

ENVIRONMENTAL AFFAIRS

January 31, 2001

Mr. Mark Roberts
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

VIACOM

Re: Report Revisions
Final Radiological Status Survey Report Building 7 and Sewer System
License No. SMB-1527, Viacom Inc.
Bloomfield Township, New Jersey

Dear Mr. Roberts:

Based upon the comments in the New Jersey Department of Environmental Protection (NJDEP) letter dated January 2, 2001, Viacom has revised the above-referenced report. The following new or revised tables and figures are enclosed:

1. Revised Cover Page with revision date;
2. Table of Contents pages iv and v (revised);
3. Revised Pages 21, 27, and 32;
4. Table L-2 – Comparison of Alpha and Gamma Spectroscopy (new);
5. Figure A-1 – Final Survey Soil Sample Locations Survey Unit A (revised);
6. Figure B-1 – Final Survey Soil Sample Locations Survey Unit B (revised);
7. Figure C-1 – Final Survey Soil Sample Locations Survey Unit C (revised);
8. Figure D-1 – Final Survey Soil Sample Locations Survey Unit D (revised);
9. Figure E-1 – Final Survey Soil Sample Locations Survey Unit E (revised);
10. Figure F-1 – Final Survey Soil Sample Locations Survey Unit F (revised);
11. Figure G-2 – Former Building 7, 1st Excavation Soil Sample Locations, Survey Unit G (revised);
12. Figure G-3 – Former Building 7, 2nd Excavation Soil Sample Locations Survey, Unit G (revised);
13. Figure G-4 – Former Building 7, Final Excavation Soil Sample Locations, Survey Unit G (revised);
14. Figure H-1 – Final Survey Soil Sample Locations Survey Unit H (revised);
15. Figure I-1 – Final Survey Soil Sample Locations Survey Unit I (revised);
16. Figure J-1 – Final Survey Soil Sample Locations Survey Unit J (revised);
17. Table A-4 – Final Soil Samples Survey Unit A (revised);
18. Table B-4 – Final Soil Samples Survey Unit B (revised);
19. Table G-5 – Final Soil Samples Survey Unit G (revised);
20. Table G-5a – Weighted Average Calculations Survey Unit G Grid 1 (revised);

01 FEB -6 11:10:30

Mr. Mark Roberts
Page 2 of 2
January 31, 2001

- 21. Table K-1a – Lab Analysis of Backfill Material Survey Unit A (revised); and
- 22. Table P-1 – Final Soil Sample Locations and Laboratory Results, Pages 28 – 40 (revised).

The corresponding tables and figures in the August 2000 report should be replaced with these documents. If you have any questions regarding this letter, please contact me.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Kenneth J. Bird". The signature is stylized with a large, sweeping initial "K" and a cursive "Bird".

Kenneth J. Bird, CIH
Project Engineer/Consultant

Enclosures

pc: Mr. Steven Myers, NJDEP (2 copies)
Mr. Richard Proctor, Township of Bloomfield, Health & Human Services
Mr. James Moran, Viacom
Mr. Andrew Lombardo, Earth Science Consultants, Inc. (without enclosure)
Cummings/Riter Consultants, Inc.

Final Radiological Status Survey Report Building 7 and Sewer System Remediation

**Former Lamp Manufacturing Plant
Bloomfield, New Jersey**

**CBS Corporation
Pittsburgh, Pennsylvania**

**Project No. 5275
August 2000
Revised January 2001**



Earth Sciences Consultants, Inc.

Providing Environmental Consulting Services Since 1979

Final Radiological Status Survey Report Building 7 and Sewer System Remediation

**Former Lamp Manufacturing Plant
Bloomfield, New Jersey**

**CBS Corporation
Pittsburgh, Pennsylvania**

**Project No. 5275
August 2000
Revised January 2001**

**Earth Sciences Consultants, Inc.
One Triangle Lane
Export, PA 15632
724/733-3000
FAX: 724/325-3352**

**Branch Offices
Akron, Ohio
Philadelphia, Pennsylvania**

Table of Contents (Continued)

Appendix D – Final Survey Data for Survey Unit D

Table D-1 – Surveys of Abandoned Pipe Ends – Fixed Contamination, Survey Unit D

Table D-2 – Surveys of Abandoned Pipe Ends – Removable Contamination, Survey Unit D

Table D-3 – Final Soil Samples, Survey Unit D

Table D-4 – Exposure Rate Readings of Backfilled Trench, Survey Unit D

Figure D-1 – Final Survey Soil Sample Locations, Survey Unit D (Dwg 5275004)

Appendix E – Final Survey Data for Survey Unit E

Table E-1 – Surveys of Abandoned Pipe Ends – Fixed Contamination, Survey Unit E

Table E-2 – Surveys of Abandoned Pipe Ends – Removable Contamination, Survey Unit E

Table E-3 – Final Soil Samples, Survey Unit E

Table E-4 – Exposure Rate Readings of Backfilled Trench, Survey Unit E

Figure E-1 – Final Survey Soil Sample Locations, Survey Unit E (Dwg 5275005)

Appendix F – Final Survey Data for Survey Unit F

Table F-1 – Final Soil Samples, Survey Unit F

Table F-2 – Exposure Rate Readings of Backfilled Trench, Survey Unit F

Figure F-1 – Final Survey Soil Sample Locations, Survey Unit F (Dwg 5275006)

Appendix G – Final Survey Data for Survey Unit G

Table G-1 – Concrete Floor Survey – Exposure Rate Readings, Survey Unit G

Table G-2 – Concrete Floor Survey – Fixed Contamination, Survey Unit G

Table G-3 – Concrete Floor Survey – Removable Contamination, Survey Unit G

Table G-4 – Surveys of Structures – Removable Contamination, Survey Unit G

Table G-5 – Final Soil Samples, Survey Unit G

Table G-5a – Weighted Average Calculations, Survey Unit G, Grid 1

Table G-6 – Exposure Rate Readings of Backfilled Trench, Survey Unit G

Figure G-1 – Former Building 7, Concrete Floor Survey Locations, Survey Unit G
(Dwg 5275201)

Figure G-2 – Former Building 7, 1st Excavation Soil Sample Locations, Survey Unit G
(Dwg 5275203)

Figure G-3 – Former Building 7, 2nd Excavation Soil Sample Locations, Survey Unit G
(Dwg 5275204)

Figure G-4 – Former Building 7, Final Survey Soil Sample Locations, Survey Unit G
(Dwg 5275205)

Appendix H – Final Survey Data for Survey Unit H

Table H-1 – Surveys of Abandoned Pipe Ends – Fixed Contamination, Survey Unit H

Table H-2 – Surveys of Abandoned Pipe Ends – Removable Contamination, Survey Unit H

Table H-3 – Surveys of Structures – Removable Contamination, Survey Unit H

Table H-4 – Final Soil Samples, Survey Unit H

Table H-5 – Exposure Rate Readings of Backfilled Trench, Survey Unit H

Figure H-1 – Final Survey Soil Sample Locations, Survey Unit H (Dwg 5275007)

Appendix I – Final Survey Data for Survey Unit I

Table I-1 – Final Soil Samples, Survey Unit I

Table I-2 – Exposure Rate Readings of Backfilled Trench, Survey Unit I

Figure I-1 – Final Survey Soil Sample Locations, Survey Unit I (Dwg 5275008)

Table of Contents (Continued)

Appendix J – Final Survey Data for Survey Unit J

Table J-1 – Final Soil Samples, Survey Unit J

Table J-2 – Exposure Rate Readings of Backfilled Trench, Survey Unit J

Figure J-1 – Final Survey Soil Sample Locations, Survey Unit J (Dwg 5275009)

Appendix K – Survey Data for Acceptable Backfill

Table K-1a – Lab Analysis of Backfill Material, Survey Unit A

Table K-1b – Lab Analysis of Backfill Material, Survey Unit B

Table K-1c – Lab Analysis of Backfill Material, Survey Unit E

Table K-2 – Gamma Exposure Rate Survey, Survey Unit A

Figure K-1 – Gamma Radiation Walkover Survey, Survey Unit A (Dwg 5275403)

Appendix L – Laboratory Analyses QA/QC Data

Table L-1 – Isotopic Uranium by Alpha Spectroscopy: Quality Control Data

Table L-2 – Comparison of Alpha and Gamma Spectroscopy Results

Appendix M – Survey Instrument QA/QC Data

Table M-1 – Daily Source Checks, Ludlum Model 2221/44-10

Table M-2 – Daily Source Checks, Ludlum Model 2929/43-10-1

Table M-3 – Daily Source Checks, Ludlum Model 2221/43-5

Table M-4 – Daily Source Checks, Ludlum Model 2224/43-68

Table M-4a – Daily Source Checks, Pre-Recalibration, Ludlum Model 2224/43-68

Table M-5 – Daily Source Checks, Ludlum Model 19

Table M-6 – Daily Source Checks, Ludlum Model 3/44-9

Table M-7 – Daily Source Checks, Ludlum Model 14C/44-6

Table M-8 – Daily MDA Calculations, Ludlum Model 2221/44-10

Table M-9 – Daily MDA Calculations, Ludlum Model 2929/43-10-1

Table M-10 – Daily MDA Calculations, Ludlum Model 2221/43-5

Table M-11 – Daily MDA Calculations, Ludlum Model 2224/43-68

Appendix N – Background Radioactivity Data

Table N-1 – Comparison of Alpha and Gamma Spectroscopy Results, Background Soil

Table N-2 – Calculation of Required Number of Background Exposure Readings

Appendix O – Derivation of the Former Building 7 Specific Fixed Contamination Guideline Values

Table O-1 – Former Building 7 Specific Guideline Values

Appendix P – Sample Log

Table P-1 – Final Soil Sample Locations and Laboratory Results

Appendix Q – Alpha Spectroscopy Results

Table Q-1 – Alpha Spectroscopy Results

Appendix R – Gamma Spectroscopy Results

Table R-1 – Gamma Spectroscopy Results

Appendix S – Removable Contamination (Smear) Results

Table S-1 – Final Removable Contamination Results

- Gross α and β removable contamination of accessible pipe surfaces.
- Excavated surface soil sample below the abandoned pipe centerline, obtained by trowel or auger inserted to a 15-cm (6-in.) depth.
- When the α combination survey results exceeded LCR P-1 (removable) or P-2 (fixed) levels, a sample of abandoned pipe material was obtained by hand scraping the interior pipe surface. The scrape sample was analyzed by α or γ spectroscopy and the results were used to calculate a sample-specific GLV in accordance with LCR P-2.

3.5.5 Backfill Material

Gross γ radioactivity scans were performed to segregate excavated soil as detailed in Section 3.4.4.1. In addition, representative soil samples from potentially radiologically impacted soil, acceptable backfill material, and off-site borrow fill (e.g., sand) were analyzed by α or γ spectroscopy. The analytical results are presented in Appendix K.

3.6 QA/QC

Final survey data obtained by laboratory analysis and field instrumentation were subject to QA/QC procedures. Standard radioactive sources of appropriate energies were used routinely to check instrument operability. Ten percent of the samples analyzed in the laboratory were processed as sample duplicates or method blanks, with twice as many sample duplicates prepared as method blanks. The method blank sample results were evaluated against background conditions; results and duplicates were compared to each other. Laboratory QA/QC data are included in Appendix L. A comparison of alpha and gamma spectroscopy results for samples analyzed by both is presented in Table L-2.

An approved health physics services organization (GTS Duratek or Applied Health Physics) calibrated portable instruments using appropriate NIST-traceable sources based upon the radiation energy range of the nuclides of concern. Field instruments were calibrated semiannually and following maintenance that could affect calibration. Before being used in the field, the instruments were checked against standard sources to confirm instrument operability. Results of routine QC checks of field instruments are included in Appendix M.

