reading at bottom of hole, dark soil
115	690'N 25'W of 23+00	15,040	17,460	1.25'	21,890 cpm at 1.0', white sand or ash
116	849'N 20'E of 23+00	180,000	40,490	1.25'	1.8 million cpm on 2-inch disc, soil still elevated **SAMPLE** R-52 (disc), R-53 (soil).
115	885'N 2'E of 23+00	13,240	11,570	0.75'	14,370 cpm on pile of light brown soil
117	250'S 15'E of 26+00	22,800	23,530	3.0'	Highest reading at bottom of hole, coal ash
118	200'S 10'W of 27+50	20,720	34,600	1.75 '	120,000 cpm in side of hole, white material
119	105'N 6'W of 21+00	7,520	11,750	1.33'	12,320 cpm at 1.0' dark brown silty sand

Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
119	110'N on 22+00	7,840	13,160	1.5'	Highest reading at bottom of hole, dark brown silty sand
120	1050'S on 26+00	10,770	18,530	3.0'	24,370 cpm at 1.5', coal ash
TP-7	189'S 3'W of 32+00	236,000	6,000	2.0	1,200,000 cpm, approximately 20-25 pieces of granite. 154,000 cpm at surface (post-backfill) due to numerous pieces of granite excavated and not taken as samples. Took **SAMPLES** of granite (R-61)*, soil (R-62) and white material (R-63) that was cemented to some pieces of granite. White material only 7,000 cpm.
TP-45	720'N 5'E of 29+50	125,000	10,000	2.0	1,500,000 cpm, 3 yellow discs, drum of white material at 108,000 cpm. Took **SAMPLES** of discs (R-64) and soil (R-65), surrounding discs.
TP-44	388'N 4' from 26+50	100,000	11,000	2.0	1,600,000 cpm, plastic "stopper" or bolt shaped object, found inside a copper tube. Took sample of "stopper," (R-66)* and soil (R-67) surrounding stopper. Copper object did not give off elevated measurements.
BD-1	995'N 5'E of 28+0	46,000	18,000	2.0-3.0	400,000 cpm, found approximately 20 metal objects, including stainless steel rods (2"x2"), steel rods with fittings (3"x2") and a small metal rod (1/4"x6"). Some of the 2"x2" rods have numbers either stamped or written on them. Not all of

TP = Test pit
BD = Bobcat "dig"

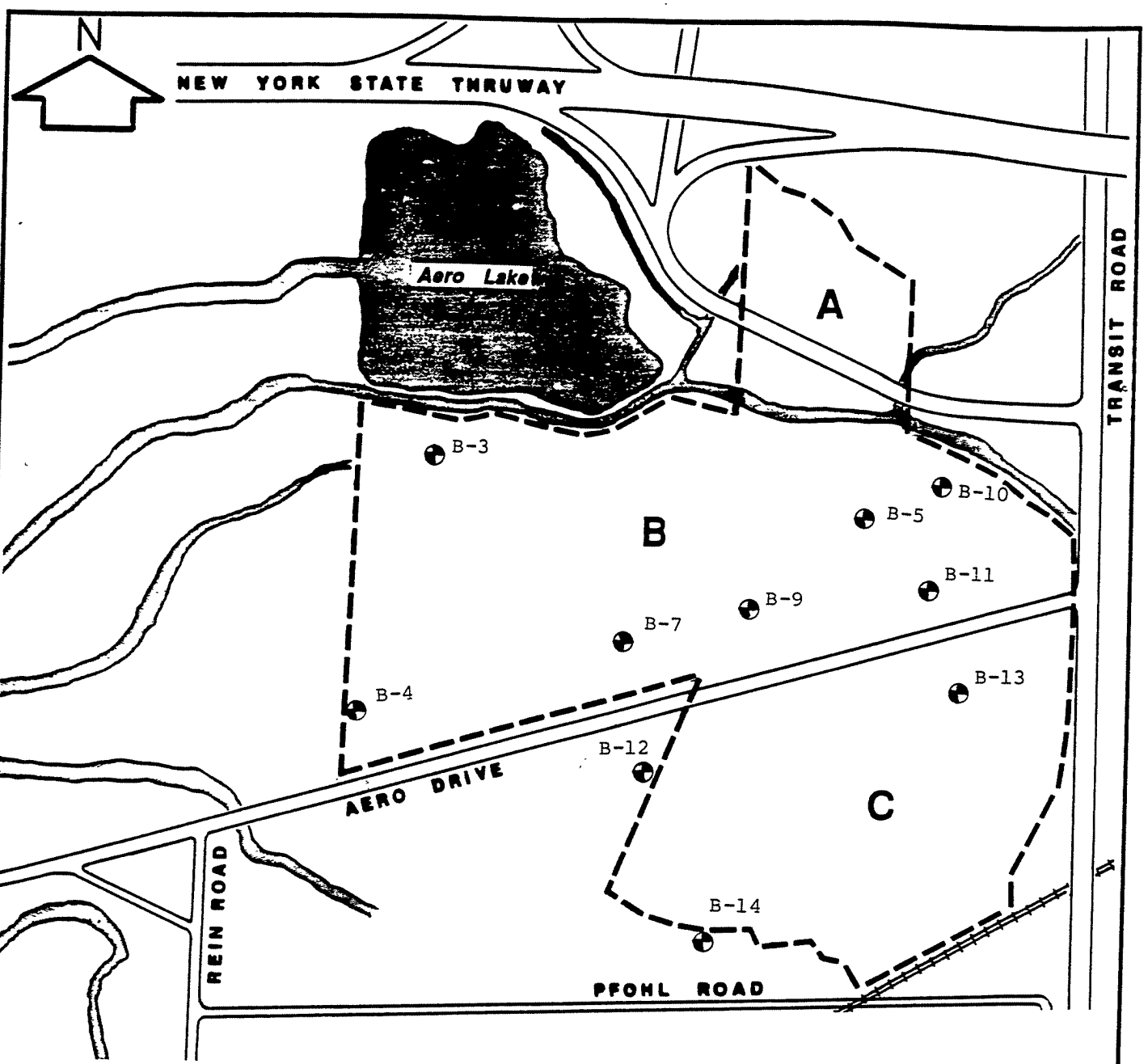
Summary Table
(Continued)

Area	Location	Gamma (and alpha) Measurements (cpm) Surface	Subsurface (bottom of hole)	Depth of hole	Highest reading/ Description
					these rods are elevated. Found along with these rods 2 silver dollar sized imprinted pieces of metal on a rubber belt. The imprint read Alloy Powder and Metal Company with a C/W logo in the center. Took all rods, soil and these imprints as samples.
BD-2	405'N 20'W of 33+50	50,000	12,000	0.25	60,000 cpm, 2 small 1"x1" pieces of roofing tar material. Took these 2 small pieces, as well as other pieces of the material for **SAMPLES**. (R-68,69).
BD-3	917'S on 32+00	20,000	8,000	2.5	900,000 cpm, black box containing "gyroscope" manufactured by Sperry Corporation for the U.S. Navy, also found plastic sheeting which was in one 40-50,000 cpm section. Took "Gyroscope", (R-70) plastic and soil (R-71) as **SAMPLES**.

(lm/237)

Attachment 1

Downhole Gamma Logs
from the
Phase II Radiation Investigation
Pfohl Brothers Landfill



LEGEND

- BORING

Not To Scale

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Figure A-1

Boring Location Plan

Pfohl Brothers Landfill, Cheektowaga, New York

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BORING NUMBER: B-3
Page 1 of 1

Log of Boring

Project PBF Location B-3 Job. No

Date Drilled 11-15-89 Drilling Co.

Total Depth Method Used Hollow Stem Auger

Inspector Organic Vapor Instruments Used Water Table Depth

Depth (feet)	Samp No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma cpm	Sample Description	Strata Change	Remarks (Time of Day)
2	SS 1	2 2 1 2	0-2	2'/0.6	3060 3180 3190 4810	Fill - wood, plastic glass silty soil	Fill	
4	2	3 2 2 4	2-4	2'/0.7	4970 6330 5360 4980	Fill - wood, white flaky material - coal ash black stained soil		
6	3	20 14 14 10	4-6	2'/0	4750 4430 4490 5010	Wood - plastic in tip		
8	4	7 7 2 3	6-8	2'/0	4930 4030 3760 3970	Silty black material in tip of spoon		OVA down hole - 15ppm
10	5	5 4 4 2	8-10	2'/0	4150 4000 4150 4820	Oily sheen on outside of spoon - black silty sand		OVA down hole >1000ppm O in breathing zone
12	6	5 4 2 2	10-12	2'/0.5	4620	Black stained silt - little ~~clay~~ gray clay		OVA down hole 80 ppm 0-1 in BZ
14	7	6 8 10 10	12-14	2'/1.0'		2" - gray clay 10" - red brown clay with silt.		
16			14-16	2'/2'		SHELBY TUBE		
18	8	6 25/6				0.2' - red/brown clay 0.8' - fill - gray		OVA 210ppm in hole 3ppm in BZ
20						rock at 16.5'		

NY-1

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BORING NUMBER: B-4
Page 1 of 2

Log of Boring

Project Pfohl Bros Location Buffalo NY Job. No 897-12-RC-SOBS

Date Drilled 11/9/89 Drilling Co. Rochester Drilling

Total Depth 19' 6" Method Used Hollow stem auger

Inspector B. Alter Organic Vapor Instruments Used OVA / HNu Water Table Depth 4'

Depth (feet)	Samp No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma cpm bkg	Sample Description	Strata Change	Remarks (Time of Day)
0	1	5	0'/2'	2'/0'	4030	Some wood + paper in shoe		0950
	1	4	↓	↓	4410			
1	1	2			4470			
	1	1	↓	↓	4730			
2	2	1	2'/4'	2'/.2'	4830			0955
	2	1	↓	↓	5070	Soil, fill with wood, black stained material and porcelain	5'	LEL = 0 at hole
3	2	2			5150			OVA = 20 at hole
	2	1	↓	↓	5130			
4	3	1	4'/6'	2'/.3'	5880	Black stained soil and paper wet and tarry		1000
	3	1	↓	↓	5570			OVA = 40 on sample
5	3	12			4460			LEL = 0 at hole
	3	13	↓	↓	5590			
6	4	1	6'/8'	2'/.2'	6590	Brown clayey silt, probably native in shoe. Spoon contains black, wet tarry substance	Silt	1010 OVA = 4 on sample.
	4	1	↓	↓	7140			
7								

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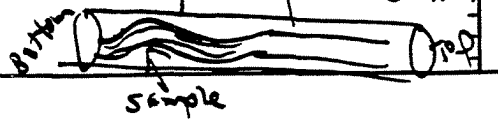
BORING NUMBER: B-4

