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FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM (FUSRAP)
CONTRACT NO. DE-AC05-81OR20722

RADIOLOGICAL SURVEY OF THE FORMER SHPACK LANDFILL

NORTON, MASSACHUSETTS

MARCH 1984

Bechtel Job 14501
Bechtel National, Inc.
Advanced Technology Division

DOE/OR/20722-4

Radiological Survey of the Former Shpack Landfill

March 1984

Prepared for the U.S. Department of Energy
under Contract No. DE-AC05-81OR20722

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDIX A

ABBREVIATIONS

cm	centimeter
cpm	counts per minute
ha	hectare
km	kilometer
m	meter
R/h	microroentgens per hour
mi	mile
mrad/h	millirads per hour
pCi/g	picocuries per gram
PIC	pressurized ion chamber
yd^3	cubic yard

1.0 INTRODUCTION AND SUMMARY

1.1 INTRODUCTION

Bechtel National, Inc., (BNI) and its radiological support subcontractor, Eberline Instrument Corporation (EIC), conducted a radiological characterization survey of the former Shpack Landfill during August and September 1982. The objective of this survey was to provide a definitive description of the boundaries of contamination which were identified during a radiological survey done by Oak Ridge National Laboratory (ORNL) in 1980 (Reference 1). The 1982 survey was technically feasible as a complementary follow-up to the ORNL survey because no actions had occurred at the site to change contamination patterns. Both surveys were performed as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). This program is a DOE initiative to clean up or otherwise control sites where low-level radioactive contamination, at levels above current guidelines, remains from the early years of the nation's atomic energy program. BNI is the Program Management Contractor (PMC) for FUSRAP.

This report describes the procedures used to conduct the 1982 survey, the results of the survey, and the significance of findings. An evaluation of the results from both surveys is required to provide the detailed information necessary for remedial action design engineering.

1.2 SUMMARY

The distribution of contamination on the Shpack Landfill site is spotty and uneven, both horizontally and vertically. Although some hotspots exceed FUSRAP criteria (see Appendix B), average concentrations of soil contamination are below the residual limits requiring remedial action. Removal of the hotspots only would generate approximately 390 m^3 (400 yd^3)

of low level radioactive waste. However, because of the relative physical and chemical stability of the radioactive contamination, such an effort could be deferred without harmful effect to individuals, the public or the natural environment. The site is also widely contaminated with chemical pollutants that might eventually require remedial action pursuant to several state and federal environmental statutes. The timing and nature of these possible environmental improvements could easily negate the need for a separate remedial action to clean up the radioactive contamination.

2.0 SITE DESCRIPTION AND HISTORY

2.1 LOCATION AND DESCRIPTION

The former Shpack Landfill covers an area of approximately 3.2 ha (8 acres). Of this area, 2.2 ha (5.5 acres) lie within the Town of Norton, Massachusetts. This area of the site was formerly owned by Mrs. Isadore Shpack who sold the property to the Town of Norton in 1981. The remaining 1 ha (2.5 acres) lies within the Attleboro, Massachusetts corporate limits and is owned by a private firm, Attleboro Landfill, Inc. The location of the site is illustrated in Figure 2-1.

The landfill is located in an area dominated by glacial deposits overlying bedrock. These deposits range in thickness from 4.5 to 7.6 m (15 to 25 ft) and in some areas are overlain by organic deposits (peat) which vary in depth from 1.5 to 9.2 m (5 to 30 ft) (Ref. 1). The groundwater in the area is produced from both bedrock and superficial aquifers.

The former Shpack Landfill is now closed and the area is undeveloped. The site is traversed by three sets of high-voltage power transmission lines owned by the New England Power Company. The surface presently contains metal scrap, brick, concrete blocks, metal drums, plastics and other miscellaneous debris. The area is swampy and covered with water part of the year. The site was fenced in 1981 to control access. Figure 2-2 is an aerial photograph of the landfill taken at a time when the site was dryer than normal.