Final survey data were verified to assure that the measurements that produced the data were performed in accordance with the approach specified in the Final Status Survey Plan (Earth Sciences, 1999). The data were also verified by ensuring that the results supported the final survey objectives. Among the items selected for verification review were the following:

4.2.3 Laboratory Analysis of Final Soil Samples

Table B-4 shows that 28 soil samples were taken in Survey Unit B; 9 of these samples were analyzed by α spectroscopy and the remainder by γ spectroscopy. Seventeen of the 28 uranium nuclide identifications were at or below the MDA of the spectroscopy analysis used; the thorium nuclide searches returned above-MDA results. The calculated $\text{unity}_{\text{soil}}$ values for this data set ranged from about 0.2 to 1.8, with an average calculated $\text{unity}_{\text{soil}}$ value of 0.50. The corresponding μ_{α} value of 0.65 satisfies LCR S-1. The results for the samples taken in the Grid 2 segment of Survey Unit B prompted a hot spot analysis per LCR S-2 that is discussed separately below.

- **Weighted Average Calculations for Grid 2** – Table B-4a shows that 12 samples of soil were taken in Grid 2; half of these samples were analyzed by α spectroscopy, the other half by γ spectroscopy. With the exception of 4 samples (FS-21, FS-23, FS-24, and FS-25), none of the calculated $\text{unity}_{\text{soil}}$ values exceeded 1.0. The $\text{unity}_{\text{soil}}$ values calculated for samples FS-21 and FS-23 through FS-25 ranged from 1.02 to 1.78. However, the weighted average $\text{unity}_{\text{soil}}$ value for this data set was 0.87 that satisfies LCR S-2.

4.2.4 Exposure Rate Survey of Backfilled Trench

Table B-5 shows that 28 measurements of the γ exposure rate at 1-meter height were obtained. The gross exposure rate measurement results ranged between 5 and 10 $\mu\text{R/hr}$ (up to 4 $\mu\text{R/hr}$ net), with an average net exposure rate of 1.3 $\mu\text{R/hr}$. The calculated net μ_{α} value for this data set was 1.6 $\mu\text{R/hr}$ that satisfies LCR S-3.

4.3 Survey Unit C

A total of four field measurements and four laboratory soil analyses were completed in Survey Unit C (see Figure C-1 and Tables C-1 and C-2) to demonstrate conformance with the required LCR. The data obtained for this survey unit showed that all the required LCR were satisfied; therefore, Survey Unit C meets the criteria for free release.

4.3.1 Laboratory Analysis of Final Soil Samples

Table C-1 shows that four soil samples were taken in Survey Unit C; these samples were subsequently analyzed by γ spectroscopy. Uranium nuclide identifications were at or below the MDA of the spectroscopy analysis; the thorium nuclide searches returned above-MDA results. The calculated $\text{unity}_{\text{soil}}$ values for this data set ranged from about 0.2 to 0.5, with an average $\text{unity}_{\text{soil}}$ value of 0.32. The corresponding μ_{α} value for this data set was 0.51 that satisfies LCR S-1.

4.7.3 Removable Contamination Surveys of Former Building 7 Basement Concrete Floor

Fifty-five swipe samples of the former Building 7 concrete basement floor were obtained and surveyed for removable α radioactivity. As shown in Table G-3, the net removable α radioactivity results ranged from 0 to 11 dpm/100 cm². The average net removable α radioactivity result was 2 dpm/100 cm². The corresponding net removable α radioactivity μ_{α} value for this data set was 2 dpm/100 cm² that satisfies LCR P-1.

Although not required to demonstrate conformance with any LCR, Table G-3 also shows that another 55 swipe samples of the former Building 7 basement floor were obtained and surveyed for removable β contamination. The net removable β contamination results ranged from 0 to 65 dpm/100 cm².

4.7.4 Removable Contamination Surveys of Former Building 7 Sectioned Concrete Blocks

Forty-three swipe samples of the sides and bottom of concrete sectioned from the former Building 7 basement floor were obtained and surveyed for removable α contamination. As shown in Table G-4, all but one of the α radioactivity results were indistinguishable above the MDA of the survey instrument used (which ranged from 19 to 22 dpm/100 cm²). The α radioactivity result for swipe Sample B7-64 of Block No. 2 was 40.8 dpm/100 cm². Assuming the presence of α radioactivity at levels corresponding to the MDA for the survey instrumentation for all other measurements, the removable α contamination result was 21.4 dpm/100 cm². The corresponding gross α removable radioactivity μ_{α} value for this data set was 22.4 dpm/100 cm² that satisfies LCR P-1.

4.7.5 Laboratory Analysis of Final Soil Samples

Table G-5 shows that 50 final soil samples were taken in Survey Unit G; 7 of these samples were analyzed by α spectroscopy and the remainder by γ spectroscopy. Thirty-one of the 50 uranium nuclide identifications were at or below the MDA of the spectroscopy analysis used; all except 1 of the thorium nuclide searches returned above-MDA results. The calculated unity_{soil} values for this data set ranged from about 0.2 to 1.5, with an average unity_{soil} value of 0.61. The corresponding μ_{α} value for this data set was 0.69 that satisfies LCR S-1.

The results for the soil samples taken in Survey Unit G prompted a hot spot analysis per LCR S-2. Table G-5a shows that the weighted average unity_{soil} value for this data set was 0.57 that also satisfies LCR S-2.

Table L-2
Comparison of Alpha and Gamma Spectroscopy Results

Gamma Spec Results:
Total U = 2 x Th-234 + U-235
Total Th = 2 x Ra-228

Alpha Spec Results:
Total U = U-234 + U-235 + U-238
Total Th = Th-228 + Th-232

| Sample Number | Comments | Gamma Spec Results | | Alpha Spec Results | | Uranium Comparison % $1-U_{tot,\alpha}/U_{tot,\gamma}$ | Thorium Comparison % $1-Th_{tot,\alpha}/Th_{tot,\gamma}$ |
|---------------|-------------------------|--------------------|---------------------|--------------------|---------------------|---|---|
| | | Total U (pCi/g) | Total Th (pCi/g) | Total U (pCi/g) | Total Th (pCi/g) | | |
| 1 | Manhole 15" TC pipe | 10.22 | 1.16 | 12.65 | 1.25 | -24% | -8% |
| 2 | Manhole 12" TC pipe | 8.16 | 1.51 | 2.07 | 1.49 | 75% | 2% |
| 3 | Bldg 7 3.5m S | 36.28 | 1.75 | 42.33 | 2.38 | -17% | -36% |
| 4 | Bldg 7 6m S 3m E | 89.33 | 2.00 | 80.54 | 2.00 | 10% | 0% |
| 5 | Bldg 7 8m S | 28.97 | 1.71 | 28.64 | 2.02 | 1% | -18% |
| 6 | Bldg 7 8m S .4m E | 27.13 | 1.79 | 44.97 | 1.71 | -66% | 5% |
| 7 | Bldg 7 10m S | 17.10 | 1.51 | 13.82 | 1.75 | 19% | -16% |
| 8 | Bldg 7 11.6m S 1m E | 8.39 | 1.66 | 1.69 | 1.71 | 80% | -3% |
| 9 | Bldg 7 13m S 2.2m E | 9.52 | 1.22 | 1.97 | 1.86 | 79% | -52% |
| 10 | Bldg 7 14m S 4.5m E | 11.07 | 1.26 | 8.17 | 1.40 | 26% | -11% |
| 11 | Bldg 7 12.5m S | 30.41 | 70.60 | 6.73 | 8.30 | 78% | 88% |
| 18 | Average background soil | 10.01 | 1.42 | 1.12 | 1.25 | 89% | 12% |
| 19 | BKG-1 | 9.63 | 1.65 | 1.52 | 2.08 | 84% | -26% |
| 20 | BKG-2 | 10.53 | 1.58 | 1.88 | 1.79 | 82% | -13% |
| 21 | BKG-3 | 2.06 | 1.60 | 1.61 | 1.84 | 22% | -15% |
| 22 | BKG-4 | 9.56 | 0.93 | 1.62 | 1.68 | 83% | -80% |
| 23 | BKG-5 | 9.58 | 1.08 | 1.60 | 1.65 | 83% | -52% |
| 24 | BKG-6 | 10.67 | 1.09 | 1.29 | 1.58 | 88% | -45% |

Notes:

MDA values are shaded.

Table A-4
Final Soil Samples
Survey Unit A

| Sample Date | Survey Point | Total U (pCi/g) | Total Th (pCi/g) | Sum (Unity) |
|-------------|-------------------------|-----------------|------------------|-------------|
| 2/3/00 | ARL-FS-27 | 8.40E+00 | 1.80E+00 | 1.20E-01 |
| 2/15/00 | Soil RR-7 (FS-30) | 9.80E+00 | 1.83E+00 | 1.49E-01 |
| 2/15/00 | Soil RR-8 (FS-31) | 1.15E+01 | 2.36E+00 | 5.55E-01 |
| 2/15/00 | Soil RR-9 (FS-32) | 9.09E+00 | 2.30E+00 | 1.00E-01 |
| 2/16/00 | Soil-RR-10 (FS-33)* | 3.70E+00 | 1.72E+00 | 2.78E-01 |
| 2/16/00 | Soil-RR-11 (FS-34)* | 4.40E+00 | 1.60E+00 | 2.86E-01 |
| 2/16/00 | Soil-RR-12 (FS-35)* | 3.06E+01 | 1.82E+00 | 1.06E+00 |
| 2/16/00 | Align-1-1 (FS-36) | 8.97E+00 | 2.14E+00 | 1.70E-01 |
| 2/16/00 | Align-1-2 (FS-37) | 9.14E+00 | 2.24E+00 | 1.85E-01 |
| 2/17/00 | Align-1-3 (FS-38) | 9.21E+00 | 1.34E+00 | 8.97E-01 |
| 2/17/00 | Align-1-4 (FS-39) | 8.57E+00 | 1.98E+00 | 3.03E-01 |
| 2/17/00 | Align-1-5 (FS-40) | 1.08E+01 | 2.78E+00 | 5.87E-01 |
| 2/8/00 | Rock Frag. RR-1 (FS-41) | 5.86E+00 | 2.10E+00 | 3.77E-01 |
| 2/18/00 | Align-1-6 (FS-42)* | 5.66E+00 | 2.25E+00 | 3.87E-01 |
| 2/18/00 | Align-1-7 (FS-43) | 5.59E+00 | 1.41E+00 | 3.01E-01 |
| 2/9/00 | Soil-RR-4 (FS-44)* | 6.08E+00 | 2.27E+00 | 4.01E-01 |
| 2/9/00 | Soil-RR-6 (FS-45)* | 9.03E+00 | 2.92E+00 | 5.50E-01 |
| 2/21/00 | Align-1-8 (FS-67) | 1.25E+01 | 1.28E+00 | 4.84E-01 |
| 2/21/00 | Align-1-9 (FS-68) | 8.99E+00 | 1.03E+00 | 8.59E-01 |
| 2/21/00 | Align-1-10 (FS-69) | 9.44E+00 | 1.28E+00 | 3.98E-01 |
| 2/22/00 | Align-1-11 (FS-70) | 7.13E+00 | 7.48E-01 | 2.78E-01 |
| 2/22/00 | Align-1-12 (FS-71) | 9.42E+00 | 7.64E-01 | 3.45E-01 |
| 2/22/00 | Align-1-13 (FS-72) | 8.04E+00 | 8.22E-01 | 1.69E-01 |
| 2/22/00 | Align-1-14 (FS-73)* | 1.30E+00 | 1.44E+00 | 1.81E-01 |
| 2/22/00 | Align-1-15 (FS-74) | 8.97E+00 | 1.37E+00 | 3.93E-01 |
| 2/23/00 | Align-1-16 (FS-75)* | 1.82E+00 | 1.32E+00 | 1.84E-01 |
| 2/23/00 | Align-1-17 (FS-76)* | 1.12E+01 | 1.54E+00 | 4.74E-01 |
| 2/23/00 | Align-1-18 (FS-77)* | 2.38E+01 | 2.40E+00 | 9.19E-01 |