Log of Boring — Pfohl Bros

Depth (feet)	Samp. No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma cpm	Sample Description	Strata Change	Remarks (Time of Day)
7								
	4	5	6'/8"	2'/.2'	8400	Brown clayey silt. Black, wet, tarry substance	Silt	1010
	4	4	↓	↓	7920			
8								1020
	5	2	8'/10"	2'/1'	7320	.4' Medium sand, brown, w/some silt. Stained	Sand	RAINING, WINDY
	5	5			7960	.6' Very coarse brown sand. Not stained		OVA=0 in hole
9								
	5	14			9610			
	5	14	↓	↓	10450	.2' Reddish brown, stiff clay in shoe		
10								1035
	6	41	10'/12"	2'/0'		No recovery		
	6	10						
11								
	6	15						
	6	18	↓	↓				
12								1050
	7	8	12'/14"	2'/1.2'		Reddish brown clay, fairly stiff	Clay	OVA=0 at hole, on sample
	7	12						
13								
	7	18						1055-Rain Stopped
	7	35	↓	↓				
14								1105
	8	9	14'/16"	2'/1.2'		Reddish-brown clay, less stiff than before "wavy" shape at bottom		
	8	14	↓	↓				
15								



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BORING NUMBER: B-5
Page 1 of 1

Log of Boring

Project _____ Location B-5 Job. No _____

Date Drilled / - Drilling Co. _____

Total Depth _____ Method Used _____

Inspector _____ Organic Vapor Instruments Used _____ Water Table Depth _____

Depth (feet)	Samp No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma cpm	Sample Description	Strata Change	Remarks (Time of Day)
2	SS 1	1 1 1 2	0-2'	2'/0.1	3780 4260 4050 3290	silty organic soil, glass, plastic Fill.		
4	2	1 14 40 55	2-4'	2'/0.1	3160 3050 2830 3340	Tile, wood, rubber, pieces of rock - Fill		
6	3	2 16 70	4-6'	2'/0.5	3600 3730 4470 4530	Fill - rubber, wood painted orange, large cobble		
8	4	4 12 14 19	6-8	2'/0.1	4880 5120 5030 4220	Fill - large chunk of wood some cobble		OVA downhole 200ppm. Oppm. > BZ
10	5	6 2 4 5	8-10	2'/0.1	4040 42801 3970 2740	Wood, stained with black silty material	WET Org. Vap = 100ppm	
12	6	9 5 24 7	10-12	2'/0.05	3150	Brown silty clay in top of shoe.		OVA 1000 ppm downh
14	7	12 12 19 40	12-14	2'/1.1		Brown silty clay.		
16	8	14 30 35 45	14-16	2'/1.5'		Brown silty sand, little, v. fine sand.		
18	9	15 25 27 20	16-18	2'/1.1		0-1.0' Brown silty sand little v. fine sand 1.0-1.1' - Brown silty clay, very stiff		OVA downhole 200-500 ppm
20	10	8 10 10 11	18-20'	2'/1.6		Brown silty clay, stiff		
22	11	15 24/3"	20-21	8"/0		Rock at 20.7'		
						Sent sample SS-8 to lab		

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BORING NUMBER: B-7
Page 1 of 2

Log of Boring L24 240'N
Project Pfohl Bros Location Buffalo, NY Job. No 897-12-RC-5083
Date Drilled 11/2/89 Drilling Co. Rochester Drilling
Total Depth 18.5' Method Used Hollow stem auger
Inspector B. Alter Organic Vapor Instruments Used OVA/HNu Water Table Depth 6'

Depth (feet)	Samp No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma cpm	Sample Description	Strata Change	Remarks (Time of Day)
0								
	1	1	0'/2'	24"/2"	5868	Soil		08:15
1	1	1			6056			
	1	1						
	1	1			5538			
2	2	1	2'/4'	24"/2"	4622	Soil		08:30
	2	2			4300			
3	2	2			4034		Soil	
	2	1			4026			0840
4	3	1	4'/6'	24"/2"	4398	Black soil with garbage		
	3	2			5424			
5	3	2			7982			
	3	2			8918	Black soil with garbage - fill plastic, brick particles		0845 wet
6	4		6'/8'	24"/2"	8140			
	4				8374			
7								

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BORING NUMBER: B-7
Page 2 of 2

Log of Boring
Project Pfohl Bros Location Buffalo NY Job. No
Date Drilled Drilling Co.
Total Depth Method Used
Inspector Organic Vapor Instruments Used Water Table Depth 6'

Depth (feet)	Samp No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma	Sample Description	Strata Change	Remarks (Time of Day)
7					cpm			
	4		6'/8'		7950	Black soil with garbage		wet
	4				7426			
8	5		8'/10'	2½'/2'	5180	wet black soil with garbage	Soil	0850 OVA=0 in breathing zone; 80 over hole HNu=0 over hole Probably methane.
	5				4628			
9	5				5220			
	5				5432			
10	6	26	10'/12'	2'/1.2'		.3' Black stained sand wet, some fill	Sand	0900 HNu=0
	6					Brown, very compacted clay; very silty		Sample 6 sent to lab.
11	6							
	6							0930
12	7	64	12'/14'	2'/1.5'		Brown clay with silt	1st C	OVA over hole = 20 HNU over hole = 0 Sample HNu = 1
	7							
13	7							
	7							
14								

NY-1

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BORING NUMBER: B-9

Log of Boring

Project Pfohl Bros Location Buffalo NY Job. No 897-12-RCSDBS

Date Drilled 11/6-7/89 Drilling Co. Rochester Drilling

Total Depth 22' 0" Method Used Hollow Stem Auger

Inspector B. Alter Organic Vapor Instruments Used OVA | HNu Water Table Depth 6'

Depth (feet)	Samp No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma cpm Ling	Sample Description	Strata Change	Remarks (Time of Day)
0								
	1	2	0'/2'	2'/.1'		Surface soil		1630
1	1	↓	↓	↓	4860			
	1				5370			
2	1				4850			
	2	2	2'/4'	2'/.2'	4510	Fill w/ soil, glass, and wood		1635
3	2	4	↓	↓	3930		Soil	
	2	7			3790			
4	2	8			3380			
	3	2	4'/6'	2'/.2'	2910	Organic soil w/ roots, possibly black stained Rocks + cobbles		1640 OVA=0@ hole
5	3	1	↓	↓	2850			Straight stem rig
	3	2			2500			
6	3	2			2820			
	4	6	6'/8'	2'/.4'	4120	Wet spoon. Fine black sand w/ coarse grains	Sand	1710 OVA=0 on Sample
7	4	4	↓	↓	4760			

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BORING NUMBER: B-9

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Log of Boring Pfohl Bros

Depth (feet)	Samp. No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov. in	Gamma cpm	Sample Description	Strata Change	Remarks (Time of Day)
7								
	4	5	6'/8'	2'/.4'	4420	Fine black sand with coarse grains	Sand	
	4	1	↓	↓	3520			
8	5	1	8'/10'	2'/.1'	2770	Black stained organic material		1715 OVA=0 in hole
	5	1			2600			
9	5	5			3020			
	5	4	↓	↓	3250			
10	6	2	10'/12'	2'/0'		No recovery		1725 OVA<40 at hole
	6	2						
11	6	1						
	6	1	↓	↓				Shut down for evening 0750
12	7	5	12'/14'	2'/1.2'		Stiff brown clay with little silt.	Clay	
	7	7						
13	7	11						
	7	21	↓	↓				
14	8		14'/16'	2'/2'		Outside looks like brown clay		0800 Shelby tube pushed through tube. OVA 200 in hole
	8		↓	↓				
15								

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BORING NUMBER: B-10
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Log of Boring L39 675'N

Project Pfohl Bros Location Buffalo NY Job. No 897-12-RL-5085

Date Drilled 11/2-3/89 Drilling Co. Rochester Drilling

Total Depth 20' 2" Method Used Hollow Stem Auger

Inspector B. Alter Organic Vapor Instruments Used OVA/HNU Water Table Depth 10'

Depth (feet)	Samp No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma cpm thing	Sample Description	Strata Change	Remarks (Time of Day)
0	1	5	0'/2'	2'/.3'	5010	Dried peat with decayed cardboard		1540
1	1				4410			
	1				3180			HNU @ hole = 0 OVA @ hole = 4 OVA in breathing zone = 0
2	1				3000			
	2	15	2'/4'	2'/.8'	4250	3" black peat		1547
3	2				5050	6" yellow cardboard	SOIL	
	2				5890			
4	2				6390			1552 HNU = 40 on sample OVA = 60 on sample
	3	15	4'/6'	2'/.6'	5490	Black peat with cardboard		
5	3				4000			HNU = 100 in shoe
	3				3460			Plastic in shoe
6	3				3000			OVA = 20 in hole
	4	6	6'/8'	2'/1.3'	2770	Black and brown peat with yellow cardboard. Black clayey, dry material, either soil or ash.		1605
7	4	10			2220			HNU = 200 in peat HNU = 100 in ash

NY-1

BORING NUMBER: B-10

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Log of Boring Pfohl Bros

Depth (feet)	Samp. No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma cpm	Sample Description	Strata Change	Remarks (Time of Day)
7	4	10	6'/1'	2'/1.3'	2080	Black + brown peat with yellow cardboard. Black dry, flaky material, may be ash.	Fill	HNU=200 in peat HNU=100 in ash(?)
8	4	6	↓	↓	1680			1615 HNU=100 in sample OVA=150 in sample
	5	15	8'/10'	2'/.5'	1670			
9	5				1560	Black + brown peat with decayed newspaper		No detectable odor in breathing zone
	5				1470			
	5		↓	↓	1630			1620
10	6	2	10'/12'	2'/.5'		Wet sample Black wet soil with glass and newspaper.		HNU>200 on sample Could not duplicate w/ OVA.
	6	3						
11	6	4						
	6	13				2" Black stained peat at bottom		1635 OVA @ hole =14 HNU @ hole = 0 OVA = 52 over sample
12	7	12	12'/14'	2'/.6'		Black stained fill, possibly more newspaper		
	7	7						
13	7	6						HNU = 20 over sample
	7	32	↓	↓		2½ brown wet, clayey silt	Silt	
14	8	13	14'/16'	2'/.8'		Wet brown clayey silt		1650 OVA=22 on sample HNU=0 on sample
	8	23	↓	↓		.2' black stained paper		
15								

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BORING NUMBER: B-11

Log of Boring

Project Pfohl Bros Location Buffalo NY Job. No 897-12-RC-SOBS

Date Drilled 11/6/89 Drilling Co. Rochester Drilling

Total Depth 20' 4" Method Used Hollow Stem Auger

Inspector B. Alter Organic Vapor Instruments Used OVA/HNu Water Table Depth 6'

Depth (feet)	Samp No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma	Sample Description	Strata Change	Remarks (Time of Day)
					cpm			
0	1	1	0'/2'	2'/.2'		Brown sand with some silt		0910
	1	2			4860			
1	1	2			5690			
	1	2			5190			
2	2	3	2'/4'	2'/.2'	5650	Fill with glass, paper & plastics		0920
	2	5			5790			
3	2	2			6740			
	2	2			6150		Fill	
4	3	2	4'/6'	2'/.4'	4380	Fill and glass mixed with fine brown soil		0930
	3	1			2910			
5	3	1			2530			
	3	1			2500			0940
6	4	1	6'/8'	2'/0'	2560	Shoe has brown silty material with some coarser grains, some gravel, & wood		wet
7	4	1			2670			