2.2 SITE HISTORY

The Shpack Landfill was a private landfill which began operating in 1946. It received both industrial and domestic

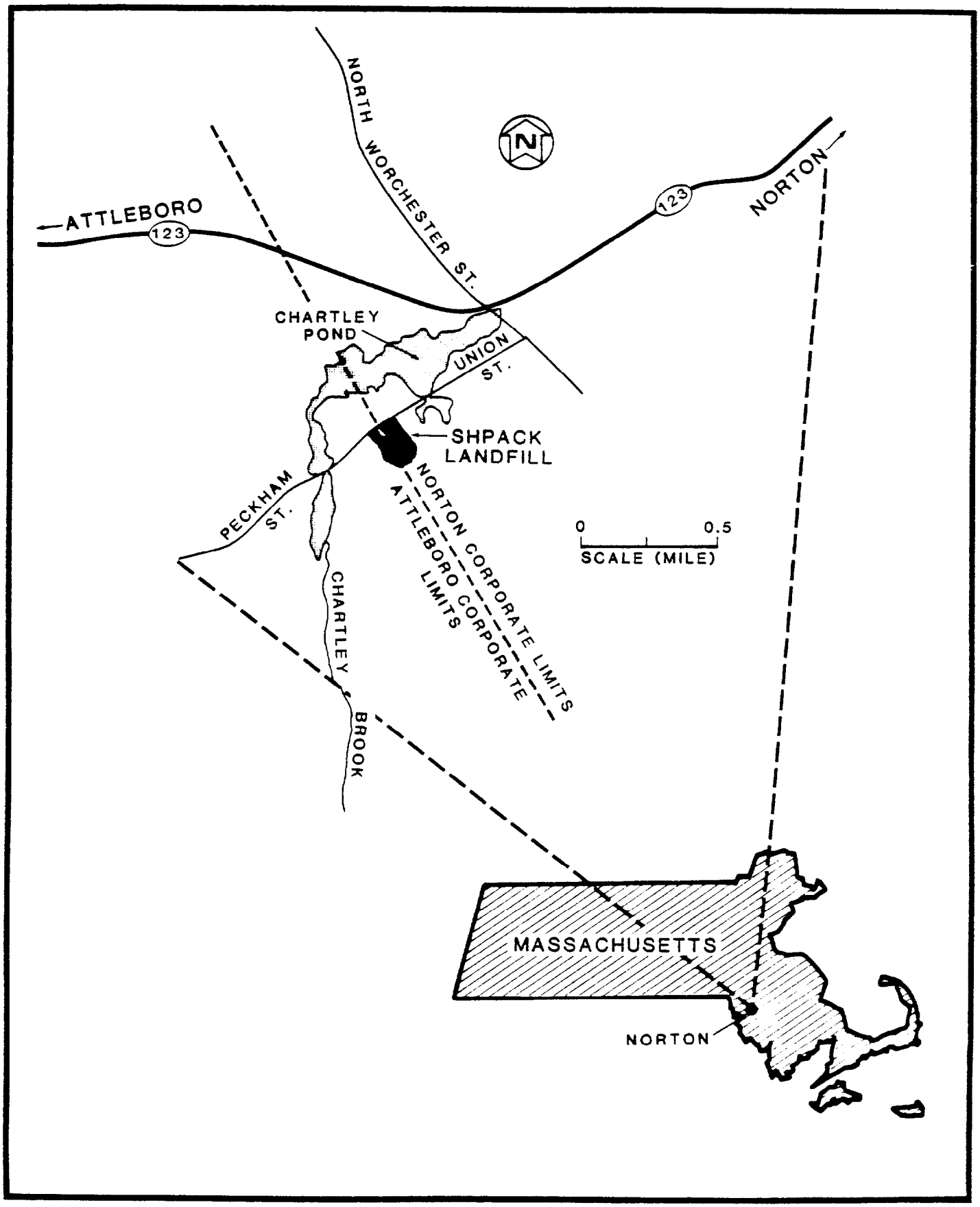

FIGURE 2-1 LOCATION OF SHPACK LANDFILL SITE