Table A-4
Final Soil Samples
Survey Unit A

| Sample Date | Survey Point | Total U (pCi/g) | Total Th (pCi/g) | Sum (Unit) |
|---------------------------------|---------------------|----------------------|------------------|-----------------------|
| 2/23/00 | Align-1-19 (FS-78) | 4.04E+00 | 2.02E+00 | 3.17E-01 |
| 2/24/00 | Align-1-20 (FS-79) | 9.79E+00 | 2.38E+00 | 5.18E-01 |
| 2/25/00 | Align-1-21 (FS-80) | 6.57E+00 | 2.10E+00 | 3.12E-01 |
| 2/25/00 | Align-1-22 (FS-81) | 6.88E+00 | 1.91E+00 | 1.29E-01 |
| 2/28/00 | Align-1-23 (FS-82)* | 1.72E+01 | 1.96E+00 | 6.86E-01 |
| 2/28/00 | Align-1-24 (FS-83) | 1.59E+01 | 1.52E+00 | 6.07E-01 |
| 2/28/00 | Align-1-25 (FS-84) | 5.35E+00 | 1.49E+00 | 3.16E-01 |
| 2/29/00 | Align-1-26 (FS-85)* | 4.83E+00 | 1.51E+00 | 2.89E-01 |
| 2/29/00 | Align-1-27 (FS-86)* | 1.66E+01 | 1.63E+00 | 6.36E-01 |
| 2/29/00 | Align-1-28 (FS-87)* | 5.89E+00 | 1.72E+00 | 3.40E-01 |
| 3/1/00 | Align-1-29 (FS-88)* | 2.11E+00 | 2.23E+00 | 2.83E-01 |
| 3/1/00 | Align-1-30 (FS-89)* | 3.15E+00 | 2.49E+00 | 3.39E-01 |
| 3/1/00 | Align-1-31 (FS-90)* | 4.62E+01 | 2.04E+00 | 1.52E+00 |
| 3/1/00 | Align-1-32 (FS-91)* | 3.57E+01 | 2.10E+00 | 1.23E+00 |
| 3/1/00 | Align-1-33 (FS-92)* | 1.88E+00 | 1.66E+00 | 2.05E-01 |
| 3/2/00 | Drain-1 (FS-93)* | 2.89E+00 | 1.52E+00 | 2.20E-01 |
| 3/2/00 | Drain-2 (FS-94)* | 1.23E+00 | 1.43E+00 | 1.78E-01 |
| 3/2/00 | Drain-3 (FS-95)* | 1.03E+00 | 1.39E+00 | 1.68E-01 |
| Railroad Spur Weighted Average: | | | | 5.23E-01 |
| Grid 4 Weighted Average: | | | | 5.48E-01 |
| Count | | | | 48 |
| Average | | | | 0.45 |
| Standard Deviation | | | | 0.27 |
| t | 1.679 | 95% CL Test | | $\mu_{\alpha} = 0.52$ |
| | 2.014 | 97.5% CL Test | | $\mu_{\alpha} = 0.53$ |

Notes:

1. MDA values are shaded.
2. **Bold results are > Acceptance Criteria.**
3. t values from NUREG/CR-5849, Table B-1.
4. * Denotes values from alpha spectroscopy.
5. Also included in the μ_{α} calculation is the weighted average from the grid 4 and railroad spur grid elevated area (hot spot) evaluation, per NUREG/CR-5849.

Table B-4
Final Soil Samples
Survey Unit B

| Sample Date | Survey Point | Total U (pCi/g) | Total Th (pCi/g) | Sum (Unity) |
|--------------------------|---------------|-----------------|------------------|-------------|
| 12/21/99 | Arl. Ave. FS1 | 6.97E+00 | 1.14E+00 | 8.13E-01 |
| 12/21/99 | Arl. Ave. FS2 | 1.32E+01 | 1.25E+00 | 5.02E-01 |
| 12/21/99 | Arl. Ave. FS3 | 9.17E+00 | 1.15E+00 | 8.77E-01 |
| 12/21/99 | Arl. Ave. FS4 | 2.32E+01 | 1.68E+00 | 8.31E-01 |
| 12/21/99 | Arl. Ave. FS5 | 1.35E+01 | 1.49E+00 | 5.63E-01 |
| 1/11/00 | Arling-FS-8 | 8.17E+00 | 1.16E+00 | 3.49E-01 |
| 1/11/00 | Arling-FS-9 | 7.01E+00 | 9.36E-01 | 2.94E-01 |
| 1/11/00 | Arling-FS-10 | 6.71E+00 | 9.46E-01 | 2.86E-01 |
| 1/17/00 | ARL-FS-13* | 1.67E+00 | 2.31E+00 | 2.79E-01 |
| 1/17/00 | ARL-FS-14* | 3.77E+00 | 9.60E-01 | 2.04E-01 |
| 1/19/00 | ARL-FS-15 | 6.08E+00 | 3.90E-01 | 2.18E-01 |
| 1/21/00 | ARL-FS-16 | 5.87E+00 | 5.74E-01 | 2.25E-01 |
| 1/21/00 | ARL-FS-17 | 6.13E+00 | 9.08E-01 | 2.66E-01 |
| 1/24/00 | ARL-FS-18 | 1.33E+01 | 6.44E-01 | 2.44E-01 |
| 1/24/00 | ARL-FS-19 | 5.64E+00 | 6.74E-01 | 2.29E-01 |
| 1/27/00 | ARL-FS-20A* | 3.27E+01 | 8.30E-01 | 1.02E+00 |
| 1/27/00 | ARL-FS-21 | 4.45E+01 | 8.48E-01 | 1.36E+00 |
| 1/28/00 | ARL-FS-22 | 4.49E+00 | 1.47E+00 | 2.75E-01 |
| 1/29/00 | ARL-FS-23* | 5.52E+00 | 1.33E+00 | 2.91E-01 |
| 1/31/00 | ARL-FS-24 | 3.44E+01 | 1.11E+00 | 1.09E+00 |
| 2/2/00 | ARL-FS-25* | 5.49E+01 | 2.11E+00 | 1.78E+00 |
| 2/2/00 | ARL-FS-26* | 1.82E+01 | 1.99E+00 | 7.18E-01 |
| 2/7/00 | ARL-FS-28* | 1.63E+00 | 1.05E+00 | 1.51E-01 |
| 2/7/00 | ARL-FS-29* | 1.10E+00 | 1.42E+00 | 1.73E-01 |
| 3/6/00 | FS-100 | 8.64E+00 | 1.21E+00 | 3.68E-01 |
| 3/6/00 | FS-101* | 2.41E+00 | 1.28E+00 | 1.97E-01 |
| 3/6/00 | FS-102 | 1.05E+01 | 1.29E+00 | 4.29E-01 |
| 3/8/00 | FS-106 | 1.12E+01 | 1.40E+00 | 4.61E-01 |
| Grid 2 Weighted Average: | | 8.75E-01 | | |
| Count | | 29 | | |
| Average | | 0.50 | | |
| Standard Deviation | | 0.39 | | |
| t | 1.701 | 95% CL Test | $\mu_\alpha =$ | 0.63 |
| | 2.048 | 97.5% CL Test | $\mu_\alpha =$ | 0.65 |

Notes:

- MDA values are shaded.
- Bold results are > Acceptance Criteria.**
- t values from NUREG/CR-5849, Table B-1.
- * Denotes values from alpha spectroscopy.
- Also included in the μ_α calculation is the weighted average from the grid 2 elevated area (hot spot) evaluation, per NUREG/CR-5849.

Table G-5
Final Soil Samples
Survey Unit G

| Sample Date | Survey Point | Total U (pCi/g) | Total Th (pCi/g) | Sum (Unity) |
|-------------|----------------|-----------------|------------------|-------------|
| 1/12/00 | D-13 (FS-11)* | 3.72E+00 | 2.33E+00 | 3.39E-01 |
| 1/7/00 | B7-E13 (FS-12) | 9.70E+00 | 1.47E+00 | 4.24E-01 |
| 3/14/00 | B-10 (FS-116) | 8.68E+00 | 1.51E+00 | 8.99E-01 |
| 3/14/00 | D-11 (FS-117) | 2.21E+01 | 1.01E+00 | 7.34E-01 |
| 3/14/00 | E-9 (FS-118) | 1.57E+01 | 2.26E+00 | 6.76E-01 |
| 3/14/00 | A-13 (FS-119) | 9.68E+00 | 1.98E+00 | 4.72E-01 |
| 3/14/00 | C-13 (FS-120) | 3.45E+00 | 1.79E+00 | 2.77E-01 |
| 3/14/00 | E-9 (FS-121)* | 1.74E+01 | 3.43E+00 | 8.41E-01 |
| 3/14/00 | D-5 (FS-123) | 1.16E+01 | 2.72E+00 | 6.04E-01 |
| 3/14/00 | E-7 (FS-124) | 1.68E+01 | 1.97E+00 | 6.77E-01 |
| 3/14/00 | F-6 (FS-126)* | 6.70E+00 | 3.14E+00 | 5.05E-01 |
| 3/14/00 | E-1 (FS-128) | 3.18E+00 | 9.42E-01 | 1.85E-01 |
| 3/14/00 | F-3 (FS-129) | 1.79E+01 | 1.23E+00 | 6.35E-01 |
| 3/14/00 | E-7 (FS-130) | 1.57E+01 | 2.42E+00 | 5.90E-01 |
| 3/14/00 | E-5 (FS-131) | 1.45E+01 | 1.75E+00 | 5.89E-01 |
| 3/14/00 | A-13 (FS-132) | 3.00E+00 | 1.34E+00 | 3.62E-01 |
| 3/14/00 | E-4 (FS-134)* | 1.58E+01 | 2.40E+00 | 6.91E-01 |
| 3/14/00 | E-10 (FS-135) | 2.03E+01 | 1.23E+00 | 7.05E-01 |
| 3/14/00 | D-8 (FS-136) | 2.85E+01 | 1.80E+00 | 9.94E-01 |
| 3/14/00 | D-3 (FS-137) | 1.55E+01 | 1.92E+00 | 6.35E-01 |
| 3/14/00 | C-6 (FS-138) | 1.21E+01 | 2.72E+00 | 5.18E-01 |
| 3/15/00 | F-2 (FS-139) | 1.94E+01 | 1.71E+00 | 7.25E-01 |
| 3/15/00 | E-11 (FS-140) | 5.87E+00 | 6.35E-01 | 2.17E-01 |
| 3/15/00 | F-2 (FS-141) | 3.49E+00 | 1.37E+00 | 3.80E-01 |
| 3/15/00 | D-6 (FS-142) | 1.10E+01 | 2.10E+00 | 5.24E-01 |
| 3/15/00 | D-4 (FS-144) | 5.02E+00 | 2.10E+00 | 3.53E-01 |
| 3/15/00 | E-6 (FS-145)* | 1.43E+01 | 2.64E+00 | 6.73E-01 |
| 3/15/00 | E-2 (FS-147) | 1.51E+01 | 1.91E+00 | 6.22E-01 |
| 3/15/00 | F-4 (FS-148) | 2.71E+00 | 8.70E-01 | 1.63E-01 |
| 3/15/00 | B-3 (FS-149) | 3.29E+00 | 1.64E+00 | 4.01E-01 |
| 3/15/00 | B-6 (FS-150) | 1.08E+01 | 1.92E+00 | 5.01E-01 |
| 3/21/00 | D-7 (FS-151) | 1.11E+01 | 2.08E+00 | 5.26E-01 |
| 3/21/00 | D-8 (FS-152) | 1.34E+01 | 2.04E+00 | 5.87E-01 |
| 3/21/00 | F-8 (FS-153) | 1.39E+01 | 2.94E+00 | 6.90E-01 |
| 3/21/00 | F-7 (FS-154) | 1.07E+01 | 2.24E+00 | 5.29E-01 |
| 3/21/00 | F-7 (FS-155) | 1.46E+01 | 2.92E+00 | 7.08E-01 |
| 3/21/00 | E-8 (FS-156) | 1.99E+01 | 2.24E+00 | 7.93E-01 |
| 3/24/00 | G-10 (FS-160) | 7.14E+00 | 1.11E+00 | 3.15E-01 |
| 3/28/00 | G-2 (FS-161) | 4.16E+01 | 2.66E+00 | 1.45E+00 |
| 3/28/00 | G-6 (FS-162) | 2.34E+01 | 1.98E+00 | 8.67E-01 |
| 3/27/00 | F-9 (FS-163)* | 1.10E+01 | 1.53E+00 | 4.67E-01 |
| 3/28/00 | F-2 (FS-164) | 3.10E+01 | 1.86E+00 | 1.07E+00 |