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BORING NUMBER: B-11

Log of Boring Pfohl Bros

Depth (feet)	Samp. No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma cpm	Sample Description	Strata Change	Remarks (Time of Day)
7								
	4	1	6'/8'	2'/0'	2220	Fill + silt		0940
	4	5	↓	↓	1920			
8	5	3	8'/10'	2'/0'	2390	Shoe has glass, plastic, wood, some brown silt.		0945 OVA not working HNU = 0 near hole
	5	1	↓	↓	2470		Silt	
9	5	1	↓	↓	2630			
	5	1	↓		2620			
10	6	2	10'/12'	2'/0'		Shoe has wood and very silty sand		0950 OVA working OVA = 30 over hole
	6	4	↓	↓				
11	6	5						
	6	5						
12	7	20	12'/14'	2'/2'		.2' Wet Fill + silt		1007
	7	23	↓	↓		1.8' Fine-very fine light gray sand		OVA and HNU = 0 at hole.
13	7	26						
	7	40	↓	↓		~~Fine - very fine light gray~~	Sand	
14	8	14	14'/16'	2'/1.3'		1': Fine - very fine light gray sand		1020 HNU, OVA = 0 at hole
	8	22	↓	↓				
15								

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BORING NUMBER: B-12

Log of Boring

Project PFOHL BROS LANDFILL Location _____ Job. No 897-12-RC.SOBS

Date Drilled 11/14/89 Drilling Co. Rochester Drilling Company

Total Depth 19'8" Method Used 6 1/4" Auger

Inspector A DOLLEN/T.RYAN Organic Vapor Instruments Used OVA/HNU Water Table Depth N.R.

Depth (feet)	Samp No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma cpm	Sample Description	Strata Change	Remarks (Time of Day)
	1	1	0'/2'	2'/.8'		Top .6' topsoil		1500
	1	2			11880			
1	1	2			11700	Bottom .2' coal ash - orange white		
	1	2			11530			
2	2	1	2'/4'	2'/.1'	11460	Orange fine material Coal ash?	?	Starting to rain
	2	1			11130		=	
3	2	1			11560			
	2	1			13740			
4	3	1	4'/6'	2'/.6'	13770	White coal ash		
	3	3			11660			
5	3	4			9840			
	3	5			8740			
6	4	2	6'/8'	2'/1.5	6890	Top .3' orange silty material		
7	4	2			7380	Silty clay material	C/S	

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BORING NUMBER: B-12

Log of Boring

Depth (feet)	Samp. No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma	Sample Description	Strata Change	Remarks (Time of Day)
					NAB- not above cpm background			
	4	3	6'/8'	2'/1.5'	7460	.5' of gray to dark gray clay		
	4	5	↓	↓	8420	green clay silty material		
8	5	6	8'/10'	2'/1.3'	9890	Stiff brown clay		
	5	12			9930			
9	5	10			9980			
	5	18	↓	↓	10060			
10	6	9	10'/12'	2'/2'		Stiff brown clay		
	6	11						
11	6	22						
	6	20	↓	↓				
12	7	12	12'/14'	2'/1.75'	OVA and HNU N.AB. in hole	Top -2': Grey to dark grey silty clay		
	7	15				Middle .3': Brown clay with some silt		
13	7	32				Brown, very stiff clay		
	7	30	↓	↓				
14	8	4	14'/16'	2'/1.7'		Brown clay, stiff		
	8	8	↓	↓				
15								

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BORING NUMBER: B-13
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Log of Boring

Project _____ Location B-13 Job. No _____

Date Drilled _____ Drilling Co. _____

Total Depth _____ Method Used _____

Inspector _____ Organic Vapor Instruments Used _____ Water Table Depth _____

Depth (feet)	Samp No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma cpm	Sample Description	Strata Change	Remarks (Time of Day)
2	SS 1	1 1 1 1	0-2	2'/0.4	4810 3560	Silty top soil No fill		
4	2	4 8 10 8	2-4	2'/0	3020 2390 2100 1980	Rubber, wood, [redacted] coal ash, orange material in tip of shoe	▽	
6	3	1 4 2 1	4-6'	2'/0	1940 2000 2700 3750	Glass, orange material	[redacted]	wet OVA - 0 ppm down hole
8	4	2 4 10 8	6-8	2'/1.6	5430 6990 6750 6650	0-0.3 orange material with silty sand 0.3-1.6 Clayey silt brown		
10	5	7 14 17 12	8-10	2'/1.8	6320 8630 8530 8270	0-1.6 Clay, brown, silty stiff 1.6-1.8 Clayey silt		OVA - 0 ppm down hole
12	6	10 12 8 9	10-12	2'/1.8	8680	Clay, brown, [redacted] silty trace fine sand.		
14	7	3 7 37 50	12-14	2'/.9		Clay, brown very stiff turning to reddish [redacted] color		OVA - 0 ppm in hole.
16	8	7 12 153 100	14-16	2'/.5		Clay, brown silty. No till.		
						Rock @ 15.8'		
						Sent sample SS-[redacted] 4 to lab also sent MS/MSD from SS-5, 6 & 7		

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BORING NUMBER: B-14
Page 1 of 1

Log of Boring

Project _____ Location B-14 Job. No _____

Date Drilled _____ Drilling Co. _____

Total Depth _____ Method Used _____

Inspector _____ Organic Vapor Instruments Used _____ Water Table Depth _____

Depth (feet)	Samp No.	Blows per 6" lbs.	Sample Interval	Adv./ Recov.	Gamma cpm	Sample Description	Strata Change	Remarks (Time of Day)
2	SS 1	1 1 2 2	0-2	2'/0.4	6940 8380 11020 15720	Top soil - coal-like chunks		
4	2	1 2 3 4	2-4	2'/0.8	15940 19700 14000 11580	Fill - brick, topsoil, glass wood - coal-like material		
6	3	1 1 1 1	4-6	2'/0.4	8780 6850 5230 4810	Fill - glass, white tile, orange silty material		T.P & spoon is moist
8	4	2 3 3 2	6-8	2'/0.5	5020 5510 7170 9300	Fill - wood, orange silty material, glass silty clay in tip of spoon		
10	5	4 8 16 16	8-10	2'/1.6	10100 9790 9650 10800	0-0.3 board, fine, brown 0.3-1.6 - Clay, silty brown		
12			10-12'	2'/2'	11100	SHELBY TUBE		
14	6	5 14 19 24	12-14	2'/1.8		Clay, brown, silty stiff		Old borehole 0ppm o.v.
16	7	5 9 19 5	14-16	2'/1.4'		Clay, brown silty - soft in middle of spoon		
18	8	5 9 17 15	16-18	2'/2'		Clay, brown silty - stiff 1.6-1.8 - silty sand, brown		
20	9	3 3 6 13	18-20	2'/2'		Clay brown, very silty soft.		
22	10	2 10 20 23	20-22	2'/1.6'		Sand, silt brown, little fine.		Sent samples SS-5 SS-13 to lab
24	11	8 9 4 6	22 24	2'/1.7		0-0.2 - Sand silt brown 0.2-1.7 - Clay, brown, stiff		
26	12	4 4 5 6	24-26	2'/2'		Clay, brown, elastic		
28	13	3 3 5 6	26-28	2'/2'		Clay, brown, elastic		
	14	10-		2'/-		Till, gray clay with rock		Down at 29.8'

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Attachment 2

Elevated Gamma Radiation Locations
from Phase I Investigation
Revised Table 1

REVISED TABLE 1

ELEVATED GAMMA RADIATION LOCATIONS IN AREAS B AND C
EXHIBITING SPECIAL CHARACTERISTICS

(AREA B)

Note: Information in **bold** indicates second walkover survey.

Location	Area No.	Result	Description of Area
636'N 8'E of 40.50	77	14,000 cpm[1]	Debris - small rocks
639'N 8'E of 40.50	**77**	**16,651 cpm**	**46,190 cpm on coated rock.**
610'N on 40.50	**77**	**24,900 cpm**	**27,200 cpm on coated rocks. (2)**
560'N on 40.00	**83**	**--**	**Did not find. (2)**
590'N 11'E of 38.50	84	34,000 cpm	Readings increased to 60,000 cpm 3" down. 10,000 cpm around spot. No grass cover, some building material in area (10' x 10').
590'N 12'E of 38.50	**84**	**34,000 cpm**	**43,760 cpm on rock.**
700'N on line 38.00	68	227,550 cpm	NYSDEC surface soil sample results: Radium 226 at 0.7 picocurie per gram (pCi/gr). Radium 228 at 3.9 pCi/gr
703'N 2'W on 38.00	**68**	**376,920 cpm**	**654,550 cpm on bag containing green chunks of powder SAMPLE R-39.**
683'N 25' E of 38.00	69	14,000 cpm	3' x 3' area
683'N 20'E of 38.00	**69**	**16,450 cpm**	**26,400 cpm at 1.0', brown clay soil, found bottles and test tubes.**
755'N on line 37.50	67	128,200 cpm	Rock
760'N on line 37.50	**67**	**211,500 cpm**	**Rock with yellow staining at surface.**
825'N on line 37.50	66	20,100 cpm	Drum
825'N on line 37.50	**66**	**25,650 cpm**	**White material in drum. Highest**

			reading on drum.
198'N 4'E of 37.00	**62**	**31,580 cpm**	**38,220 cpm on coated rock in hole, light color sands. (2)**
639'N 3'E of 36.50	65	35,000 cpm	Rock. Mounded ground around area at 23,000 cpm. Much building material in area, no soil cover. Area of spot 3' x 3'.
639'N 3'E of 36.50	**65**	**30,720 cpm**	**White material SAMPLE R-38.**
190'N 8'W of 36.50	64	66,000 cpm*	Small area 1' x 1'. Weeds on ground. 219,000 cpm 4" down, some metal in area.
200'N 10'W of 36.50	**64**	**50,870 cpm**	**1.2 million cpm on disc, pile of soil 20-25,000 cpm SAMPLE R-37.**
650'N 15'E of 35.00	**85**	**20,010 cpm**	**29,810 cpm on rock. (2)**
837'N 3'W of 35.00	86	25,000 cpm	Leaves cover area, soil underneath. Much debris in area, metal & rocks. 1' x 1' area.
856'N 1'W of 35.00	86	30,000 cpm	White material on ground, consistency of fertilizer. No soil cover, some rocks in area. Refusal noted at 6". Area size 1' x 1'.
857'N 2'E of 35.00	**86**	**33,900 cpm**	**White material, possibly drum.**
846'N 1'E of 34.50	86	42,000 cpm	White material. Some trash, metal, building material found at the surface. 2" down - 51,000 cpm; material is hard and dry. Refusal at 3". Area is 3' x 3'.
864'N 2'W of 34.00	86	31,000 cpm	Much building material, metal, no soil cover. A 3' x 3' area above 12,000 cpm exists around spot.
860'N 2'E of 34.00	**86**	**26,860 cpm**	**35,220 cpm at 1.0', white material.**
790'N on 33.50	**87**	**41,000 cpm**	**73,910 cpm at 1.0', white material. (2)**
725'N 15'W of 33.50	87	25,000 cpm	Small area, moss cover. No elevated readings in area.
775'N 10'W of 33.50	**87**	**28,000 cpm**	**32,910 cpm at 0.5', white material.**
404'N 20'E of 33.00	88	68,000 cpm	Tar material, small spot 3" x 3". Approximately 10,000 cpm on other