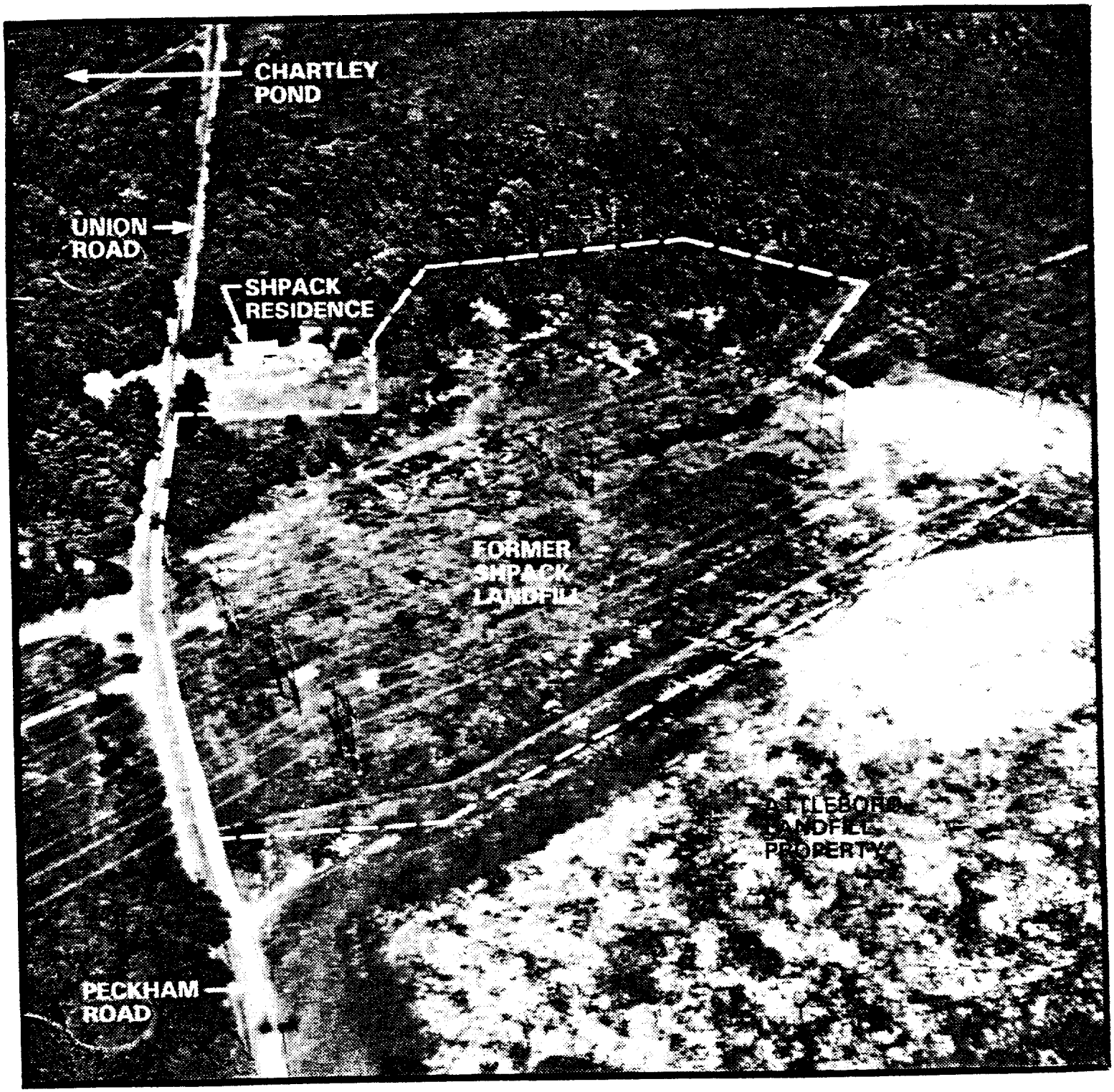

FIGURE 2-2 AERIAL PHOTOGRAPH OF SHPACK LANDFILL SITE, LOOKING NORTHEAST

wastes, with the major use of the landfill occurring between 1951 and 1965, after which the landfill was closed by a court order.