Table G-5
Final Soil Samples
Survey Unit G

| Sample Date | Survey Point | Total U (pCi/g) | Total Th (pCi/g) | Sum (Unity) |
|-------------|----------------------|-----------------|------------------|-----------------|
| 3/27/00 | G-6 (FS-165)* | 2.73E+01 | 2.23E+00 | 1.00E+00 |
| 3/28/00 | G-5 (FS-166) | 2.32E+01 | 2.32E+00 | 8.94E-01 |
| 3/28/00 | G-2 (FS-167) | 3.95E+01 | 2.14E+00 | 1.34E+00 |
| 3/28/00 | E-6 (FS-168) | 1.12E+01 | 1.75E+00 | 4.96E-01 |
| 3/28/00 | G-7 (FS-169) | 1.21E+01 | 2.24E+00 | 5.70E-01 |
| 3/28/00 | G-7 (FS-170) | 1.77E+01 | 1.53E+00 | 6.59E-01 |
| 3/28/00 | G-8 (FS-171) | 1.04E+01 | 2.26E+00 | 5.22E-01 |
| 3/28/00 | G-8 (FS-172) | 1.11E+01 | 3.04E+00 | 6.21E-01 |
| | weighted mean | | | 5.72E-01 |
| | Count | | | 51 |
| | Average | | | 0.61 |
| t | Standard Deviation | | | 0.26 |
| 1.678 | 95% CL Test | | $\mu_\alpha =$ | 0.67 |
| 2.011 | 97.5% CL Test | | $\mu_\alpha =$ | 0.69 |

Notes:

1. MDA values are shaded.
2. **Bold results are > Acceptance Criteria.**
3. t values from NUREG/CR-5849, Table B-1.
4. * Denotes values from alpha spectroscopy.
5. μ_α values were calculated including the as left FS samples.
6. Also included in the μ_α calculation is the weighted average from the grid 1 elevated area (hot spot) evaluation, per NUREG/CR-5849.

Table G-5a
Weighted Average Calculations
Survey Unit G
Grid 1

| Survey Point | Total U (pCi/g) | Total Th (pCi/g) | Sum (Unity) |
|---------------|-----------------|------------------|-------------|
| E-1 (FS-128) | 3.8E+00 | 9.42E-01 | 1.85E-01 |
| F-3 (FS-129) | 1.79E+01 | 1.23E+00 | 6.35E-01 |
| E-4 (FS-134)* | 1.58E+01 | 2.40E+00 | 6.91E-01 |
| D-3 (FS-137) | 1.55E+01 | 1.92E+00 | 6.35E-01 |
| F-2 (FS-139) | 1.94E+01 | 1.71E+00 | 7.25E-01 |
| F-2 (FS-141) | 3.9E+00 | 1.37E+00 | 1.80E-01 |
| D-4 (FS-144) | 5.02E+00 | 2.10E+00 | 3.53E-01 |
| E-2 (FS-147) | 1.51E+01 | 1.91E+00 | 1.22E-01 |
| E-2 (FS-148) | 2.7E+00 | 8.70E-01 | 1.84E-01 |
| B-3 (FS-149) | 3.29E+00 | 1.64E+00 | 1.01E-01 |
| Average: | 1.11E+01 | 1.61E+00 | 4.79E-01 |

Elevated Area Samples

| | | | |
|---------------|----------|----------|----------|
| G-2 (FS-161) | 4.16E+01 | 2.66E+00 | 1.45E+00 |
| F-2 (FS-164) | 3.10E+01 | 1.86E+00 | 1.07E+00 |
| G-6 (FS-165)* | 2.73E+01 | 2.23E+00 | 1.00E+00 |
| G-2 (FS-167) | 3.95E+01 | 2.14E+00 | 1.34E+00 |
| Average: | 3.49E+01 | 2.22E+00 | 1.22E+00 |

$$\bar{x}_w = (1/n_s) \sum_{i=1}^{n_s} x_i \left[1 - \sum_{k=1}^{n_k} A_k \right] + \sum_{k=1}^{n_k} y_k A_k$$

Area test: $A_1 = (80/10)^{0.5} = 2.83$

Average in elevated area must be < 2.83 x guideline value of unity:
 $1.22 < 2.83$

$X_{\text{weighted average}} = (0.479 \times (1 - (10/80))) + (1.22 \times (10/80)) = 0.572$

where $A_{\text{hs1}} = 10 \text{ m}^2$

$A_{\text{tot}} = 80 \text{ m}^2$

y_k = elevated area activity in area k

n_s = number of systematic and random measurements

n_k = number of measurements in area k

x_i = systematic and random measurements at point

$A_k = A_{\text{hs}}/A_{\text{tot}}$ = ratio of hotspot area to total averaged area

Notes:

MDA values are shaded.

* Denotes results from alpha spectroscopy.

Table K-1a
Lab Analysis of Backfill Material
Survey Unit A

| Sample Date | Survey Point | Total U (pCi/g) | Total Th (pCi/g) | Sum (Unit) |
|----------------|------------------------------|-----------------|------------------|------------|
| 2/3/00 | SP-6A | 1.24E+01 | 1.32E+00 | 4.85E-01 |
| 2/3/00 | SP-6B | 1.23E+01 | 1.23E+00 | 4.76E-01 |
| 2/3/00 | SP-6C | 1.27E+01 | 1.22E+00 | 4.85E-01 |
| 2/3/00 | SP-7 | 2.00E+00 | 2.02E+00 | 3.32E-01 |
| 2/15/00 | Stockpile-SP-9-1 | 1.48E+00 | 1.48E+00 | 3.1E-01 |
| 2/15/00 | Stockpile-SP-9-2 | 2.06E+00 | 2.06E+00 | 3.0E-01 |
| 2/16/00 | Stockpile-SP-9-3 | 1.64E+00 | 1.64E+00 | 3.0E-01 |
| 2/16/00 | Stockpile-SP-9-4 | 1.27E+00 | 1.27E+00 | 2.8E-01 |
| 2/18/00 | Stockpile-SP-9-7 | 1.01E+00 | 1.01E+00 | 2.92E-01 |
| 2/18/00 | Stockpile-SP-9-8 | 1.61E+00 | 1.61E+00 | 3.4E-01 |
| 2/17/00 | Stockpile-SP-9-5 | 2.00E+00 | 2.00E+00 | 3.9E-01 |
| 2/17/00 | Stockpile-SP-9-6 | 2.04E+00 | 2.04E+00 | 5.09E-01 |
| 2/21/00 | Stockpile-SP-9-9 | 1.46E+00 | 1.46E+00 | 3.39E-01 |
| 2/15/00 | Stockpile-SP-10-1 | 1.49E+00 | 1.49E+00 | 3.52E-01 |
| 2/15/00 | Stockpile-SP-10-2 | 1.85E+00 | 1.85E+00 | 3.80E-01 |
| 2/21/00 | Stockpile-SP-11-1 | 2.04E+00 | 2.04E+00 | 4.0E-01 |
| 2/22/00 | Stockpile-SP-12-1 | 1.31E+00 | 1.31E+00 | 2.3E-01 |
| 2/23/00 | Stockpile SP-13-1 | 1.98E+00 | 1.98E+00 | 3.76E-01 |
| 2/23/00 | Stockpile SP-14-1 | 2.20E+00 | 2.20E+00 | 3.89E-01 |
| 2/24/00 | Stockpile-SP-15-1 | 1.32E+00 | 1.32E+00 | 3.2E-01 |
| 2/25/00 | Stockpile-SP-15-2 | 1.03E+01 | 1.72E+00 | 4.66E-01 |
| 2/28/00 | Stockpile-Sp-16-1 | 1.25E+00 | 1.25E+00 | 5.53E-01 |
| 2/28/00 | Stockpile-Sp-16-2 | 1.74E+00 | 1.74E+00 | 4.3E-01 |
| 3/1/00 | Stockpile-SP-17-1* | 1.59E+01 | 1.64E+00 | 6.19E-01 |
| 3/1/00 | Stockpile-SP-18-1* | 1.79E+01 | 1.90E+00 | 7.00E-01 |
| 2/17/00 | Quarry Sand 1 | 1.19E+01 | 1.19E+01 | 1.5E-00 |
| 2/8/00 | Backfill-1 | 1.40E+01 | 1.40E+01 | 1.9E-00 |
| 2/21/00 | Backfill-2 | 1.15E+01 | 1.15E+01 | 1.5E-00 |
| 2/21/00 | Backfill-3 | 8.48E-01 | 8.48E-01 | 3.08E-01 |
| 2/28/00 | Backfill-4* | 7.98E-01 | 9.20E-01 | 1.15E-01 |
| 1.699 2.045 | Count | 30 | 30 | 30 |
| | Average | 10.67 | 2.67 | 0.57 |
| | Standard Deviation | 4.57 | 3.36 | 0.42 |
| | 95% CL Test μ_α = | 12.09 | 3.71 | 0.70 |
| | 97.5% CL Test μ_α = | 12.38 | 3.92 | 0.73 |

Notes:

- * Denotes results from alpha spectroscopy.
- MDA values are shaded.
- t values from NUREG/CR-5849, Table B-1.

Table P-1
Final Soil Sample Locations and Laboratory Results

| Sample ID | Survey Unit | Location | GPS Coordinates ⁽¹⁾ | | | Spectroscopy | Radionuclide | Radionuclide Concentration (pCi/g) | | |
|---------------|-------------|------------------------------------|--------------------------------|-------------|-----------|--------------|--------------|------------------------------------|------------------|----------|
| | | | Northing | Easting | Elevation | | | Activity | Uncertainty (2σ) | MDC |
| B-10 (FS-116) | G | Grid B-10, bottom @ 2' depth | 709742.0722 | 576606.7474 | 148.4300 | Gamma | U-238 | 1.04E+01 | NR | 1.04E+01 |
| | | | | | | | U-235 | 5.52E-01 | NR | 5.52E-01 |
| | | | | | | | Th-234 | 4.06E+00 | NR | 4.06E+00 |
| | | | | | | | Th-228 | 7.93E-01 | 1.83E-01 | NR |
| | | | | | | | Ra-228 | 7.54E-01 | 1.39E-01 | NR |
| | | | | | | | Ra-226 | 5.38E-01 | 7.02E-02 | NR |
| D-11 (FS-117) | G | Grid D-11, bottom @ 2' depth | 709730.7322 | 576610.3014 | 148.9900 | Gamma | U-238 | 1.43E+01 | 5.78E+00 | NR |
| | | | | | | | U-235 | 5.38E-01 | 1.83E-01 | NR |
| | | | | | | | Th-234 | 1.08E+01 | 1.32E+00 | NR |
| | | | | | | | Th-228 | 5.67E-01 | 1.37E-01 | NR |
| | | | | | | | Ra-228 | 5.05E-01 | 1.06E-01 | NR |
| | | | | | | | Ra-226 | 4.05E-01 | 6.21E-02 | NR |
| E-9 (FS-118) | G | Grid E-9, bottom @ 4' depth | 709730.4002 | 576593.2444 | 146.9300 | Gamma | U-238 | 1.69E+01 | 6.78E+00 | NR |
| | | | | | | | U-235 | 5.89E-01 | 4.80E-01 | NR |
| | | | | | | | Th-234 | 7.58E+00 | 4.71E+00 | NR |
| | | | | | | | Th-228 | 1.12E+00 | 2.49E-01 | NR |
| | | | | | | | Ra-228 | 1.13E+00 | 1.48E-01 | NR |
| | | | | | | | Ra-226 | 6.77E-01 | 8.18E-02 | NR |
| A-13 (FS-119) | G | Grid A-13, bottom @ 4' depth | 709749.2832 | 576624.8814 | 150.7300 | Gamma | U-238 | 1.01E+01 | NR | 1.01E+01 |
| | | | | | | | U-235 | 5.60E-01 | NR | 5.60E-01 |
| | | | | | | | Th-234 | 4.51E+00 | NR | 4.51E+00 |
| | | | | | | | Th-228 | 1.26E+00 | 2.62E-01 | NR |
| | | | | | | | Ra-228 | 9.92E-01 | 1.72E-01 | NR |
| | | | | | | | Ra-226 | 7.19E-01 | 8.80E-02 | NR |
| C-13 (FS-120) | G | Grid C-13, wall @ 2' depth | 709728.8112 | 576621.5614 | 150.1200 | Gamma | U-238 | 1.14E+01 | NR | 1.14E+01 |
| | | | | | | | U-235 | 3.58E-01 | NR | 3.58E-01 |
| | | | | | | | Th-234 | 1.54E+00 | NR | 1.54E+00 |
| | | | | | | | Th-228 | 9.77E-01 | 2.03E-01 | NR |
| | | | | | | | Ra-228 | 8.93E-01 | 1.43E-01 | NR |
| | | | | | | | Ra-226 | 5.80E-01 | 7.38E-02 | NR |

(1) New Jersey State Plane, 1983, Coordinate System used. Elevation in feet above mean sea level.