			portion of material.
405'N 20'W of 33.50	**88**	**75,380 cpm**	**Isolated "hot spot" tar material, very hard.**
BD-2 405'N 20'W of 33.50	**88**	**50,000 cpm**	**60,000 cpm, 2 small 1"x1" pieces of roofing tar material. Took these 2 small pieces, as well as other pieces of the material for SAMPLES. (R-68,69).**
1059'N 20'W of 32.50	91	700,000 cpm*	Metal rod (3" x 9"). 16,000 cpm at waist level. Removed rod and excavated down 1'; no elevated readings. Wood scraps, white material, and metal in hole.
1070'N 25'E of 32.00	**91**	**714,500 cpm**	**Rod, 0.5' x 0.25' diameter SAMPLE R-45 (rod), R-46 (soil).**
1125'N on line 31.50	92	28,960 cpm	Rock. Building material 3" x 4" x 2".
1140'N 2'E of 31.50	**92**	**18,000 cpm**	**36,760 cpm on concrete cinderblock, soil is grey and brown.**
650'N on 31.50	90	54,000 cpm	Rock with elevated readings. Excavated down 6"- no elevated readings.
1027'N 25' E of 31.00	92	12,500 cpm	In hole.
652'N 2'W of 31.50	90	80,000 cpm	Piece of metal rod 1 1/2" diameter by 1" high.
652'N 2'W of 31.50	**90**	**67,210 cpm**	**67,210 cpm on rock with crystals SAMPLE R-44.**
535'N on 31.00	89	20,000 cpm	3" x 3" x 1" tar w/rock
530'N 2'W of 31.00	**89**	**16,010 cpm**	**34,730 cpm on rock.**
1180'N on 31.00	92	12-16,000 cpm	Stones, building material
1142'N 3'E of 30.50	93	30,000 cpm	Rock on surface, 20,000 cpm around it. Excavated down 6"- 16,000 cpm. Much white material. Rock is very hard. Black with sand and cement on one side. Area is small.
1146'N 3'E of 30.50	**93**	**35,120 cpm**	**High reading on coated rock at surface, white material in hole.**
1025'N 3'E of 30.50	92	28,000 cpm	Rock, same as above but not smooth.

			Not elevated around spot. Could not excavate because of metal and roots.
950'N 10'E of 30.50	92	14,200 cpm	Belgian block/building material.
958'N on line 30.50	92	14,000 cpm	Belgian block/building material.
960'N on 30.50	**92**	**14,930 cpm**	**14,000 cpm on soil with brick material, refusal at 8 inches.**
1011'N on 30.50	92	16,000 cpm	Belgian block/building material.
860'N on 30.50	94	32,000 cpm	Soil area, moss in area. At 3" down- 58,000 cpm. Could not excavate deeper.
860'N 1'W of 30.50	**94**	**38,760 cpm**	**287,990 cpm on rock core, green color SAMPLE R-50 (core), R-51 (soil).**
1100'N 15'E of 30.50	92	13,000 cpm	Gravel and tar.
1050'N on 30.50	**92**	**21,590 cpm**	**High reading on coated rock at surface.**
1198'N 3'W of 30.00	92	25,000 cpm	Black rock (as before). Soil is not elevated around it.
1148'N 3'W of 30.00	**92**	**14,780 cpm**	**21,140 cpm on coated rock.**
962'N on line 30.00	92	15,000 cpm	Debris; could be the rocks.
1185'N 1'W of 29.50	**92**	**25,660 cpm**	**No source found, small rock fragments mixed with light color sands. (2)**
650'N 10'W of 30.00	**100**	**29,490 cpm**	**34,120 cpm on sandstone rock. (2)**
570'N on 30.00	**101**	**44,610 cpm**	**42,380 cpm at 0.5', coated rocks and white material in hole. (2)**
725'N on line 29.50	99	110,000 cpm	Soil: Radium 226 at 0.7 pCi/gr; Radium 228 at 0.6 pCi/gr.
720'N 5'E of 29.50	**99**	**178,070 cpm**	**No source found in hole, refusal.**
TP-45 720'N 5'E of 29.50	**99**	**125,000 cpm**	**1,500,000 cpm, 3 yellow discs, drum of white material at 108,000 cpm. Took SAMPLES of discs (R-64) and soil (R-65), surrounding discs.**
590'N 15'W of 29.50	**102**	**31,400 cpm**	**Highest reading at bottom of hole on white material, material, is dry and compact. SAMPLE R-47*. (2)**

580'N 15'E of 29.50 (to 620'N)	102	12-25,000 cpm	10' x 30' area; small mounds elevated, some blocks in area.
580'N to 620'N 15'E of 29.50	102	12-25,000 cpm	Could not locate spot - may need to excavate (see note #1).
805'N 10'W of 29.00	98	12,770 cpm	17,650 cpm at 0.5', light brown sand and soil. (2)
765'N on 29.00	97	25,060 cpm	34,630 cpm on white sands, red rock material in hole. (2)
650'N 2'E of 29.00	97	41,220 cpm	57,200 on coated rock, white "vermiculite" material in hole. (2)
313'N 10'E of 29.00	29	16,000 cpm	Readings measured up to 20,000 cpm 3" down.
313'N 10'E of 29.00	29	21,370 cpm	37,120 cpm on sandstone rock.
100'N 10'E of 28.50	27	72,000 cpm	Buried drum, only 1' x 2' area showing. Drum not open.
100'N 10'W of 28.50	27	80,760 cpm	Highest measurement on buried drum SAMPLE R-73*.
250'N 15'E of 28.00	28	20,000 cpm	10' x 10' area.
245'N 10'E of 28.00	28	33,570 cpm	41,130 cpm on sandstone rocks.
1105'N 15'W of 28.50	95	30,000 cpm	Drum buried in ground, only east side elevated. Readings do not increase 8" down. Wood in area. No drum contents.
1110'N 15'W of 28.50	95	56,300 cpm	Highest reading on white material near drum.
995'N 5'E of 28.00	96	109,660 cpm	400,000 cpm on approximately ten 2" x 1" metal rods, hole still elevated SAMPLE R-48 (rods), R-49* (soil). (went back with bobcat "dig"). (2)
BD-1 995'N 5'E of 28.00	96	46,000 cpm	400,000 cpm, found approximately 20 metal objects, including stainless steel rods (2"x2"), steel rods with fittings (3"x2") and a small metal rod (1/4"x6"). Some of the 2"x2" rods have numbers either stamped or written on them. Not all of these rods are elevated. Found along with these rods 2 silver dollar sized imprinted pieces of metal on a

			rubber belt. The imprint read Alloy Powder and Metal Company with a C/W logo in the center. Took all rods, soil and these imprints as samples. (2)
1196'N 10-17'W of 27.50	104	15,000 cpm	18-22,000 cpm 3" down. White pellets in ground (3").
1195'N 15'W of 27.50	**104**	**21,690 cpm**	**28,860 cpm at 0.5', white material.**
900'-950'N of line 27.50	15	12-26,000 cpm	White pellets in ground (3").
955'N on 27.50	**15**	**25,630 cpm**	**50,000 cpm at 0.5', rocks and sewer drains with white cement material.**
740'N on 27.50	**15**	**23,770 cpm**	**30,000 cpm on red soil and rocks. (2)**
135'N 25'W of 27.50	30	255,000 cpm*	This measurement was at surface. Object found with reading of 1,000,000 cpm. 1/2" x 1/2" glass on one side, metal on the other. Readings at waist level were 8,000 cpm. Area is grass covered and not elevated. No readings in hole.
Area to 1175' N to line 27.00	78	15-20,000 cpm	Area 20' x 50'. Same found on line 27.50 to 1150' N.
1190'N 5'E of 27.00	**78**	**13,310 cpm**	**Highest reading at bottom of hole on white material.**
1190'N 6'E of 27.00	**78**	**31,920 cpm**	**51,000 cpm (alpha=7), white "fertilizer" material.**
1132'N 5'E of 27.00	105	22,000 cpm	In gopher hole.
1165'N 10'W of 27.00	**105**	**23,750 cpm**	**27,190 cpm at 0.5', white material.**
620'N 25-40'W of 27.00	15	30,000 cpm	Many buried drums in area.
620'N 25-40'W of 27.00	**15**	**30,000 cpm**	**Could not locate spot - may need to excavate (see note #1).**
685'N 15'W of 27.00	14	60,000 cpm	Open drum or metal sheet with white material. Much grass cover in area.
685'N 15'W of 27.00	**14**	**53,000 cpm**	**156,000 cpm at 0.5', material is white chunks surrounded by buried drum. At 1', readings no longer elevated. SAMPLE R-15*.**