In 1978, the Nuclear Regulatory Commission (NRC) was contacted by a concerned citizen who had detected elevated radiation levels at the site. The NRC conducted a special investigation of the landfill which confirmed the presence of radioactivity above natural background levels for the area. The primary contaminants found were radium-226, uranium-238 and uranium-235.

It is not known exactly when these radioactive materials were deposited at the site. However, an NRC investigation determined that the former M&C Nuclear, Inc., of Attleboro, Massachusetts (which merged with Texas Instruments, Inc., in 1959) had used the landfill for the disposal of trash and other materials, including zirconium ashes, associated with nuclear fuel operations conducted at the facility from 1957 to 1965. The NRC concluded that the M&C facility was the likely source of the major portion of the radioactive materials.

Following the NRC investigation, the determination was made that the Shpack Landfill should be further investigated as a candidate site for FUSRAP. In the summer of 1980, ORNL conducted a radiological survey, which measured beta-gamma dose rates at ground surface and gamma exposure rates at the surface and 1 m (3 ft) above the surface. It also measured radionuclide concentrations in surface and subsurface soils (down to the water table), in surface and subsurface water on the site, and in surface water in the vicinity which receives runoff from the site. Sixty-three boreholes were drilled during the ORNL survey to determine the gamma profile of subsurface radioactivity. ORNL published a report which presented the results of the survey and the significance of the findings (Reference 1). The ORNL report confirmed the NRC

preliminary finding that radium and uranium were the principal contaminants and defined the general areas of contamination. Based on the results of this survey, the former Shpack Landfill was designated by DOE as a candidate site for remedial action under FUSRAP.

One principal observation from the ORNL survey findings was the non-uniform distribution of radioactive material on the site. Additional survey data on the depth of contamination and on the size and shape of the contaminated areas were required to provide input for an engineering evaluation of possible remedial action alternatives. As Project Management Contractor for FUSRAP, BNI and EIC, (the radiological support subcontractor,) conducted another radiological survey of the landfill in August and September 1982. The procedures, results and significance of this survey are presented in the following sections.

3.0 SURVEY PROCEDURES

3.1 GENERAL

The present radiological survey was conducted by BNI in August and September 1982. The survey grid system previously established during the ORNL survey was used for this survey of the site. However, in reconstructing the grid system, mutually perpendicular lines were spaced 30 m (100 ft) apart, as shown in Figure 3-1, instead of 15 m (50 ft) as used by ORNL. Except as noted below, most of the radiological measurements were made at 6-m (20-ft) intervals within the major grid blocks.

3.2 FIELD MEASUREMENTS

Beta-gamma dose rate measurements were made at the ground surface using a thin-window (GM) probe (EIC Model HP-210) coupled with a ratemeter/scaler (EIC Model PRS-1). The HP-210 detector was calibrated against certified check sources of strontium-90, yttrium-90, and technetium-99. The average background in the landfill area using an HP-210 probe was 30 counts per minute (cpm), or .02 mrad/h.

Gamma measurements were made 30 cm (1 ft) above the ground surface using a 5-cm x 5-cm (2-in. x 2-in.) sodium-iodide (NaI) detector (EIC Model SPA-3). The detector was mounted in a probe assembly surrounded with a conical lead shield to reduce the gamma intensity through the sides, thus providing a downward directional response. The detector was coupled with an EIC PRS-1 ratemeter/scaler. The SPA-3 detector was calibrated against a certified check source of cesium-137. The average background reading using a SPA-3 detector in the landfill area was 5,000 cpm.