Table P-1
Final Soil Sample Locations and Laboratory Results

| Sample ID | Survey Unit | Location | GPS Coordinates ⁽¹⁾ | | | Spectroscopy | Radionuclide | Radionuclide Concentration (pCi/g) | | |
|---|-------------|-----------------------------|--------------------------------|-------------|-----------|--------------|--------------|------------------------------------|------------------|----------|
| | | | Northing | Easting | Elevation | | | Activity | Uncertainty (2σ) | MDC |
| E-9 (FS-121) | G | Grid E-9, wall @ 3' depth | 709728.9172 | 576589.2284 | 147.9000 | Alpha | U-234 | 7.80E+00 | 1.60E+00 | 1.80E-01 |
| | | | | | | | U-235 | 6.20E-01 | 2.90E-01 | 1.60E-01 |
| | | | | | | | U-238 | 9.00E+00 | 1.80E+00 | 1.60E-01 |
| | | | | | | | Th-228 | 1.75E+00 | 3.30E-01 | 1.00E-01 |
| | | | | | | | Th-230 | 1.09E+00 | 2.30E-01 | 3.50E-02 |
| | | | | | | | Th-232 | 1.68E+00 | 3.20E-01 | 1.60E-02 |
| F-7 (FS-122) | G | Grid F-7, bottom @ 4' depth | 709731.2442 | 576580.6884 | 150.1700 | Alpha | U-234 | 2.63E+01 | 4.70E+00 | 2.20E-01 |
| AFTER ADDITIONAL REMEDIATION - REPLACE F-7(FS-122) WITH F-7(FS-154) | | | | | | | U-235 | 1.68E+00 | 5.40E-01 | 1.50E-01 |
| | | | | | | | U-238 | 2.59E+01 | 4.70E+00 | 2.40E-01 |
| | | | | | | | Th-228 | 1.44E+00 | 2.80E-01 | 5.40E-02 |
| | | | | | | | Th-230 | 1.04E+00 | 2.10E-01 | 3.20E-02 |
| | | | | | | | Th-232 | 1.33E+00 | 2.60E-01 | 2.50E-02 |
| F-7 (FS-122) Lab Dup | G | Grid F-7, bottom @ 4' depth | 709731.2442 | 576580.6884 | 150.1700 | Alpha | U-234 | 2.52E+01 | 4.50E+00 | NR |
| AFTER ADDITIONAL REMEDIATION - REPLACE F-7(FS-122) WITH F-7(FS-154) | | | | | | | U-235 | 1.58E+00 | 5.20E-01 | NR |
| | | | | | | | U-238 | 2.56E+01 | 4.60E+00 | NR |
| | | | | | | | Th-228 | 1.48E+00 | 2.90E-01 | NR |
| | | | | | | | Th-230 | 1.14E+00 | 2.30E-01 | NR |
| | | | | | | | Th-232 | 1.41E+00 | 2.70E-01 | NR |
| D-5 (FS-123) | G | Grid D-5, bottom @ 4' depth | 709749.8712 | 576575.8334 | 147.0400 | Gamma | U-238 | 1.33E+01 | NR | 1.33E+01 |
| | | | | | | | U-235 | 7.00E-01 | NR | 7.00E-01 |
| | | | | | | | Th-234 | 5.45E+00 | NR | 5.45E+00 |
| | | | | | | | Th-228 | 1.44E+00 | 2.94E-01 | NR |
| | | | | | | | Ra-228 | 1.36E+00 | 2.05E-01 | NR |
| | | | | | | | Ra-226 | 9.08E-01 | 9.86E-02 | NR |
| E-7 (FS-124) | G | Grid E-7, bottom @ 4' depth | 709738.6292 | 576587.5354 | 146.5300 | Gamma | U-238 | 1.49E+01 | NR | 1.49E+01 |
| | | | | | | | U-235 | 6.17E-01 | NR | 6.17E-01 |
| | | | | | | | Th-234 | 8.08E+00 | 1.75E+00 | NR |
| | | | | | | | Th-228 | 1.07E+00 | 2.26E-01 | NR |
| | | | | | | | Ra-228 | 9.86E-01 | 2.01E-01 | NR |
| | | | | | | | Ra-226 | 6.07E-01 | 8.86E-02 | NR |

(1) New Jersey State Plane, 1983, Coordinate System used. Elevation in feet above mean sea level.

Table P-1
Final Soil Sample Locations and Laboratory Results

| Sample ID | Survey Unit | Location | GPS Coordinates ⁽¹⁾ | | | Spectroscopy | Radionuclide | Radionuclide Concentration (pCi/g) | | |
|--|-------------|-----------------------------|--------------------------------|-------------|-----------|--------------|--------------|------------------------------------|------------------|----------|
| | | | Northing | Easting | Elevation | | | Activity | Uncertainty (2σ) | MDC |
| E-7 (FS-124) Field Dup | G | Grid E-7, bottom @ 4' depth | 709738.6292 | 576587.5354 | 146.5300 | Gamma | U-238 | 1.20E+01 | 7.10E+00 | NR |
| | | | | | | | U-235 | 8.78E-01 | 2.76E-01 | NR |
| | | | | | | | Th-234 | 1.10E+01 | 1.92E+00 | NR |
| | | | | | | | Th-228 | 1.04E+00 | 2.39E-01 | NR |
| | | | | | | | Ra-228 | 9.86E-01 | 1.44E-01 | NR |
| | | | | | | | Ra-226 | 6.00E-01 | 7.96E-02 | NR |
| F-8 (FS-125) | G | Grid F-8, bottom @ 4' depth | 709728.4372 | 576585.5564 | 149.2600 | Gamma | U-238 | 3.14E+01 | 9.59E+00 | NR |
| U-235 | | | | | | | 5.41E-01 | 4.26E-01 | NR | |
| Th-234 | | | | | | | 2.20E+01 | 8.25E+00 | NR | |
| Th-228 | | | | | | | 9.23E-01 | 2.28E-01 | NR | |
| Ra-228 | | | | | | | 8.38E-01 | 1.67E-01 | NR | |
| Ra-226 | | | | | | | 5.79E-01 | 9.18E-02 | NR | |
| F-6 (FS-126) | G | Grid F-6, bottom @ 4' depth | 709732.1552 | 576572.2744 | 148.9100 | Alpha | U-234 | 2.88E+00 | 7.70E-01 | 2.20E-01 |
| | | | | | | | U-235 | 2.10E-01 | 1.70E-01 | 2.00E-01 |
| | | | | | | | U-238 | 3.61E+00 | 9.00E-01 | 1.80E-01 |
| | | | | | | | Th-228 | 1.65E+00 | 3.20E-01 | 8.60E-02 |
| | | | | | | | Th-230 | 1.17E+00 | 2.40E-01 | 3.80E-02 |
| | | | | | | | Th-232 | 1.49E+00 | 2.90E-01 | 3.80E-02 |
| F-6 (FS-126) Field Dup | G | Grid F-6, bottom @ 4' depth | 709732.1552 | 576572.2744 | 148.9100 | Alpha | U-234 | 3.52E+00 | 8.80E-01 | 2.40E-01 |
| | | | | | | | U-235 | 2.90E-01 | 2.10E-01 | 2.30E-01 |
| | | | | | | | U-238 | 3.62E+00 | 9.00E-01 | 2.40E-01 |
| | | | | | | | Th-228 | 1.21E+00 | 2.40E-01 | 9.00E-02 |
| | | | | | | | Th-230 | 1.09E+00 | 2.20E-01 | 3.40E-02 |
| | | | | | | | Th-232 | 1.27E+00 | 2.50E-01 | 3.10E-02 |
| D-9 (FS-127) | G | Grid D-9, bottom @ 4' depth | 709739.3122 | 576600.2624 | 147.5000 | Gamma | U-238 | 4.06E+01 | 1.25E+01 | NR |
| U-235 | | | | | | | 8.97E-01 | 3.64E-01 | NR | |
| Th-234 | | | | | | | 1.73E+01 | 7.77E+00 | NR | |
| Th-228 | | | | | | | 1.12E+00 | 2.46E-01 | NR | |
| Ra-228 | | | | | | | 1.11E+00 | 1.72E-01 | NR | |
| Ra-226 | | | | | | | 8.50E-01 | 8.65E-02 | NR | |
| AFTER ADDITIONAL REMEDIATION - REMOVE FROM CALCULATION | | | | | | | | | | |

(1) New Jersey State Plane, 1983, Coordinate System used. Elevation in feet above mean sea level.