570'N 20'W of 27.00	79	21,180 cpm	30,250 cpm on pile of white sands. (2)
500'N 10'W of 27.00	103	21,260 cpm	31,220 cpm on coated rock. (2)
135'N 20'E of 27.00	30	144,180 cpm	1.21 million cpm on disc, 1/2" x 1/2" SAMPLE R-20.
1190'N 15'E of 26.50	78	13,000 cpm	Near drums.
988'N 5'W of 26.50	15	13,600 cpm	12,000 cpm measured at the surface.
988'N 5'W of 26.50	15	13,170 cpm	Black material with white ash and white "fertilizer" material, highest reading at bottom of hole.
825'N 20'W of 26.50	15	13,500 cpm	Light brown soil and gravel. (2)
615'N 2'W to 15'W of 26.00	15	14,000 cpm	Shielded by grass 10' x 50'. Area generally 10,000 to 12,000 cpm.
580'N on 26.50	80	36,730 cpm	Sands and soil, highest reading at 0.25'. (2)
458'N 4'E of 26.50	13	40,920 cpm	White "fertilizer" material with (alpha=9) white sand, coated rocks at 27,000 cpm SAMPLE R-14. (2)
518'N 6'E of 26.00	13	37,000 cpm	White material mixed with soil, refusal at 1 foot depth. (2)
388'N 4'E of 26.50	12	99,790 cpm	Debris in hole, no source found (alpha=4) (alpha=5) (went back with test pit 44). (2)
TP-44 388'N 4' from 26.50	12	100,000 cpm	1,600,000 cpm, plastic "stopper" or bolt shaped object, found inside a copper tube. Took sample of "stopper," (R-66)* and soil (R-67) surrounding stopper. Copper object did not give off elevated measurements. (2)
842'N 5'E of 25.50	16	36,000 cpm*	This measurement was at surface. Found metal object with a reading of 182,000 cpm. Readings of 6,000 cpm at waist level. Grass cover in area. No readings in hole.
1160' to 1175'N 3'E of 25.50	17	12,000 cpm	14,000 cpm measured at 1" below the ground surface.
852'N 20'E of 25.50	16	66,000 cpm*	This measurement was at surface. Found object with reading of 1.8

			million cpm. Disk 2" x 2"; yellow on one side, metal on the other. Reading of 36,000 cpm measured at waist level.
852'N 25'E of 25.50	**16**	**66,000 cpm**	**1.8 million cpm on disc. Sent to NYDEC for analysis 4/26/89 SAMPLE R-03.**
630'N 20'W of 25.50	15	14,000 cpm	Area generally elevated.
630'N 5'E of 25.00	15	12,000 cpm	In hole.
620'N of 25.00	**15**	**9,420 cpm**	**16,920 cpm at 3.0', brown and black soil.**
1115'N 3'E of 25.50	17	40,000 cpm	White material found below leaf cover. Encountered refusal when placing stakes. Did not excavate further.
1116'N 3'E of 25.50	**17**	**42,350 cpm**	**49,310 cpm on coated rock.**
1040'N 1'E of 25.00	17	18,000 cpm	Whole area measured 12-20,000 cpm between 1000' and 1050'N on 25.00.
660'N 12'W of 25.00	15	16,000 cpm	A reading of 30,000 cpm was measured 3" below the ground surface.
660'N 12'W of 25.00	**15**	**16,000 cpm**	**30,000 cpm 3" down - could not locate spot, same as above (see note #1).**
1090'N 4'E of 24.50	**18**	**41,290 cpm**	**56,360 cpm on sandstone rock SAMPLE R-16. (2)**
1100'N 25'E of 24.00	17	14,500 cpm	Area generally greater than 10,000 cpm.
1040'N 15'E of 24.00	17	12,000 cpm	Area from 1100'-1050' N of 24.00 was elevated.
1080'N 10'W of 24.00	17	12,000 cpm	Area generally elevated.
1085'N 5'W of 24.00	**17**	**20,280 cpm**	**46,340 cpm on coated rock.**
1225'N of 23.50	19	97,000 cpm	Drum tested by NYSDEC-- Radium 226 at 25 pCi/gr; Radium 228 at 8 pCi/gr.
1215'N of 23.50	**19**	**127,250 cpm**	**White material assumed to be contained in drum, at 2.0' break thru drum, readings no longer elevated SAMPLE R-60.**

815'N 25'W of 23.50	115	14,000 cpm	Area around location was elevated to 795'N. 15-20,000 cpm. Elevated readings were measured along the center of line to 715'N.
885'N 2'E of 23.00	**115**	**13,240 cpm**	**14,370 cpm on pile of light brown soil. (2)**
690'N 25'W of 23.00	**115**	**15,040 cpm**	**21,890 cpm at 1.0', white sand or ash. (2)**
600'N 20'E of 23.50	**81**	**26,730 cpm**	**58,700 cpm at 1', off white sands. (2)**
1252'N 8'E of 23.00	20	30,000 cpm	Leaf cover, some grass, soil under leaves. Some white specs of material found. Area 2' x 2'.
1280'N 5'E of 23.00	**20**	**17,300 cpm**	**21,440 cpm on rock, white material mixed with soil.**
846'N 20'E of 23.00	116	630,000 cpm	36,000 cpm at waist level. Grass cover with soil underneath. Refusal w/stake.
849'N 20'E of 23.00	**116**	**180,000 cpm**	**1.8 million cpm on 2 inch disc, soil still elevated SAMPLE R-52 (disc), R-53 (soil).**
670'N 25'E of 23.00	82	260,000 cpm	In hole approximately 6" down, grass cover 38,000 cpm around spot. Debris, trash, glass and metal in hole.
675'N 20'E of 23.00	**82**	**274,870 cpm**	**2.32 million cpm (alpha=1) on disc in hole alpha=2, SAMPLE R-42 (disc), R-43 (soil).**
1205'N 10'E of 22.50	106	26,000 cpm	No soil cover at spot, some moss and leaves in area. Whole area 10' x 15' is over 12,000 cpm.
1040'N 10'E of 22.50	**106**	**15,220 cpm**	**17,930 cpm at 0.5', off white sands. (2)**
300'N 1'E of 22.50	31	12,000 cpm	Area around location is elevated.
825'N 10'E of 22.50	115	16,000 cpm	In hole.
1250'N 20'E of 22.00	20	31,000 cpm	Leaf cover in area, white substance under soil. Refusal with stake. Surrounding area is not elevated.
1237'N 25'E of 21.50	20	14-16,000 cpm	Area 6' in diameter.

1245'N on 21.50	**20**	**33,640 cpm**	**33,640 cpm on rock, white material in hole. (2)**
1280'-1320'N 20-40'E of 21.50 to 1400'N approx. 25'E of 21.50	20	14-18,000 cpm 12-20,000 cpm	In isolated spots over area. Found in center of area.
1350'N on line 21.50	20	31,480 cpm	White material in drum. Sampled by NYSDEC-- Radium 228 at 410 pCi/gr.
110'N on 22.00	**119**	**7,840 cpm**	**Highest reading at bottom of hole, dark brown silty sand. (2)**
105'N 6'W of 21.00	**119**	**7,520 cpm**	**12,320 cpm at 1.0' dark brown silty sand. (2)**
1210'N 10'W of 21.00	21	51,000 cpm	Drum area, 12,000 cpm surrounding it. Refusal when staking.
1215'N 15'W of 21.00	**21**	**58,470 cpm**	**58,470 cpm on drum, subsurface investigation conducted at 1.0' from drum SAMPLE R-72*.**
1348'N 15'E of 21.00	20	20,000 cpm	White/grey material.
1350'N 15'E of 21.00	**20**	**23,990 cpm**	**27,100 cpm on chimney pipe material.**
1310'N 10'W of 21.00	20	13,000 cpm	Surrounding area is elevated.
1350'-1354'N 5'W of 21.00	20	21,000 cpm	Many white pellets on line.
1335'N 6'W of 21.00	20	15,000 cpm	Area approximately 12,000 cpm.
1115'N 10'W of 21.00 Area elevated north of it.	20	41,000 cpm	Leaf cover with white material underneath. Area is 10' x 15'.
1108'N on 21.00	**20**	**18,660 cpm**	**White material on ground, debris and rocks in hole.**
215'N on 21.00	**31**	**12,350 cpm**	**Highest reading on black shale. (2)**
1358'N 15'W of 20.50	20	32,000 cpm	Leaf cover, some white material present. Area is 5' x 10'. Some metal debris on ground.
1275'N 15'E of 20.50	20	22,000 cpm	Whole area elevated; white pellets as before.
1337'N 10'E of 20.00	20	21,000 cpm	Area elevated.
1355'N 5'W of 20.00	**20**	**18,630 cpm**	**29,600 cpm at 1.0', light brown sandy soil.**

1300'N 20'E of 19.50	20	13,000 cpm	Area elevated.
1400'-1410'N 25-30'W of 19.50	20	18,000 cpm	Area elevated, white pellets.
1190'N 15'E of 19+00	**20**	**17,690 cpm**	**Highest reading at bottom of hole, compact white material. (2)**
1436'N 3'E of 19.00	107	20,000 cpm	Rocks and debris.
1440'N 20'W of 19.50	**107**	**40,600 cpm**	**40,600 cpm on coated rock at surface. (2)**
1310'N 2'E of 18.50	**108**	**84,000 cpm**	**Highest reading at surface on drum, white material in drum R-75*. (2)**
1340'N 5'E of 18.00	109	27,000 cpm	Some leaves on ground. Red-brown material on ground; could be rusted metal giving off this color.
1340'N 5'E of 18.00	**109**	**27,480 cpm**	**28,060 cpm at 0.5', red-brown soil with white ash.**
1454'N 30'W of 18.00	19	12-14,000 cpm	Area elevated.
1070'N 20'W of 18.00	22	155,000 cpm	In hole, 80,000 cpm at surface. Ground is leaf covered with some weeds, rocks and glass found in hole. Refusal with stake.
1070'N 22'W of 18.00	**22**	**115,190 cpm**	**788,710 cpm on tar-like material SAMPLE R-17.**
652'N 15'E of 18.00	**26**	**20,420 cpm**	**23,000 cpm, soil and metal debris. (2)**
595'N 20'W of 18.00	36	62,000 cpm	In hole. Weed and grass cover in area.
590'N 20'W of 18.00	**36**	**62,000 cpm**	**182,510 cpm on face of clock SAMPLE R-27.**
585'N 35-50'W of 17.50	36	12-34,000 cpm	Area elevated.
585'N 6'E of 17.00	**36**	**35,870 cpm**	**80,020 cpm at 1.5', dark brown and red soil SAMPLE R-26***
585'N 15'W of 17.00	36	22,000 cpm	In hole.
1285'N 20'E of 17.50	25	950,000 cpm	Small elevated area under grass. Leaf cover with soil underneath. Reading of 22,000 cpm measured at waist level.