Initial beta-gamma and gamma measurements were made at 6-m (20-ft) intervals within the grid. Following analysis of these

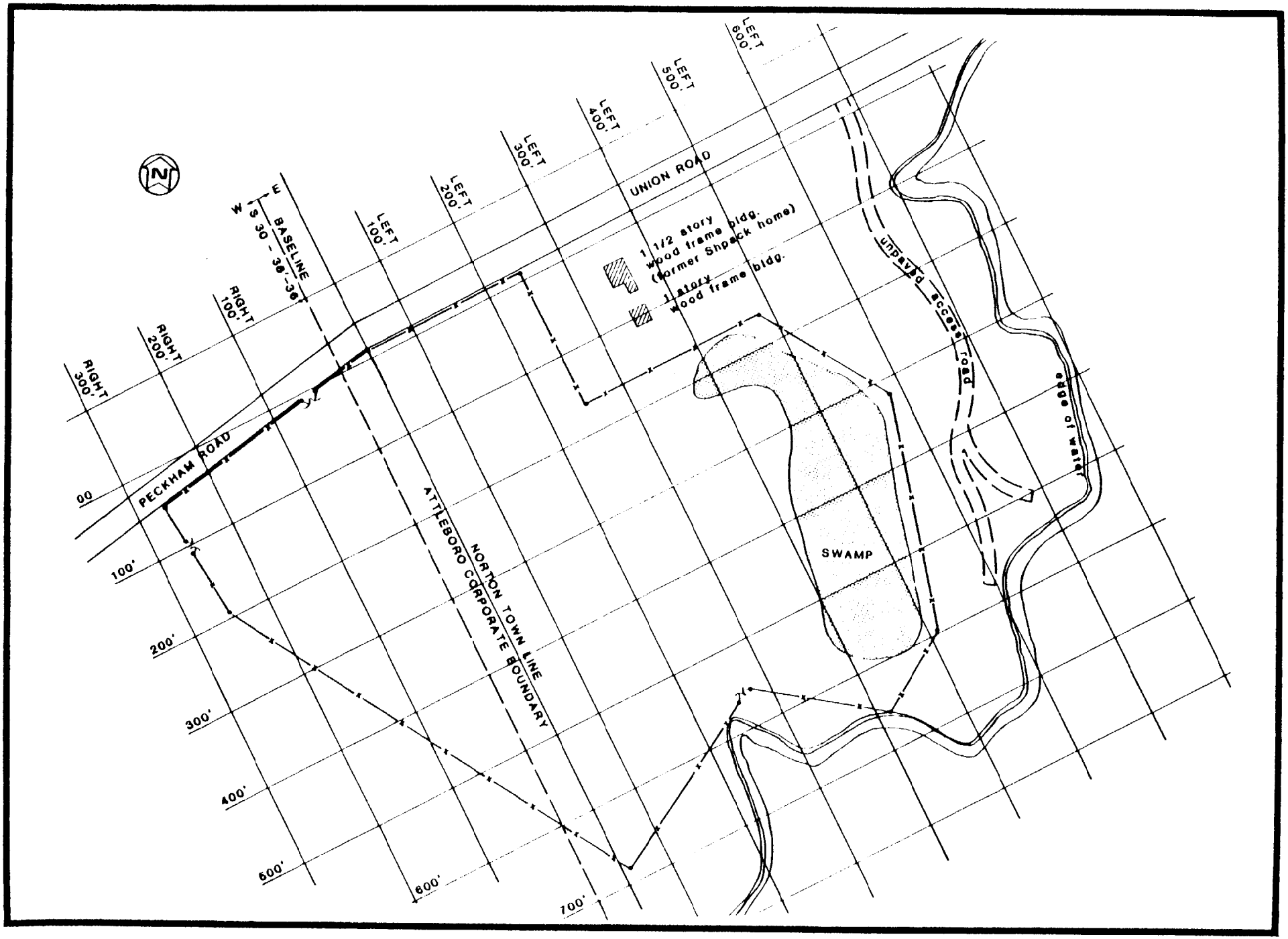

FIGURE 3-1 SHPACK MASTER GRID

initial measurements, coupled with the findings of the ORNL report, additional measurements were taken as necessary at 1.5 m (5-ft) intervals to define more precisely the boundaries of contaminated surface soil.