Table P-1
Final Soil Sample Locations and Laboratory Results

| Sample ID | Survey Unit | Location | GPS Coordinates ⁽¹⁾ | | | Spectroscopy | Radionuclide | Radionuclide Concentration (pCi/g) | | |
|---------------|-------------|--|--------------------------------|-------------|-----------|--------------|--------------|------------------------------------|------------------|----------|
| | | | Northing | Easting | Elevation | | | Activity | Uncertainty (2σ) | MDC |
| E-1 (FS-128) | G | Grid E-1, under concrete @ 3' depth (wall) | 709755.8322 | 576553.7464 | 145.7500 | Gamma | U-238 | 8.24E+00 | NR | 8.24E+00 |
| | | | | | | | U-235 | 3.12E-01 | NR | 3.12E-01 |
| | | | | | | | Th-234 | 1.44E+00 | NR | 1.44E+00 |
| | | | | | | | Th-228 | 6.92E-01 | 1.62E-01 | NR |
| | | | | | | | Ra-228 | 4.71E-01 | 1.01E-01 | NR |
| | | | | | | | Ra-226 | 4.31E-01 | 5.59E-02 | NR |
| F-3 (FS-129) | G | Grid F-3, bottom @ 3' depth | 709744.1352 | 576563.9044 | 147.1300 | Gamma | U-238 | 9.58E+00 | 5.72E+00 | NR |
| | | | | | | | U-235 | 4.56E-01 | 3.44E-01 | NR |
| | | | | | | | Th-234 | 8.73E+00 | 4.77E+00 | NR |
| | | | | | | | Th-228 | 6.38E-01 | 1.68E-01 | NR |
| | | | | | | | Ra-228 | 6.17E-01 | 1.37E-01 | NR |
| | | | | | | | Ra-226 | 4.99E-01 | 7.84E-02 | NR |
| E-7 (FS-130) | G | Grid E-7, side @ 4' depth | 709736.2792 | 576584.6744 | 146.6200 | Gamma | U-238 | 1.58E+01 | 8.34E+00 | NR |
| | | | | | | | U-235 | 6.54E-01 | NR | 6.54E-01 |
| | | | | | | | Th-234 | 7.51E+00 | 2.44E+00 | NR |
| | | | | | | | Th-228 | 1.24E+00 | 2.57E-01 | NR |
| | | | | | | | Ra-228 | 1.21E+00 | 1.63E-01 | NR |
| | | | | | | | Ra-226 | 7.30E-01 | 8.62E-02 | NR |
| E-5 (FS-131) | G | Grid E-5, wall @ 3' depth | 709739.5532 | 576570.4504 | 148.0700 | Gamma | U-238 | 6.94E+00 | 6.71E+00 | NR |
| | | | | | | | U-235 | 6.60E-01 | NR | 6.60E-01 |
| | | | | | | | Th-234 | 6.92E+00 | 1.26E+00 | NR |
| | | | | | | | Th-228 | 9.64E-01 | 2.20E-01 | NR |
| | | | | | | | Ra-228 | 8.73E-01 | 1.70E-01 | NR |
| | | | | | | | Ra-226 | 5.96E-01 | 7.98E-02 | NR |
| A-13 (FS-132) | G | Grid A-13, wall @ 2' depth | 709744.7622 | 576628.7884 | 151.2400 | Gamma | U-238 | 9.55E+00 | NR | 9.55E+00 |
| | | | | | | | U-235 | 4.57E-01 | NR | 4.57E-01 |
| | | | | | | | Th-234 | 3.77E+00 | NR | 3.77E+00 |
| | | | | | | | Th-228 | 7.34E-01 | 1.86E-01 | NR |
| | | | | | | | Ra-228 | 6.68E-01 | 1.29E-01 | NR |
| | | | | | | | Ra-226 | 3.88E-01 | 7.28E-02 | NR |

(1) New Jersey State Plane, 1983, Coordinate System used. Elevation in feet above mean sea level.

Table P-1
Final Soil Sample Locations and Laboratory Results

| Sample ID | Survey Unit | Location | GPS Coordinates ⁽¹⁾ | | | Spectroscopy | Radionuclide | Radionuclide Concentration (pCi/g) | | |
|--|-------------|--------------------------------|--------------------------------|-------------|-----------|--------------|--------------|------------------------------------|------------------|----------|
| | | | Northing | Easting | Elevation | | | Activity | Uncertainty (2σ) | MDC |
| F-9 (FS-133) | G | Grid F-9, wall @ 4' depth | 709722.8322 | 576589.1504 | 148.0500 | Gamma | U-238 | 2.86E+01 | 8.43E+00 | NR |
| AFTER ADDITIONAL REMEDIATION - REMOVE FROM CALCULATION | | | | | | | U-235 | 1.30E+00 | 5.91E-01 | NR |
| | | | | | | | Th-234 | 2.48E+01 | 8.46E+00 | NR |
| | | | | | | | Th-228 | 1.03E+00 | 2.20E-01 | NR |
| | | | | | | | Ra-228 | 9.16E-01 | 1.43E-01 | NR |
| | | | | | | | Ra-226 | 5.88E-01 | 7.49E-02 | NR |
| E-4 (FS-134) | G | Grid E-7, bottom @ 2' depth | 709744.0012 | 576564.6624 | 147.2700 | Alpha | U-234 | 7.70E+00 | 1.60E+00 | 1.90E-01 |
| | | | | | | | U-235 | 3.70E-01 | 2.20E-01 | 1.40E-01 |
| | | | | | | | U-238 | 7.70E+00 | 1.60E+00 | 1.60E-01 |
| | | | | | | | Th-228 | 1.27E+00 | 2.60E-01 | 1.10E-01 |
| | | | | | | | Th-230 | 8.70E-01 | 1.90E-01 | 3.80E-02 |
| | | | | | | | Th-232 | 1.13E+00 | 2.30E-01 | 3.50E-02 |
| E-4 (FS-134) Lab Dup | G | Grid E-7, bottom @ 2' depth | 709744.0012 | 576564.6624 | 147.2700 | Alpha | U-234 | 6.80E+00 | 1.40E+00 | NR |
| | | | | | | | U-235 | 2.30E-01 | 1.70E-01 | NR |
| | | | | | | | U-238 | 6.90E+00 | 1.40E+00 | NR |
| | | | | | | | Th-228 | 1.13E+00 | 2.30E-01 | NR |
| | | | | | | | Th-230 | 7.50E-01 | 1.70E-01 | NR |
| | | | | | | | Th-232 | 1.10E+00 | 2.30E-01 | NR |
| E-10 (FS-135) | G | Grid E-10, bottom @ 2.5' depth | 709732.8752 | 576602.2134 | 148.2100 | Gamma | U-238 | 1.35E+01 | 6.92E+00 | NR |
| U-235 | | | | | | | 5.21E-01 | 3.62E-01 | NR | |
| Th-234 | | | | | | | 9.91E+00 | 1.22E+00 | NR | |
| Th-228 | | | | | | | 5.56E-01 | 1.59E-01 | NR | |
| Ra-228 | | | | | | | 6.17E-01 | 1.61E-01 | NR | |
| Ra-226 | | | | | | | 3.42E-01 | 6.15E-02 | NR | |
| D-8 (FS-136) | G | Grid D-8, bottom @ 4' depth | 709739.1032 | 576593.2034 | 146.9900 | Gamma | U-238 | 2.35E+01 | 9.28E+00 | NR |
| U-235 | | | | | | | 8.88E-01 | 8.29E-01 | NR | |
| Th-234 | | | | | | | 1.38E+01 | 6.38E+00 | NR | |
| Th-228 | | | | | | | 1.10E+00 | 2.40E-01 | NR | |
| Ra-228 | | | | | | | 9.01E-01 | 2.07E-01 | NR | |
| Ra-226 | | | | | | | 4.46E-01 | 7.49E-02 | NR | |

(1) New Jersey State Plane, 1983, Coordinate System used. Elevation in feet above mean sea level.

Table P-1
Final Soil Sample Locations and Laboratory Results

| Sample ID | Survey Unit | Location | GPS Coordinates ⁽¹⁾ | | | Spectroscopy | Radionuclide | Radionuclide Concentration (pCi/g) | | |
|---------------|-------------|--|--------------------------------|-------------|-----------|--------------|--------------|------------------------------------|------------------|----------|
| | | | Northing | Easting | Elevation | | | Activity | Uncertainty (2σ) | MDC |
| D-3 (FS-137) | G | Grid D-3, bottom @ 4' depth | 709756.7572 | 576564.7294 | 147.2400 | Gamma | U-238 | 1.55E+01 | 8.77E+00 | NR |
| | | | | | | | U-235 | 1.03E+00 | 4.62E-01 | NR |
| | | | | | | | Th-234 | 7.23E+00 | 5.65E+00 | NR |
| | | | | | | | Th-228 | 1.08E+00 | 2.43E-01 | NR |
| | | | | | | | Ra-228 | 9.62E-01 | 1.57E-01 | NR |
| | | | | | | | Ra-226 | 6.99E-01 | 8.30E-02 | NR |
| C-6 (FS-138) | G | Grid C-6, bottom @ 4' depth | 709753.0942 | 576583.6744 | 147.0900 | Gamma | U-238 | 1.44E+01 | NR | 1.44E+01 |
| | | | | | | | U-235 | 7.62E-01 | NR | 7.62E-01 |
| | | | | | | | Th-234 | 5.67E+00 | NR | 5.67E+00 |
| | | | | | | | Th-228 | 1.46E+00 | 3.54E-01 | NR |
| | | | | | | | Ra-228 | 1.36E+00 | 2.05E-01 | NR |
| | | | | | | | Ra-226 | 9.00E-01 | 1.09E-01 | NR |
| F-2 (FS-139) | G | Grid F-2, east wall @ 4' depth | 709748.7072 | 576551.4974 | 146.4800 | Gamma | U-238 | 8.20E+00 | 5.40E+00 | NR |
| | | | | | | | U-235 | 4.70E-01 | 4.68E-01 | NR |
| | | | | | | | Th-234 | 9.46E+00 | 5.38E+00 | NR |
| | | | | | | | Th-228 | 7.90E-01 | 2.04E-01 | NR |
| | | | | | | | Ra-228 | 8.54E-01 | 1.58E-01 | NR |
| | | | | | | | Ra-226 | 5.74E-01 | 8.20E-02 | NR |
| E-11 (FS-140) | G | Grid E-11, center bottom @ 2' depth | 709731.8912 | 576601.7774 | 148.5300 | Gamma | U-238 | 1.06E+01 | NR | 1.06E+01 |
| | | | | | | | U-235 | 2.94E-01 | NR | 2.94E-01 |
| | | | | | | | Th-234 | 2.54E+00 | 4.92E-01 | NR |
| | | | | | | | Th-228 | 4.36E-01 | 1.27E-01 | NR |
| | | | | | | | Ra-228 | 3.17E-01 | NR | 3.17E-01 |
| | | | | | | | Ra-226 | 2.47E-01 | 5.30E-02 | NR |
| F-2 (FS-141) | G | Grid F-2, wall under concrete @ 2' depth | 709749.3522 | 576552.1504 | 145.9600 | Gamma | U-238 | 8.01E+00 | NR | 8.01E+00 |
| | | | | | | | U-235 | 5.23E-01 | NR | 5.23E-01 |
| | | | | | | | Th-234 | 3.98E+00 | NR | 3.98E+00 |
| | | | | | | | Th-228 | 5.89E-01 | 1.44E-01 | NR |
| | | | | | | | Ra-228 | 6.86E-01 | 1.21E-01 | NR |
| | | | | | | | Ra-226 | 4.88E-01 | 6.87E-02 | NR |

(1) New Jersey State Plane, 1983, Coordinate System used. Elevation in feet above mean sea level.