1285'N 20'E of 17.50	25	438,340 cpm	1.56 million cpm on object that looks like conductor spool SAMPLE R-19*.
1225'N 10'E of 17.50	24	212,000 cpm	Grass cover - 230,000 cpm under grass. No further elevated measurements found.
1220'N 8'E of 17.50	24	71,580 cpm	309,960 cpm on disc 1" in diameter SAMPLE R-18.
1065'N 15'W of 17.50	23	16,700 cpm	23,990 cpm at bottom of the hole, refusal on plastic and rubber material, white material in hole. (2)
1371'N 15'W of 17.50	110	237,000 cpm	Leaf cover, metal objects in area.
1375'N 25'W of 17.50	110	306,710 cpm	570,000 cpm on 1"x1"x0.33" metal square objects SAMPLE R-56, R-57 (soil).
1475'N on line 16.50	111	154,000 cpm	Steel rod.
1385'N 3'W of 16.50	19	31,390 cpm	Highest reading at surface, soil. (2)
1340'N on 16.50	19	153,790 cpm	108,000 cpm, black soil in bag. SAMPLE R-40*. (2)
1340'N 6'W of 16.50	18	413,770 cpm	1,074,680 cpm, black resin in bag SAMPLE R-41*. (2)
1340'N 10'E of 16.00	112	200,000 cpm	Machinery metal in area; leaf cover with soil underneath.
1338'N 10'E of 16.50	112	229,880 cpm	239,600 cpm on 3' x 0.5" diameter metal rod SAMPLE R-58 (rod), R-59 (soil).
1280'N of 16.50	113	28,830 cpm	Highest reading at surface on white clay material.
220'N 10'E of 16.50	32	23,550 cpm	46,320 cpm at 1.0', sand, bricks and dark brown soil SAMPLE R-21. (2)
1170'N 25-35'E of 16.00 1220'N 25-35'E of 16.00	114	60,000 cpm	White/brown material, could be rust stains.
1120'N 30'E of 16.00	114	133,390 cpm	300,000 cpm on metal object SAMPLE R-54 (metal), R-55 (soil). (2)

1285'N on line 16.00	113	26,000 cpm	White material pellets with ceramic piping material in area.
420'N 15'W of 15.50	35	20,000 cpm	Reading at surface. 60,000 cpm reading measured under the grass.
420'N 15'W of 15.50	**35**	**53,950 cpm**	**715,170 cpm on disc SAMPLE R-25.**
355'N 17'E of 15.00	34	59,000 cpm	Weed and grass cover with soil underneath.
355'N 15'E of 15.00	**34**	**72,180 cpm**	**1.14 million cpm on disc, soil in hole 160,000 cpm. SAMPLE R-23 (disc) and R-24 (soil)*.**
250'N 5'W of 15.00	63	13,600 cpm	In hole.
385'N 10'W of 15.00	33	113,000 cpm	Grass and weed cover, small spot, soil underneath.
385'N 8'W of 15.00	**33**	**157,000 cpm**	**Light and dark brown soil cause of elevated readings SAMPLE R-22.**
235'N on 14.50	**63**	**19,990 cpm**	**36,590 cpm on rocks in hole. (2)**
200'N on 13.50	**63**	**13,860 cpm**	**Highest reading at bottom of hole, dark soil. (2)**

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* Revisited these locations to take measurement with alpha and beta probe.

Note #1 - Areas which were initially found to be over 25,000 cpm but could not be found in subsequent staking. These areas may have been saturated by rainwater causing the gamma radiation to be attenuated.

(2) Second readings taken in the same area, if not the exact location of initial readings.

[1]For gamma radiation measurements, 1,000 cpm = 1 uR/hr.
For alpha radiation measurements, 1 cpm = 10 dpm.
*Samples with asterisk were sent to NYSDEC for analysis.
All other samples will remain at the frum storage compound.

(PR/6)

REVISED TABLE 1 (Cont.)

ELEVATED GAMMA RADIATION LOCATIONS IN AREAS B AND C
EXHIBITING SPECIAL CHARACTERISTICS

(AREA C)

Location	Area No.	Result	Description of Area
790'S 10'W of 40.00	59	13,300 cpm[1]	19,040 cpm on rock, white sand in hole. (2)
600' to 622'S 12'W of 39.50	60	20-22,000 cpm	Westinghouse signs found at 650' and 600' markers.
545'S 3'E of 40.00	60	20,080 cpm	170,150 cpm (alpha=6) at 1.5', glass with grey and white material. clay - like SAMPLE R-36.
815'S on 38.50	56	32,810 cpm	57,000 cpm at 0.75', white chunks of material with orange and red sands. (2)
755'S 10'W of 38.50	57	65,000 cpm	Area elevated surrounding hot spot approximately 15' x 15'. Readings of 12-50,000 cpm measured. Large rocks with grass cover and soil underneath.
760'S 6'W of 38.50	57	67,680 cpm	67,460 cpm at 0.5', white chunks of material with orange and red sands SAMPLE R-35.
1000'S 15'W of 38.00	53	30,350 cpm	307,720 cpm at bottom of hole. Green metalic material (alpha=120), white "fertilizer" material (alpha=90), much debris in hole SAMPLE R-34. (2)
892'S of 38.00	54	28,000 cpm	Soil cover. A piece of coal ash noted.
892'S on 38.00	54	51,690 cpm	70,150 cpm (alpha=1) at 0.5 rust color material with white "fertilizer" material.
680'S on 38.00	58	22,410 cpm	27,000 cpm on coated rock. (2)

787'S 1'W of 38.00	55	33,000 cpm	Soil with leaf cover. Reading measured at 3" below the ground surface. Soil is sandy (fine-med) with ligher (white) sand grains mixed with brown.
785'S on 38.00	**55**	**30,300 cpm**	**Dark brown soil with light color sands.**
825'S 15'E of 37.50	**55**	**10,840 cpm**	**Ash, highest readings at bottom of hole. (2)**
770'S 3'E of 37.50	55	41,000 cpm	Soil with leaf cover, but more rocks. Soil is sandy (fine-med) with lighter (white) sand grains mixed with brown. Some black shiny soil.
770'S 3'E of 37.50	**55**	**62,820 cpm**	**74,070 cpm at 0.5', white chunks of material with orange and red sands SAMPLE R-35.**
1100'S 25'E of 36.50	52	98,000 cpm	Large quantities of glass, small rocks, and debris; no leaf cover.
1105'S 20'E of 36.50	**52**	**101,710 cpm**	**1.48 million cpm on disc SAMPLE R-33.**
735'S on 36.50	**74**	**31,400 cpm**	**41,080 cpm on coated rock. (2)**
315'S 25'E of 36.50	**61**	**20,800 cpm**	**41,150 cpm at 1.0', red and white sand with black soil. (2)**
880'S on 36.00	**75**	**34,770 cpm**	**Highest reading on concrete. (2)**
675'S 25'W of 36.00	73	40,000 cpm	Rock, cement and stone sidewalk material.
680'S 30'E of 35.50	**73**	**40,870 cpm**	**Piece of concrete, 6 inch cube.**
570'S of 35.50 to 36.00	72	18,000 cpm	Whole area is elevated; fill material.
590'S of 35.50	**72**	**24,800 cpm**	**Rocks, concrete and gravel.**
595'S 5'W of 35.00	**72**	**108,300 cpm**	**Concrete material in ground. (2)**
690'S 5-15'E of 34.50	72	20-44,000 cpm	44,000 cpm at rear of truck parking lot. Five feet of fill in area; much construction debris, roads and sidewalks.
700'S 15'E of 34.50	**72**	**45,610 cpm**	**70,760 cpm, concrete chunks and fill material.**

625'S 5'W of 34.50	72	24,000 cpm	Truck parking lot.
615'S 6'W of 34.50	72	24,000 cpm	Piece of concrete.
620'S 20'E of 33.50	72	53,550 cpm	2' x 1' x 1' piece of concrete. (2)
100'S on 34.00	70	-	Area freshly cemented no elevated measurements found. (2)
300'S on 33.50	71	-	No elevated measurements found. (2)
190'S 2'E of 32.50	11	14,000 cpm	Area elevated with readings greater than 10,000 cpm.
197'S 6'E of 32.50 to 220'S	11	17,000 cpm	Debris found on the ground. Area has elevated readings.
200'S 10'E of 32.50	11	18,950 cpm	Refusal at metal obstruction.
189'S 3'W of 32.00	4	145,000 cpm	Moist dark brown organic rich (alpha>100cpm) soil with wood and plastic debris. Went back 11/6/89; source is granite and white material SAMPLE R61-63. (2)
115'S on 32.00	5	137,790 cpm	1,093,860 cpm on rock, 2" x 3" x (alpha=5) 2" possibly granite SAMPLE R-07. (2)
375'S 20'E of 32.50	7	12,000 cpm	Area has elevated readings.
430'S on 33.00	7	14,000 cpm	In gopher hole.
425'S 5'E of 32.50	7	21,000 cpm	White "fertilizer" material with light grey sand. (2)
TP-7 189'S 3'W of 32.00	4	236,000 cpm	1,200,000 cpm, approximately 20-25 pieces of granite. 154,000 cpm at surface (post-backfill) due to numerous pieces of granite excavated and not taken as samples. Took SAMPLES of granite (R-61)*, soil (R-62), and white material (R-63) that was cemented to some pieces of granite. White material only 7,000 cpm. (2)
920'S 5'E of 32.00	9	32,000 cpm	Much metal and debris in area, Reading of 25,000 cpm measured 3" below the ground surface. Soil is very dark and organically rich. Some weed and leaf cover.

917'S on 32.00	**9**	**23,690 cpm**	**Buried drum.**
BD-3 917'S on 32.00	**9**	**20,000 cpm**	**900,000 cpm, black box containing "gyroscope" manufactured by Sperry Corporation for the U.S. Navy, also found plastic sheeting which was in one 40-50,000 cpm section. Took "Gyroscope", (R-70) plastic and soil (R-71) as SAMPLES.**
615'S 20'E of 32.00	8	12,000 cpm	Area has readings up to 20,000 cpm.
613'S 1'W of 32.00	**8**	**22,780 cpm**	**25,000 cpm on coated rocks.**
340'S 10-12'E of 32.00	6	14,000 cpm	Area has readings of 10,000 cpm.
300'-325'S 10'E of 32.00 to 32.50	6	12-70,000 cpm	Reading of 70,000 cpm measured at 315'S, 15'W of line 32.50. White fertilizer-type material. Much weed cover. Refusal encountered when staking.
315'S 15'W of 32.50	**6**	**61,470 cpm**	**White "fertilizer" material SAMPLE R-08.**
235'S 25'E of 32.00	11	20,000 cpm	Area has elevated readings.
235'S 20'W of 32.00	**11**	**23,090 cpm**	**34,950 cpm (alpha=1cpm) at (alpha=1) 1.0', soil light in weight dark brown in color SAMPLE R-13.**
200'S 2'W of 32.50	11	20,000 cpm	Area has elevated readings.
596'S 20'W of 32.00	8	44,000 cpm	Many readings of 15,000 cpm in the area. Few locations were found to be greater than 25,000 cpm. Weed cover - open area. Other elevated areas within 10' of spot.
593'S 15'W of 31.50	8	50,000 cpm	Weed cover, soil underneath is light brown; some small rocks in area.
593'S 15'W of 31.50	**8**	**42,380 cpm**	**34,000 cpm on coated rock, left more rocks in hole SAMPLE R-10.**
645'S 28'E of 31.00	8	15,000 cpm	Grassy area.
641'S 6'W of 31.50	8	12,000 cpm	Similar values in surrounding areas within 10'.
635'S 20'W of 31.50	8	22,000 cpm	Grassy area.