Gamma exposure rates at 1 m (3 ft) above the ground were also made using an EIC Model SPA-3. Measurements were taken on the grid points at 30-m (100-ft) intervals. A pressurized ion chamber (PIC) was also used to make a series of measurements to obtain the calibration factor used to estimate the gamma exposure rate from NaI detector readings in microroentgens per hour (R/h). The PIC response is proportional to exposure in roentgens. The average background using the PIC in the landfill area was 10 R/h. PIC reading locations are shown in Figure 3-2.

Boreholes were drilled throughout the contaminated areas (see Figure 3-3) to determine the depth of contamination. Many of the borehole locations were selected based on the findings in the ORNL report. This was done in order to extend the investigation of areas where ORNL had observed elevated radioactivity at the water table. In some areas, more than one borehole was drilled at the same grid point to better define the highly irregular patterns of contamination. These results are reported in data tables of this report with the same location coordinates as previously noted boreholes.

Boreholes of 15-cm (6-in.) diameter were drilled with an auger through the landfill material to determine the spatial distribution in the saturated zone below the existing water table. A section of 7.6-cm (3-in.) PVC plastic pipe was inserted into the hole. A 5-cm x 5-cm (2 in. x 2 in.) NaI scintillation detector coupled with a PRS-1 ratemeter/scaler was lowered into the pipe to determine a profile of the radioactivity as a function of depth. Timed gamma measurements were made at 15-cm (6-in.) vertical intervals.