Table P-1
Final Soil Sample Locations and Laboratory Results

| Sample ID | Survey Unit | Location | GPS Coordinates ⁽¹⁾ | | | Spectroscopy | Radionuclide | Radionuclide Concentration (pCi/g) | | |
|--|-------------|--|--------------------------------|-------------|-----------|--------------|--------------|------------------------------------|------------------|----------|
| | | | Northing | Easting | Elevation | | | Activity | Uncertainty (2σ) | MDC |
| D-6 (FS-142) | G | Grid D-6, bottom center of grid @ 4.5' depth | 709746.3092 | 576581.7244 | 146.8200 | Gamma | U-238 | 7.7E+01 | NR | 1.17E+01 |
| | | | | | | | U-235 | 5.88E-01 | NR | 5.88E-01 |
| | | | | | | | Th-234 | 5.19E+00 | NR | 5.19E+00 |
| | | | | | | | Th-228 | 1.12E+00 | 2.53E-01 | NR |
| | | | | | | | Ra-228 | 1.05E+00 | 2.00E-01 | NR |
| | | | | | | | Ra-226 | 7.73E-01 | 9.96E-02 | NR |
| D-7 (FS-143) | G | Grid D-7, bottom center of grid @ 5' depth | 709743.4122 | 576589.5644 | 147.1700 | Gamma | U-238 | 3.54E+01 | 9.18E+00 | NR |
| U-235 | | | | | | | 1.42E+00 | 6.25E-01 | NR | |
| Th-234 | | | | | | | 2.98E+01 | 9.93E+00 | NR | |
| Th-228 | | | | | | | 1.07E+00 | 2.39E-01 | NR | |
| Ra-228 | | | | | | | 9.81E-01 | 1.89E-01 | NR | |
| Ra-226 | | | | | | | 6.02E-01 | 8.22E-02 | NR | |
| D-4 (FS-144) | G | Grid D-4, bottom, east side of grid @ 4' depth | 709752.0562 | 576568.5574 | 146.9700 | Gamma | U-238 | 1.30E+01 | NR | 1.30E+01 |
| | | | | | | | U-235 | 3.98E-01 | NR | 3.98E-01 |
| | | | | | | | Th-234 | 2.31E+00 | 5.10E-01 | NR |
| | | | | | | | Th-228 | 1.19E+00 | 2.47E-01 | NR |
| | | | | | | | Ra-228 | 1.05E+00 | 1.57E-01 | NR |
| | | | | | | | Ra-226 | 7.12E-01 | 7.82E-02 | NR |
| E-6 (FS-145) | G | Grid E-6, bottom, east side of grid @ 4' depth | 709737.2572 | 576576.2944 | 147.2300 | Alpha | U-234 | 6.90E+00 | 1.30E+00 | 2.20E-01 |
| | | | | | | | U-235 | 4.20E-01 | 2.10E-01 | 1.20E-01 |
| | | | | | | | U-238 | 7.00E+00 | 1.40E+00 | 1.40E-01 |
| | | | | | | | Th-228 | 1.53E+00 | 3.10E-01 | 7.70E-02 |
| | | | | | | | Th-230 | 8.60E-01 | 2.00E-01 | 3.00E-02 |
| | | | | | | | Th-232 | 1.11E+00 | 2.40E-01 | 1.70E-02 |
| E-9 (FS-146) | G | Grid E-9, north wall @ 3' depth | 709726.6972 | 576595.5504 | 147.1000 | Gamma | U-238 | 2.64E+01 | 8.43E+00 | NR |
| U-235 | | | | | | | 8.96E-01 | 3.59E-01 | NR | |
| Th-234 | | | | | | | 1.89E+01 | 7.06E+00 | NR | |
| Th-228 | | | | | | | 7.68E-01 | 1.95E-01 | NR | |
| Ra-228 | | | | | | | 7.82E-01 | 1.32E-01 | NR | |
| Ra-226 | | | | | | | 5.43E-01 | 7.83E-02 | NR | |
| AFTER ADDITIONAL REMEDIATION - REMOVE FROM CALCULATION | | | | | | | | | | |

(1) New Jersey State Plane, 1983, Coordinate System used. Elevation in feet above mean sea level.

Table P-1
Final Soil Sample Locations and Laboratory Results

| Sample ID | Survey Unit | Location | GPS Coordinates ⁽¹⁾ | | | Spectroscopy | Radionuclide | Radionuclide Concentration (pCi/g) | | |
|--------------------|-------------|---|--------------------------------|-------------|-----------|--------------|--------------|------------------------------------|------------------|----------|
| | | | Northing | Easting | Elevation | | | Activity | Uncertainty (2σ) | MDC |
| E-2 (FS-147) | G | Grid E-2, bottom center of grid @ 5' depth | 709754.5792 | 576556.6074 | 145.6000 | Gamma | U-238 | 1.03E+01 | 6.54E+00 | NR |
| | | | | | | | U-235 | 6.92E-01 | NR | 6.92E-01 |
| | | | | | | | Th-234 | 7.20E+00 | 1.30E+00 | NR |
| | | | | | | | Th-228 | 1.13E+00 | 2.47E-01 | NR |
| | | | | | | | Ra-228 | 9.56E-01 | 1.61E-01 | NR |
| | | | | | | | Ra-226 | 6.63E-01 | 8.73E-02 | NR |
| Align-5-2 (FS-148) | F | outside of bld 7 basement @ F-4 grid, next to iron pipe penetrating | 709733.8592 | 576558.7574 | 150.1000 | Gamma | U-238 | 7.78E+00 | NR | 7.78E+00 |
| | | | | | | | U-235 | 2.61E-01 | NR | 2.61E-01 |
| | | | | | | | Th-234 | 1.22E+00 | NR | 1.22E+00 |
| | | | | | | | Th-228 | 4.15E-01 | 1.24E-01 | NR |
| | | | | | | | Ra-228 | 4.35E-01 | 1.08E-01 | NR |
| | | | | | | | Ra-226 | 4.18E-01 | 6.07E-02 | NR |
| B-3 (FS-149) | G | Grid B-3, bottom @ 3' depth | 709770.7032 | 576574.8874 | 148.1800 | Gamma | U-238 | 9.13E+00 | NR | 9.13E+00 |
| | | | | | | | U-235 | 4.58E-01 | NR | 4.58E-01 |
| | | | | | | | Th-234 | 3.92E+00 | NR | 3.92E+00 |
| | | | | | | | Th-228 | 7.69E-01 | 1.77E-01 | NR |
| | | | | | | | Ra-228 | 8.19E-01 | 1.54E-01 | NR |
| | | | | | | | Ra-226 | 6.03E-01 | 7.39E-02 | NR |
| B-6 (FS-150) | G | Grid B-6, bottom, east side of grid @ 2' depth | 709756.0302 | 576594.9334 | 148.6700 | Gamma | U-238 | 1.29E+01 | NR | 1.29E+01 |
| | | | | | | | U-235 | 6.81E-01 | NR | 6.81E-01 |
| | | | | | | | Th-234 | 5.05E+00 | NR | 5.05E+00 |
| | | | | | | | Th-228 | 1.04E+00 | 2.52E-01 | NR |
| | | | | | | | Ra-228 | 9.62E-01 | 1.89E-01 | NR |
| | | | | | | | Ra-226 | 7.66E-01 | 1.04E-01 | NR |
| D-7 (FS-151) | G | Grid D-7, bottom @ 6' depth | N/A | N/A | N/A | Gamma | U-238 | 1.24E+01 | NR | 1.24E+01 |
| | | | | | | | U-235 | 5.72E-01 | NR | 5.72E-01 |
| | | | | | | | Th-234 | 5.27E+00 | NR | 5.27E+00 |
| | | | | | | | Th-228 | 1.03E+00 | 2.37E-01 | NR |
| | | | | | | | Ra-228 | 1.04E+00 | 1.93E-01 | NR |
| | | | | | | | Ra-226 | 6.40E-01 | 9.31E-02 | NR |

(1) New Jersey State Plane, 1983, Coordinate System used. Elevation in feet above mean sea level.

Table P-1
Final Soil Sample Locations and Laboratory Results

| Sample ID | Survey Unit | Location | GPS Coordinates ⁽¹⁾ | | | Spectroscopy | Radionuclide | Radionuclide Concentration (pCi/g) | | |
|--------------|-------------|--------------------------------|--------------------------------|---------|-----------|--------------|--------------|------------------------------------|------------------|----------|
| | | | Northing | Easting | Elevation | | | Activity | Uncertainty (2σ) | MDC |
| D-8 (FS-152) | G | Grid F-8, bottom @ 5' depth | N/A | N/A | N/A | Gamma | U-238 | 9.98E+00 | 8.59E+00 | NR |
| | | | | | | | U-235 | 7.22E-01 | NR | 7.22E-01 |
| | | | | | | | Th-234 | 6.35E+00 | NR | 6.35E+00 |
| | | | | | | | Th-228 | 1.10E+00 | 2.43E-01 | NR |
| | | | | | | | Ra-228 | 1.02E+00 | 1.89E-01 | NR |
| | | | | | | | Ra-226 | 5.59E-01 | 8.37E-02 | NR |
| F-8 (FS-153) | G | Grid F-8, east wall @ 4' depth | N/A | N/A | N/A | Gamma | U-238 | 1.57E+01 | NR | 1.57E+01 |
| | | | | | | | U-235 | 5.03E-01 | NR | 5.03E-01 |
| | | | | | | | Th-234 | 6.68E+00 | 9.72E-01 | NR |
| | | | | | | | Th-228 | 1.48E+00 | 2.91E-01 | NR |
| | | | | | | | Ra-228 | 1.47E+00 | 1.79E-01 | NR |
| | | | | | | | Ra-226 | 8.75E-01 | 9.79E-02 | NR |
| F-7 (FS-154) | G | Grid F-7, east wall @ 4' depth | N/A | N/A | N/A | Gamma | U-238 | 1.19E+01 | NR | 1.19E+01 |
| | | | | | | | U-235 | 5.78E-01 | NR | 5.78E-01 |
| | | | | | | | Th-234 | 5.05E+00 | NR | 5.05E+00 |
| | | | | | | | Th-228 | 1.29E+00 | 2.59E-01 | NR |
| | | | | | | | Ra-228 | 1.12E+00 | 1.96E-01 | NR |
| | | | | | | | Ra-226 | 7.26E-01 | 8.26E-02 | NR |
| F-7 (FS-155) | G | Grid F-7, bottom @ 6' depth | N/A | N/A | N/A | Gamma | U-238 | 1.65E+01 | NR | 1.65E+01 |
| U-235 | | | | | | | 8.03E-01 | NR | 8.03E-01 | |
| Th-234 | | | | | | | 6.88E+00 | NR | 6.88E+00 | |
| Th-228 | | | | | | | 1.47E+00 | 3.36E-01 | NR | |
| Ra-228 | | | | | | | 1.15E+01 | 1.99E-01 | NR | |
| Ra-226 | | | | | | | 8.57E-01 | 1.08E-01 | NR | |
| E-8 (FS-156) | G | Grid C-8, bottom @ 6' depth | N/A | N/A | N/A | Gamma | U-238 | 1.96E+01 | 8.94E+00 | NR |
| U-235 | | | | | | | 5.07E-01 | NR | 5.07E-01 | |
| Th-234 | | | | | | | 9.71E+00 | 1.45E+00 | NR | |
| Th-228 | | | | | | | 1.34E+00 | 2.50E-01 | NR | |
| Ra-228 | | | | | | | 1.12E+00 | 1.67E-01 | NR | |
| Ra-226 | | | | | | | 6.07E-01 | 7.83E-02 | NR | |

(1) New Jersey State Plane, 1983, Coordinate System used. Elevation in feet above mean sea level.

Table P-1
Final Soil Sample Locations and Laboratory Results

| Sample ID | Survey Unit | Location | GPS Coordinates ⁽¹⁾ | | | Spectroscopy | Radionuclide | Radionuclide Concentration (pCi/g) | | |
|---|-------------|---------------------------------|--------------------------------|---------|-----------|--------------|--------------|------------------------------------|------------------|----------|
| | | | Northing | Easting | Elevation | | | Activity | Uncertainty (2σ) | MDC |
| F-2 (FS-157) | G | Grid F-2, south wall @ 2' depth | N/A | N/A | N/A | Gamma | U-238 | 1.10E+01 | NR | 1.10E+01 |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - REMOVE FROM CALCULATION | | | | | | | U-235 | 3.74E-01 | NR | 3.74E-01 |
| | | | | | | | Th-234 | 4.53E+00 | 8.80E-01 | NR |
| | | | | | | | Th-228 | 9.03E-01 | 1.91E-01 | NR |
| | | | | | | | Ra-228 | 6.78E-01 | 1.17E-01 | NR |
| | | | | | | | Ra-226 | 6.25E-01 | 7.03E-02 | NR |
| F-2 (FS-157) Field Dup | G | Grid F-2, south wall @ 2' depth | N/A | N/A | N/A | Gamma | U-238 | NRC | NRC | NRC |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - REMOVE FROM CALCULATION | | | | | | | U-235 | | | |
| | | | | | | | Th-234 | | | |
| | | | | | | | Th-228 | | | |
| | | | | | | | Ra-228 | | | |
| | | | | | | | Ra-226 | | | |
| F-7 (FS-158) | G | Grid F-7, east wall @ 3' depth | N/A | N/A | N/A | Gamma | U-238 | 1.50E+01 | NR | 1.50E+01 |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - REMOVE FROM CALCULATION | | | | | | | U-235 | 6.80E-01 | NR | 6.80E-01 |
| | | | | | | | Th-234 | 6.80E-01 | NR | 6.80E-01 |
| | | | | | | | Th-228 | 1.38E+00 | 3.02E-01 | NR |
| | | | | | | | Ra-228 | 1.25E+00 | 1.91E-01 | NR |
| | | | | | | | Ra-226 | 7.50E-01 | 9.53E-02 | NR |
| F-7 (FS-158) Field Dup | G | Grid F-7, east wall @ 3' depth | N/A | N/A | N/A | Gamma | U-238 | NRC | NRC | NRC |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - REMOVE FROM CALCULATION | | | | | | | U-235 | | | |
| | | | | | | | Th-234 | | | |
| | | | | | | | Th-228 | | | |
| | | | | | | | Ra-228 | | | |
| | | | | | | | Ra-226 | | | |
| F-8 (FS-159) | G | Grid F-8, east wall @ 3' depth | N/A | N/A | N/A | Gamma | U-238 | 1.09E+01 | 9.11E+00 | NR |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - REMOVE FROM CALCULATION | | | | | | | U-235 | 4.25E-01 | 3.45E-01 | NR |
| | | | | | | | Th-234 | 9.71E+00 | 1.27E+00 | NR |
| | | | | | | | Th-228 | 1.43E+00 | 3.14E-01 | NR |
| | | | | | | | Ra-228 | 1.36E+00 | 1.88E-01 | NR |
| | | | | | | | Ra-226 | 1.22E+00 | 1.09E-01 | NR |

(1) New Jersey State Plane, 1983, Coordinate System used. Elevation in feet above mean sea level.