560'S 20'W of 31.50	8	22,590 cpm	31,980 cpm on coated rock, left more rocks in hole SAMPLE R-09.
1165'S 5'W of 32.50	10	22,270 cpm	31,460 cpm on white and grey rock SAMPLE R-12. (2)
1135'S on 31.50	10	21,370 cpm	Light brown sandy soil, glass (alpha=64) material with pink coating SAMPLE R-11. (2)
350'S 10'E of 30.50	7	14,000 cpm	Mossy ground.
1220'S 10'W of 30.00	49	20,000 cpm	Granite building material.
1220'S of 30.00	49	19,700 cpm	Pile of granite building material.
1055'S 10'E of 29.50	51	64,000 cpm	Leaf cover; soil underneath is rocky and light brown.
1055'S 10'E of 29.50	51	83,610 cpm	93,790 cpm, red sand R-74.
1120'S 10'E of 29.00	50	27,000 cpm	Weed and leaf cover, dark black material underneath. Measurement of 12,000 cpm recorded in a 6'radius west and south of the elevated reading.
1120'S 10'E of 29.00	50	34,520 cpm	34,160 cpm at 0.5', red sand.
338'S 3'E of 29.00	76	16,000 cpm	Gopher hole.
338'S 3'E of 29.00	76	14,220 cpm	18,100 cpm at 2.5', coal ash.
846'S 20'E of 29.00	46	25,000 cpm	Weed cover and black organic soil underneath.
846'S 20'E of 29.00	46	25,230 cpm	Red sands mixed with soil.
840'S 1'E of 29.00	46	16,000 cpm	Reading at surface; 22,000 cpm found 4" below the ground surface.
915'S 20'W of 29.00	46	27,820 cpm	28,760 cpm on coated rock. (2)
615'S 15'E of 28.50	45	155,000 cpm	Reading recorded in hole, approx. 4" below the ground surface. Much small metal debris in hole, weed cover. Surface reading of 24,000 cpm. Reading of 40,000 cpm recorded 2" below the ground surface.
615'S 15'E of 28.50	45	164,900 cpm	2.18 million cpm on disc SAMPLE R-32.

842'S 5'W of 28.50	48	31,000 cpm	Rock is likely cause of elevated readings. Black organic soil, some weed and leaf cover. Refusal with stake.
1096'S 10'E of 28.00	48	36,000 cpm	Weed cover, some open areas, light brown soil.
1096'S 5'E of 28.00	**48**	**45,160 cpm**	**46-50,000 cpm on rocks, white sands also in hole.**
1142'S 5'W of 28.50	**48**	**39,330 cpm**	**50,930 cpm on rock with coating. (1)**
975'S 2'E of 28.00	47	42,000 cpm	Rock. Reading on one side was 42,000 cpm; other side-30,000 cpm. Black tarry material.
915'S 8'E of 28.00	47	27,000 cpm	Rocks in area, elevated in slight depression. Refusal with stake.
915'S 5'E of 28.00	**47**	**29,770 cpm**	**66,890 cpm on white and red soil.**
1010'S to 1015'S 15'W of 28.00	47	26,000 cpm	Area has elevated readings. Rocky area. Refusal with stake.
950'S 17'W of 28.00	47	28,000 cpm	Many rocks in area.
135'S on line 27.50	118	16,000 cpm	Grinding stone.
980'S 20'E of 27.50	47	28,700 cpm	Many rocks in area on slight hill, weed and grass cover. Rocks at surface in area with elevated readings ranging from 12,000 cpm to 13,000 cpm.
980'S 20'E of 27.50	**47**	**32,070 cpm**	**66,630 cpm at 1.0' red sand and black soil.**
950'S 20'E of 27.50	47	13,000 cpm	Same as above; readings elevated 10' further south.
680'S 10'W of 27.50	44	15,000 cpm	4' x 4' area of rocks.
685'S 15'W of 27.50	**44**	**23,976 cpm**	**Soil mixed with white and rust color material.**
200'S 10'W of 27.50	**118**	**20,720 cpm**	**120,000 cpm in side of hole, white material. (2)**
165'S 20'E of 26.50	118	13,000 cpm	In hole.
1050'S to 1100'S between 27.00 and 26.50	120	10-12,000 cpm	Wet area.

1050'S on 26.00	**120**	**10,770 cpm**	**24,370 cpm at 1.5', coal ash.**
250'S 17'E of 26.00	117	17,000 cpm	In hole, area generally 10,000 cpm to 11,000 cpm; higher readings found in the holes.
250'S 15' E of 26.00	**117**	**22,800 cpm**	**Highest reading at bottom of hole, coal ash.**
240'S 5'W of 26.00	117	16,000 cpm	Gopher hole. Entire area has elevated readings of 12,000 cpm.
800'S 25'W of 26.00	43	14,000 cpm	In hole.
755'S 3'W of 26.00	**43**	**27,120 cpm**	**Pocket of red sand SAMPLE R-31* (alpha=4).**
70'S 5'W of 25.50	3	280,000 cpm	Reading taken at 3" below the ground surface. Swampy area, many reeds. Reading at surface was 150,000 cpm.
70'S 5'W of 25.50	**3**	**177,810 cpm**	**219,340 cpm (alpha=103 cpm) at 0.5', white material mixed with soil, hit water at 1.5' (oil sheen) SAMPLE R-06*.**
335'S 25'E of 25.50	117	16,000 cpm	In gopher hole.
840'S 10'E of 25.50	43	16,500 cpm	Reading at ground surface ranged from 10,000 cpm to less than 12,000 cpm. From lines 1150' to road, readings were approximately 10,000 cpm. All holes to 950'S were elevated to 16,000 - 14,000 cpm.
85'S 20'W of 25.00	**31**	**12,910 cpm**	**Water at 1.0', ash in hole. Highest readings at bottom of hole. (2)**
240'S 20'W of 25.00	2	264,000 cpm	Reeds on ground, open area.
240'S 22'W of 25.00	**2**	**254,830 cpm**	**2 million cpm on disc (3/4" dia.), white material mixed with soil (alpha=14 cpm) SAMPLE R-05.**
225'S 15'W of 25.00	2	12,000 cpm	Area has elevated readings.
270'S 5'E of 24.50	2	12,000 cpm	Area has elevated readings; some coal ash in holes.
1125'S 10'E of 25.00 to 20'E of 25.00	37	12-13,000 cpm	Readings in area were generally greater than 11,000 cpm. 16,000

			cpm in holes.
Hotspots from 1000' to 1040'S across line 25.00 to 25.50.	37	12-17,000 cpm	Readings at surface. Reading in excess of 16,000 cpm measured in holes. Readings at surface were less than 12,000 cpm.
1060'S 15'W of 25.50	**37**	**15,380 cpm**	**Dark brown soil with white ash, (alpha=1) highest readings at bottom of hole.**
725'S to 1120'S between 24.50 - 25.00	37	12-15,000 cpm	Coal ash in gopher holes. 20,000 cpm recorded in some holes.
750'S 1'W of 25.00	**37**	**12,300 cpm**	**26,540 cpm at 1.5', brown and black soil with ash, pieces of coal.**
475'S on line 24.00	42	320,000 cpm	Reading at surface. At 6" below surface - 1,105,350 cpm. NYSDEC surface soil sample results: Radium 226 at 2.2 pCi/gr and Radium 228 at 94 pCi/gr.
198'S 2'W of 24.00	1	73,600 cpm	Open area, coal ash, grass and reeds on ground.
198'S 2'W of 24.00	**1**	**85,760 cpm**	**223,880 cpm (alpha=2 cpm) on piece of rusted metal SAMPLE R-04.**
510'S on 24.00	**42**	**868,790 cpm**	**2.58 million cpm on disc, 2" x 2" SAMPLE R-30. (2)**
400'S to 420'S between lines 24.00 and 24.50	38	12,000 cpm	Much ash in holes.
350'S to 100'S of 24.50	38	12,000 cpm	Area has elevated readings. 100'S of line 24.50 to Aero Dr. the area is wet; readings of 10,000 cpm. Area appears to be shielded.
298'S on 24.50	**38**	**14,970 cpm**	**25,580 cpm (alpha=3) at 1.5', ash.**
710'S 20'E of 23.50	37	12,000 cpm	Some spots measured at 15,000 cpm.
725'S to 1100'S of 23.50 - 24.00	37	12,000 cpm	Holes with readings of 16,000 cpm.
996'S 5'W of 24.00	**37**	**14,340 cpm**	**White ash material, highest readings at bottom of hole, refusal at 1.5'-2.0' (rock).**
800'S 35'W of 24.00	**37**	**13,940 cpm**	**31,660 CPM (alpha=3cpm) at 2.0',**

			(alpha=1) coal ash and white material. (2)
1025'S to 710'S 23.50 - 23.00	37	12,000 cpm	Some spots at 15,000 cpm.
860'S 20'W of 23.00	**37**	**15,600 cpm**	**28,110 cpm at 1.5', white ash.**
525'S 10-25'E of 23.00	38	12,000 cpm	Area has elevated readings.
415'S 3'W of 23.50	38	12,000 cpm	Readings generally less than 12,000 cpm.
125'S to 120'S of 23.50	38	12-13,000 cpm	At 250'S 10'E of 22.50 readings were less than 12,000 cpm.
150'S to 250'S 23.00 - 22.50	38	12,000 cpm	From 260'S 25'E readings were less than 12,000 cpm.
300'S 10'W of 23.00	38	>12,000 cpm	Area of elevated readings.
600'S 15'W of 23.00	**38**	**13,600 cpm**	**23,000 cpm (alpha=3) at 1.0; ash. (2)**
540'S to 30'E of 22.50	38	13,000 cpm	West side of line 23.00 readings were approx. 11,000 cpm.
675'S 20'E of 22.50	37	13,000 cpm	All readings generally ranged between 10,000 to 11,000 cpm.
660'S 15'W of 22.00	**37**	**19,830 cpm**	**39,300 cpm at 1.5', white ash (alpha-5) SAMPLE R-28. (2)**
870'S to 690'S of 22.50 - 22.00	37	12,000 cpm	Reading of 24,000 cpm was measured in a hole; much ash present.
200'S 5'W of 22.50	38	14,000 cpm	10' x 10' area.
640'S 10'E of 21.00	38	13,000 cpm	In large pit (6' x 10' x 3').
250'S 20'E of 22.00	**38**	**13,650 cpm**	**23,900 cpm at 1.5', white ash. (2)**
560'S 10'W of 21.00	**38**	**14,450 cpm**	**25,520 cpm at 2.0', coal ash (alpha=2). (2)**
608'S 4'W of 19.00	**41**	**11,990 cpm**	**23,630 cpm at 1.5', coal ash. (2)**
475'S on 18.50	**41**	**13,860 cpm**	**27,650 cpm (alpha=3) at 2.0', (alpha=0) coal ash. (2)**
260'S 25'E of 18.50	**40**	**18,440 cpm**	**Coal ash, highest reading at (alpha=2) bottom of hole, refusal at 1.0'. (2)**

370'S 25'W of 16.50	39	70,000 cpm	Grey mounds 3-4' high with elevated readings exceeding 12,000 cpm.
375'S 25'W of 16.50	**39**	**96,000 cpm**	**Off-white clay (157,000 cpm, alpha= 47), highest reading at bottom of hole at refusal SAMPLE R-29*.**

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* Revisited these locations to take measurements with the alpha and beta probes.

Note #1 - Areas which were initially found to be over 25,000 cpm, but could not be found in subsequent staking. These areas may have been saturated by rainwater causing the gamma radiation to be attenuated.

(2) Second readings taken in the same area, if not the exact location of initial readings.