Table P-1
Final Soil Sample Locations and Laboratory Results

| Sample ID | Survey Unit | Location | GPS Coordinates ⁽¹⁾ | | | Spectroscopy | Radionuclide | Radionuclide Concentration (pCi/g) | | |
|--|-------------|--|--------------------------------|---------|-----------|--------------|--|--|--|--|
| | | | Northing | Easting | Elevation | | | Activity | Uncertainty (2σ) | MDC |
| F-8 (FS-159) Field Dup AFTER ADDITIONAL REMEDATION BEHIND EAST WALL - REMOVE FROM CALCULATION | G | Grid F-8, east wall @ 3' depth | N/A | N/A | N/A | Gamma | U-238 U-235 Th-234 Th-228 Ra-228 Ra-226 | NRC | NRC | NRC |
| G-10 (FS-160) AFTER ADDITIONAL REMEDATION BEHIND EAST WALL - ADD TO CALCULATION | G | Grid G-10 outside bld. 7, east wall, bottom | N/A | N/A | N/A | Gamma | U-238 U-235 Th-234 Th-228 Ra-228 Ra-226 | 9.58E+00 5.00E-01 3.32E+00 6.87E-01 5.56E-01 4.78E-01 | NR NR 7.88E-01 1.61E-01 1.20E-01 7.48E-02 | 9.58E+00 5.00E-01 NR NR NR NR |
| G-2 (FS-161) AFTER ADDITIONAL REMEDATION BEHIND EAST WALL - ADD TO CALCULATION | G | Grid G-10 outside bld. 7, east wall, bottom | N/A | N/A | N/A | Gamma | U-238 U-235 Th-234 Th-228 Ra-228 Ra-226 | 2.73E+01 1.37E+00 2.01E+01 1.38E+00 1.33E+00 6.25E-01 | 1.06E+01 6.64E-01 8.50E+00 3.15E-01 2.24E-01 9.36E-02 | NR NR NR NR NR NR |
| G-6 (FS-162) AFTER ADDITIONAL REMEDATION BEHIND EAST WALL - ADD TO CALCULATION | G | Grid G-6 outside bld. 7, east wall, bottom | N/A | N/A | N/A | Gamma | U-238 U-235 Th-234 Th-228 Ra-228 Ra-226 | 1.45E+01 1.59E+00 1.09E+01 1.17E+00 9.92E-01 7.13E-01 | NR 1.14E+00 5.96E+00 2.83E-01 1.86E-01 9.87E-02 | 1.45E+01 NR NR NR NR NR |
| F-9 (FS-163) AFTER ADDITIONAL REMEDATION BEHIND EAST WALL - ADD TO CALCULATION | G | Grid F-9, north wall @ 3' depth | N/A | N/A | N/A | Alpha | U-234 U-235 U-238 Th-228 Th-230 Th-232 | 5.20E+00 3.90E-01 5.40E+00 7.90E-01 7.00E-01 7.40E-01 | 1.10E+00 1.70E-01 1.10E+00 1.70E-01 1.60E-01 1.70E-01 | 1.20E-01 8.00E-02 4.60E-01 4.20E-02 1.40E-02 2.90E-02 |

(1) New Jersey State Plane, 1983, Coordinate System used. Elevation in feet above mean sea level.

Table P-1
Final Soil Sample Locations and Laboratory Results

| Sample ID | Survey Unit | Location | GPS Coordinates ⁽¹⁾ | | | Spectroscopy | Radionuclide | Radionuclide Concentration (pCi/g) | | |
|--|-------------|-----------------------------------|--------------------------------|---------|-----------|--------------|--------------|------------------------------------|------------------|----------|
| | | | Northing | Easting | Elevation | | | Activity | Uncertainty (2σ) | MDC |
| F-2 (FS-164) | G | Grid F-2, south wall @ 2.5' depth | N/A | N/A | N/A | Gamma | U-238 | 1.71E+01 | 8.31E+00 | NR |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - ADD TO CALCULATION | | | | | | | U-235 | 3.81E-01 | 4.19E-01 | NR |
| | | | | | | | Th-234 | 1.53E+01 | 6.59E+00 | NR |
| | | | | | | | Th-228 | 6.97E-01 | 1.95E-01 | NR |
| | | | | | | | Ra-228 | 9.32E-01 | 1.66E-01 | NR |
| | | | | | | | Ra-226 | 5.78E-01 | 7.77E-02 | NR |
| G-4 (FS-165) | G | Grid G-4, bottom @ 7.5' depth | N/A | N/A | N/A | Alpha | U-234 | 1.32E+01 | 2.50E+00 | 1.30E-01 |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - ADD TO CALCULATION | | | | | | | U-235 | 6.40E-01 | 2.40E-01 | 8.70E-02 |
| | | | | | | | U-238 | 1.35E+01 | 2.50E+00 | 8.70E-02 |
| | | | | | | | Th-228 | 1.23E+00 | 2.50E-01 | 7.50E-02 |
| | | | | | | | Th-230 | 8.00E-01 | 1.80E-01 | 4.40E-02 |
| | | | | | | | Th-232 | 1.00E+00 | 2.10E-01 | 4.80E-02 |
| G-5 (FS-166) | G | Grid G-5, east wall @ 6' depth | N/A | N/A | N/A | Gamma | U-238 | 1.58E+01 | 7.30E+00 | NR |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - ADD TO CALCULATION | | | | | | | U-235 | 7.78E-01 | 3.52E-01 | NR |
| | | | | | | | Th-234 | 1.12E+01 | 6.54E+00 | NR |
| | | | | | | | Th-228 | 1.20E+00 | 2.59E-01 | NR |
| | | | | | | | Ra-228 | 1.16E+00 | 1.62E-01 | NR |
| | | | | | | | Ra-226 | 7.77E-01 | 9.26E-02 | NR |
| G-2 (FS-167) | G | Grid G-2, east wall @ 6' depth | N/A | N/A | N/A | Gamma | U-238 | 2.54E+01 | 8.89E+00 | NR |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - ADD TO CALCULATION | | | | | | | U-235 | 1.14E+00 | 5.82E-01 | NR |
| | | | | | | | Th-234 | 1.92E+01 | 7.89E+00 | NR |
| | | | | | | | Th-228 | 8.91E-01 | 2.43E-01 | NR |
| | | | | | | | Ra-228 | 1.07E+00 | 1.93E-01 | NR |
| | | | | | | | Ra-226 | 7.77E-01 | 9.50E-02 | NR |
| G-6 (FS-168) | G | Grid G-6, bottom @ 7' depth | N/A | N/A | N/A | Gamma | U-238 | 1.24E+01 | NR | 1.24E+01 |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - ADD TO CALCULATION | | | | | | | U-235 | 6.50E-01 | NR | 6.50E-01 |
| | | | | | | | Th-234 | 5.29E+00 | NR | 5.29E+00 |
| | | | | | | | Th-228 | 1.16E+00 | 2.51E-01 | NR |
| | | | | | | | Ra-228 | 8.76E-01 | 1.58E-01 | NR |
| | | | | | | | Ra-226 | 5.93E-01 | 8.06E-02 | NR |

(1) New Jersey State Plane, 1983, Coordinate System used. Elevation in feet above mean sea level.

Table P-1
Final Soil Sample Locations and Laboratory Results

| Sample ID | Survey Unit | Location | GPS Coordinates ⁽¹⁾ | | | Spectroscopy | Radionuclide | Radionuclide Concentration (pCi/g) | | |
|--|-------------|--------------------------------|--------------------------------|---------|-----------|--------------|--------------|------------------------------------|------------------|----------|
| | | | Northing | Easting | Elevation | | | Activity | Uncertainty (2σ) | MDC |
| G-7 (FS-169) | G | Grid G-7, east wall @ 7' depth | N/A | N/A | N/A | Gamma | U-238 | 1.59E+01 | 8.07E+00 | NR |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - ADD TO CALCULATION | | | | | | | U-235 | 6.23E-01 | NR | 6.23E-01 |
| | | | | | | | Th-234 | 5.74E+00 | NR | 5.74E+00 |
| | | | | | | | Th-228 | 1.27E+00 | 2.70E-01 | NR |
| | | | | | | | Ra-228 | 1.12E+00 | 1.91E-01 | NR |
| | | | | | | | Ra-226 | 7.84E-01 | 9.05E-02 | NR |
| G-7 (FS-170) | G | Grid G-7, east wall @ 5' depth | N/A | N/A | N/A | Gamma | U-238 | 1.12E+01 | 6.33E+00 | NR |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - ADD TO CALCULATION | | | | | | | U-235 | 6.86E-01 | NR | 6.86E-01 |
| | | | | | | | Th-234 | 8.52E+00 | 1.91E+00 | NR |
| | | | | | | | Th-228 | 8.02E-01 | 1.90E-01 | NR |
| | | | | | | | Ra-228 | 7.65E-01 | 1.57E-01 | NR |
| | | | | | | | Ra-226 | 6.49E-01 | 8.17E-02 | NR |
| G-8 (FS-171) | G | Grid G-7, bottom @ 7' depth | N/A | N/A | N/A | Gamma | U-238 | 1.19E+01 | NR | 1.19E+01 |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - ADD TO CALCULATION | | | | | | | U-235 | 5.83E-01 | NR | 5.83E-01 |
| | | | | | | | Th-234 | 4.89E+00 | NR | 4.89E+00 |
| | | | | | | | Th-228 | 1.15E+00 | 2.47E-01 | NR |
| | | | | | | | Ra-228 | 1.13E+00 | 1.61E-01 | NR |
| | | | | | | | Ra-226 | 5.91E-01 | 7.83E-02 | NR |
| G-8 (FS-172) | G | Grid G-7, east wall @ 6' depth | N/A | N/A | N/A | Gamma | U-238 | 1.21E+01 | NR | 1.21E+01 |
| AFTER ADDITIONAL REMEDIATION BEHIND EAST WALL - ADD TO CALCULATION | | | | | | | U-235 | 6.64E-01 | NR | 6.64E-01 |
| | | | | | | | Th-234 | 5.22E+00 | NR | 5.22E+00 |
| | | | | | | | Th-228 | 1.20E+00 | 2.83E-01 | NR |
| | | | | | | | Ra-228 | 1.52E+00 | 2.32E-01 | NR |
| | | | | | | | Ra-226 | 7.02E-01 | 8.61E-02 | NR |

Revised 01/16/01

Notes:

MDA values are shaded.

"NR" denotes values not reported by the laboratory.

"NRC" denotes duplicate samples taken by NRC.

"N/A" denotes GPS readings not available.

* denotes result is less than the sample specific minimum detectable activity.

(1) New Jersey State Plane, 1983, Coordinate System used. Elevation in feet above mean sea level.