[1]For gamma radiation measurements, 1,000 cpm = 1 uR/hr.
For alpha radiation measurements, 1 cpm = 10 dpm.
*Samples with asterisk were sent to NYSDEC for analysis.
All other samples will remain at the drum storage compound.

(PR/7)

Attachment 3

Table 2 - Sample Inventory

Samples Collected at the Pfohl Brothers Landfill
During Phase I and Phase II Radiation Investigation

TABLE 2

SAMPLE INVENTORY
SAMPLES COLLECTED
AT THE
PFOHL BROTHERS LANDFILL
DURING THE
PHASE I AND PHASE II RADIATION INVESTIGATION

CAMP DRESSER & McKEE SAMPLES

LOCATION	GAMMA (cpm)	DESCRIPTION	DATE	NUMBER	CURRENT STATUS
652'N, 2'W 31+50	80,000	Piece of metal bar	04/26/89	01	DEC for analysis 06/02/89
842'N, 5'E 25+50	182,000	Metal piece of equipment	04/26/89	02	DEC for analysis 06/02/89
852'N, 20'E 25+50	1,800,000	Disc	04/26/89	03	DEC for analysis 06/02/89
198'S, 2'W 24+00	223,000	2" piece of metal	09/11/89	04	at Trailer
240'S, 22'W 25+00	2,000,000	1" diameter disc	09/11/89	05	at Trailer
70'S, 5'W 25+50	219,340	Sand with white and rust color material	09/11/89	06	DEC/DOH for analysis 12/05/89
115'S, on 32+00	812,750	Granite	09/12/89	07	at Trailer
315'S, 15'W 32+50	42,830	White fertilizer like material	09/12/89	08	at Trailer
560'S, 20'W 31+50	31,980	Rock, black coating on one side	09/12/89	09	at Trailer
593'S, 15'W 31+50	33,190	Sandstone rock	09/12/89	10	at Trailer

TABLE 2 (continued)
SAMPLE INVENTORY
SAMPLES COLLECTED
AT THE
PFOHL BROTHERS LANDFILL

1135'S, on 31+50	49,320	Light brown sand with pieces of glass	09/12/89	11	at Trailer
1165'S, 5'W 32+50	31,460	White rock	09/12/89	12	at Trailer
235'S, 20'W 32+00	34,950	Black soil, pot ash like material	09/12/89	13	at Trailer
458'N, 4'E 26+50	40,000	Light brown sand with white material	09/13/89	14	at Trailer
685'N, 15'W 27+00	70,000	White chunks of material from drum	09/13/89	15	DEC for analysis 12/05/89
1090'N, 4'E 24+50	23,930	Sandstone rock	09/13/89	16	at Trailer
1070'N, 22'W 18+00	788,710	Black tar-like material	09/13/89	17	at Trailer
1220'N, 0'E 17+50	309,960	1" diameter disc	09/13/89	18	at Trailer
1285'N, 20'E 17+50	1,500,000	Conductor spool 1" x 1/2"	09/13/89	19	DEC for analysis 12/05/89
135'N, 20'E 27+00	1,200,000	1/2" diameter disc	09/14/89	20	at Trailer
220'N, 10'E 16+50	50,000	Dark brown soil, with light brown soil	09/14/89	21	at Trailer
385'N, 10'W 15+00	50,000	Dark brown soil	09/14/89	22	DEC for analysis 12/05/89
355'N, 15'E 15+00	1,400,000	1/2" diameter disc	09/14/89	23	at Trailer
355'S, 15'E 15+00	160,000	Light brown soil	09/14/89	24	DEC for analysis 12/05/89

TABLE 2 (continued)
SAMPLE INVENTORY
SAMPLES COLLECTED
AT THE
PFOHL BROTHERS LANDFILL

420'N, 15'W 15+50	715,170	1/2" diameter disc	09/14/89	25	at Trailer
585'N, 6'E 17+00	60,000	Reddish brown soil	09/14/89	26	DEC for analysis 12/05/89
590'N, 20'W 18+00	182,510	Alarm clock	09/14/89	27	at Trailer
660'S, 15'W 22+00	39,300	White ash	10/02/89	28	at Trailer
375'S, 25'W 16+50	157,000	Off-white clay material	10/03/89	29	DEC for analysis 12/05/89
510'S, on 24+00	2,580,000	2" x 2" disc	10/03/89	30	DEC for analysis 10/17/89
755'S, 3'W 26+00	42,310	Red sands	10/03/89	31	DEC/DOH for analysis 12/05/89
615'S, 15'E 28+50	2,180,000	Disc	10/03/89	32	DEC for analysis 10/17/89
1105'S, 20'E 36+50	1,480,000	Disc	10/04/89	33	DEC for analysis 10/17/89
1000'S, 15'W 38+00	307,720	White & pink material, green metallic chunks	10/04/89	34	at Trailer
760'S 6'W 38+50	67,680	Sandy loam-white sands	10/04/89	35	DEC for analysis 12/05/89
545'S, 3'E 40+00	170,150	Glass with white clay "fertilizer" like material	10/05/89	36	at Trailer
200'N, 10'W 36+00	1,200,000	1" x 1" disc	10/05/89	37	at Trailer
639'N, 3'E 36+00	94,410	White material	10/05/89	38	at Trailer

TABLE 2 (continued)
SAMPLE INVENTORY
SAMPLES COLLECTED
AT THE
PFOHL BROTHERS LANDFILL

703'N, 2'W 38+00	654,550	Green bag of powder chunks	10/05/89	39	at Trailer/DEC for analysis 10/17/89
1340'N, on 16+50	217,990	Black soil in bag	10/06/89	40	DEC for analysis 12/05/89
1340'N, 6'W 16+50	1,074,680	Black chunks of resin material in bag	10/06/89	41	DEC/DOH for analysis 12/05/89
675'N, 20'E 23+00	2,320,000	Disc	10/16/89	42	DEC for analysis 10/17/89
675'N, 20'E 23+00	-	Soil from disc	10/16/89	43	DEC for analysis 10/17/89
652'N, 2'W 31+50	67,210	Rock - crystals on top	10/17/89	44	at Trailer
1070'N, 35'E 32+00	714,500	Metal rod 8" x 6"	10/17/89	45	at Trailer
1070'N, 35'E 32+00	-	Soil from metal rod	10/17/89	46	at Trailer
590'N, 15'W 29+50	177,190	White material	10/18/89	47	DEC for analysis 12/05/89
995'N, 5'E 28+00	400,000	2" rods	10/18/89	48	at Trailer
995'N, 5'E 28+00	--	Soil from rods	10/18/89	49	DEC for analysis 12/05/89
860'N, 1'W 30+50	287,900	Rock core?	10/18/89	50	at Trailer
860'N, 1'W 30+50	--	Soil from rock core.	10/18/89	51	at Trailer

TABLE 2 (continued)
SAMPLE INVENTORY
SAMPLES COLLECTED
AT THE
PFOHL BROTHERS LANDFILL

849'N, 20'E 23+00	1,800,000	Disc	10/19/89	52	at Trailer
849'N, 20'E 23+00	--	Soil from disc	10/19/89	53	at Trailer
1120'N, 30'E 16+00	300,000	Artifact - metal?	10/19/89	54	at Trailer
1120'N, 30'E 16+00	--	Soil from artifact	10/19/89	55	at Trailer
1375'N, 25'W 17+50	570,110	Metal squares 1" x 1" x 1/3"	10/19/89	56	at Trailer
1375'N, 25'W 17+50	17,000	Soil from metal squares	10/19/89	57	at Trailer
1338'N, 10'E 16+50	239,600	3' rod	10/19/89	58	at Trailer
1338'N, 10'E 16+50	--	Soil from 3' rod	10/19/89	59	at Trailer
1215'N, on 23+50	127,250	White material	10/20/89	60	DEC for analysis 10/25/89

TABLE 2 (continued)
SAMPLE INVENTORY
SAMPLES COLLECTED
AT THE
PFOHL BROTHERS LANDFILL
DURING THE
PHASE II TEST PIT/DIG INVESTIGATION

CAMP DRESSER & McKEE SAMPLES

LOCATION	GAMMA (cpm)	DESCRIPTION	DATE	NUMBER	CURRENT STATUS
189'S, 3'W 32+50	1,200,000	Granite - more in hole	11/06/89	61	DEC for analysis 12/05/89
189'S, 3'W 32+50	-	Soil from granite	11/06/89	62	at Trailer
189'S, 3'W 32+50	-	White material from granite	11/06/89	63	at Trailer
720'N, 5'E 29+50	1,500,000	3 discs	11/07/89	64	at Trailer
720'N, 5'E 29+50	-	Soil from discs	11/07/89	65	at Trailer
388'N, 4' 26+50	1,600,000	Stopper shaped object	11/07/89	66	DEC for analysis 12/05/89
388'N, 4' 26+50	-	Soil from object	11/07/89	67	at Trailer
995'N, 5'E 28+00	400,000	2" rods	11/07/89	48*	at Trailer
405'N, 20'W 33+50	60,000	Tar material - 1" x 1"	11/08/89	68	at Trailer
405'N, 20'W 33+50	-	Tar material from hole - lower readings	11/08/89	69	at Trailer
917'S, on 32+00	900,000	Gyroscope	11/08/89	70	at Trailer

TABLE 2 (continued)
SAMPLE INVENTORY
SAMPLES COLLECTED
PHASE II TEST PIT/DIG INVESTIGATION

917'S, on 32+00	-	Soil from Gyroscope	11/08/89	71	at Trailer
1215'N, 15'W 21+00	58,470	White material	12/04/89	72	DEC/DOH for analysis 12/05/89
100'N, 10'W 28+50	80,760	White material in chunks	12/05/89	73	DEC for analysis 12/06/89
1055'S, 10'E 29+50		Red Sand	not collect	74	
1310'N, 2'W 18+50	84,000	White material in chunks	12/04/89	75	DEC for analysis 12/05/89

PHASE II RADIATION INVESTIGATION
SOURCE CHARACTERIZATION

CDM

SHEET NO. 1

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
VASOCE No. 3-001894
BROTHERS AVENUE
TOWACA, NEW YORK

FEB 23, 1989

Scale 1"= 100'

LEGEND

- MEASUREMENT LOCATION WITH NO SPECIAL CHARACTERISTICS
- DISC
- METAL ARTIFACT OR ROD
- DRUM
- WHITE VERMICULITE MATERIAL
- WHITE MATERIAL IN/AROUND DRUM
- ROCK
- BUILDING MATERIAL
- ASH
- EXPOSED SOIL OR SAND LIKE MATERIAL
- INVESTIGATION AREA (WITH AREA #)

NOTE: READINGS ARE IN COUNTS PER MINUTE (cpm), 25K=25,000 CPM

Approved by ARCHITECTURAL Date
Approved by STRUCTURAL Date
Approved by ELECTRICAL Date
Approved by INSTRUMENTATION Date
Approved by HVAC Date
Approved by PLUMBING Date
Approved by PROJECT ENGINEER Date
Approved by PROJECT MANAGER Date