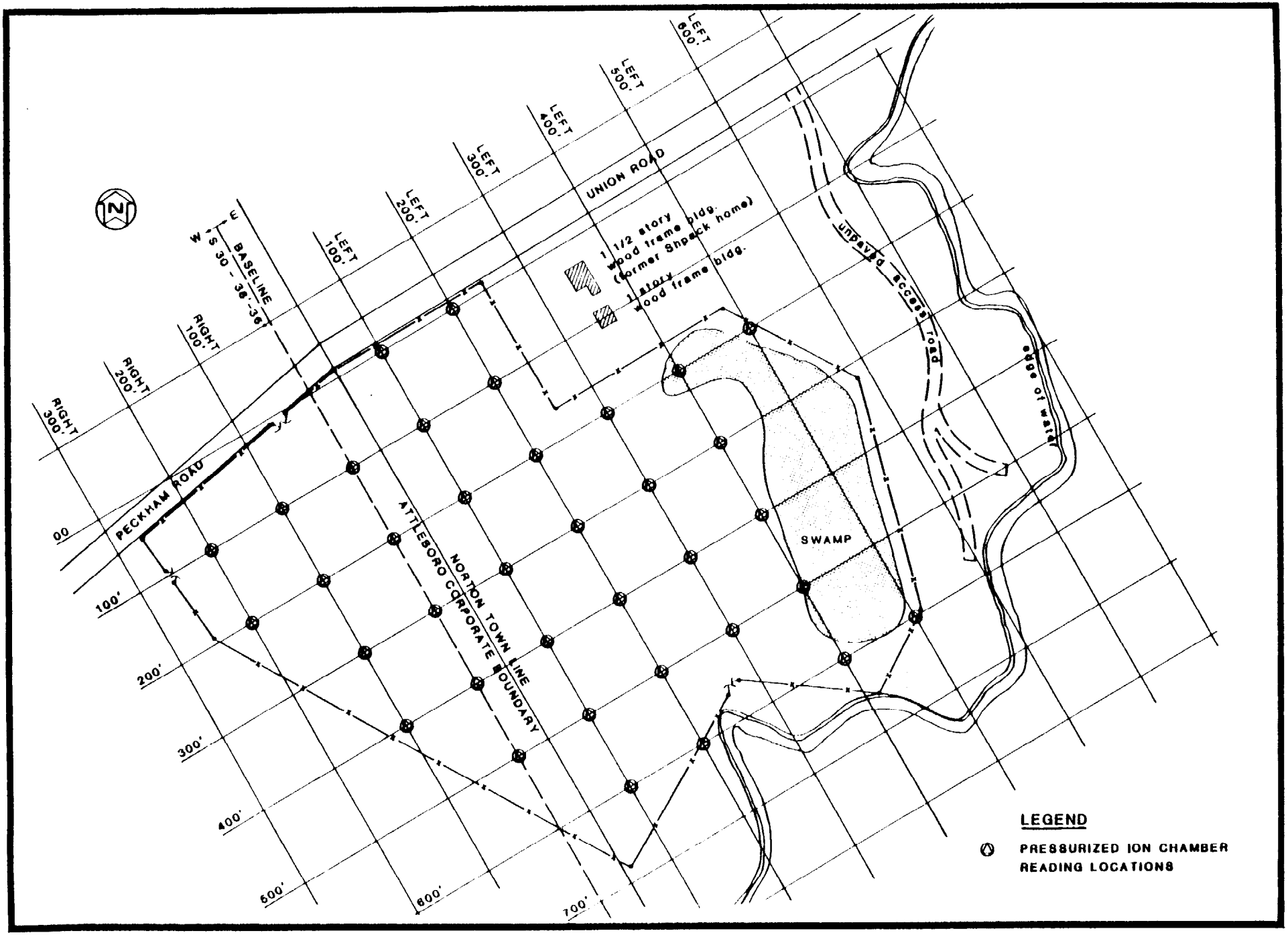

FIGURE 3-2 PRESSURIZED ION CHAMBER (PIC) READING LOCATIONS

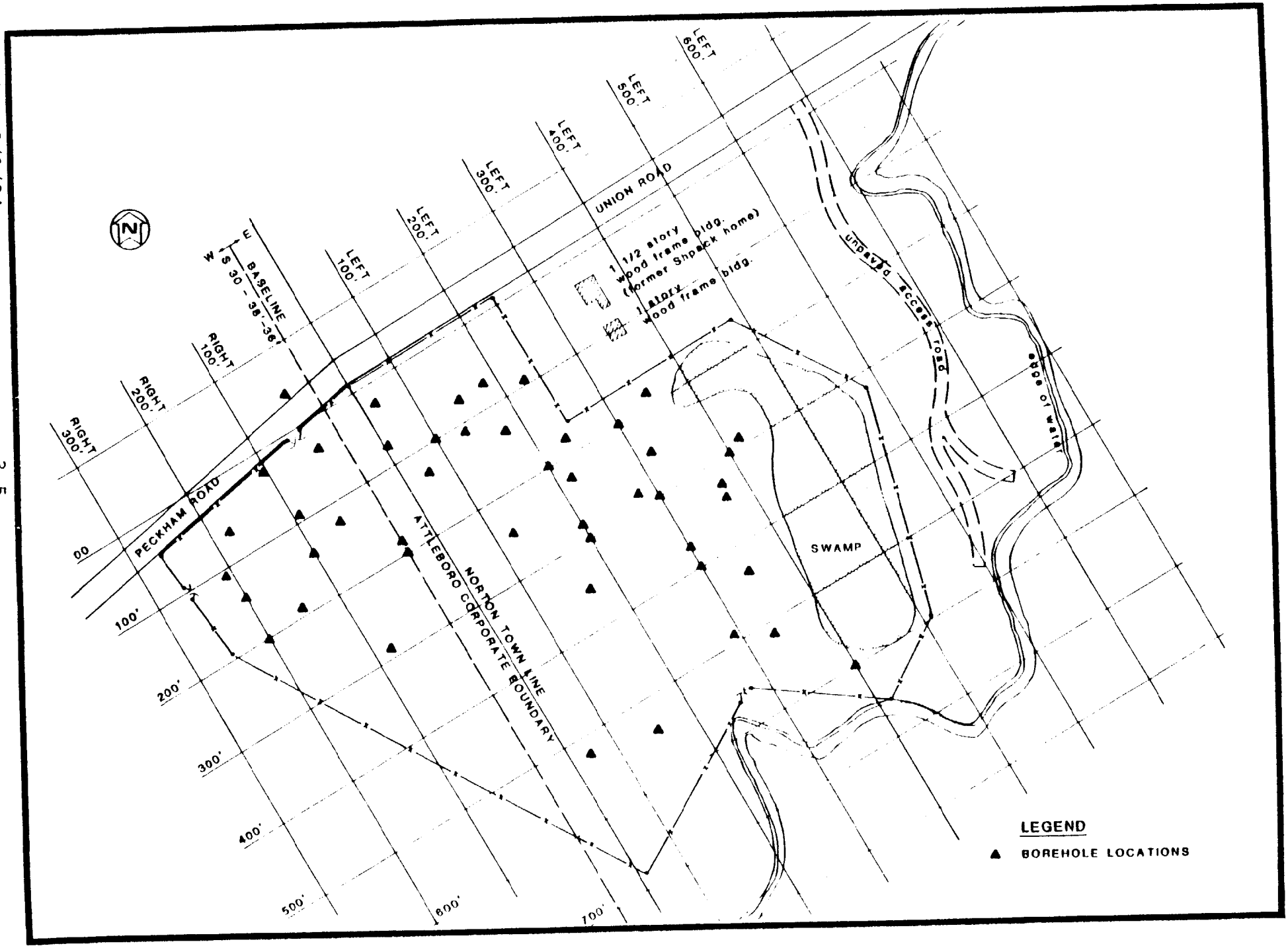

FIGURE 3-3 BOREHOLE LOCATIONS

After completion of the characterization survey, all holes were sealed with a bentonite slurry material to eliminate vertical contamination spread.

3.3 SAMPLE COLLECTION AND ANALYSIS

In this report, surface soil samples are considered those from the top 15 cm (6 in.) of soil. Surface soil sampling locations were determined based on near-surface gamma measurement data; the locations are shown in Figure 3-4. In addition, a minimum of four samples were collected in the vicinity of each surface area identified in the ORNL report as having a ground-level gamma exposure rate greater than 50 R/h. Surface soil samples consisted of composites of soil plugs 2 cm (0.75 in.) in diameter to a depth of 15 cm (6 in.). Samples were placed in 0.5-liter (1 pt) plastic containers, labelled, and capped. The samples were sent to DOE's Niagara Falls Storage Site (NFSS), where they were analyzed on site for radium-226 and uranium-238 using the high resolution gamma spectrometry system in the FUSRAP Count Trailer No. 1 (Ref. 2). Each sample was analyzed 10 minutes using an intrinsic-germanium detector [30 percent efficiency as compared to a 7.6 x 7.6 cm (3 in. x 3 in.) NaI detector] housed in a lead counting cave lined with copper and cadmium.

Following the initial gamma spectrometry analysis of soil samples, an aliquot of soil was taken from each of 50 selected samples and sent to the EIC laboratory in Albuquerque, New Mexico for radiochemical analysis. This analysis was performed to provide more accurate measures of the concentrations of uranium-234 and uranium-238. Additional analyses were also required to determine the concentrations of uranium-235 throughout the landfill. Following the radiochemical analyses in the EIC laboratory, an aliquot of the remaining portion of

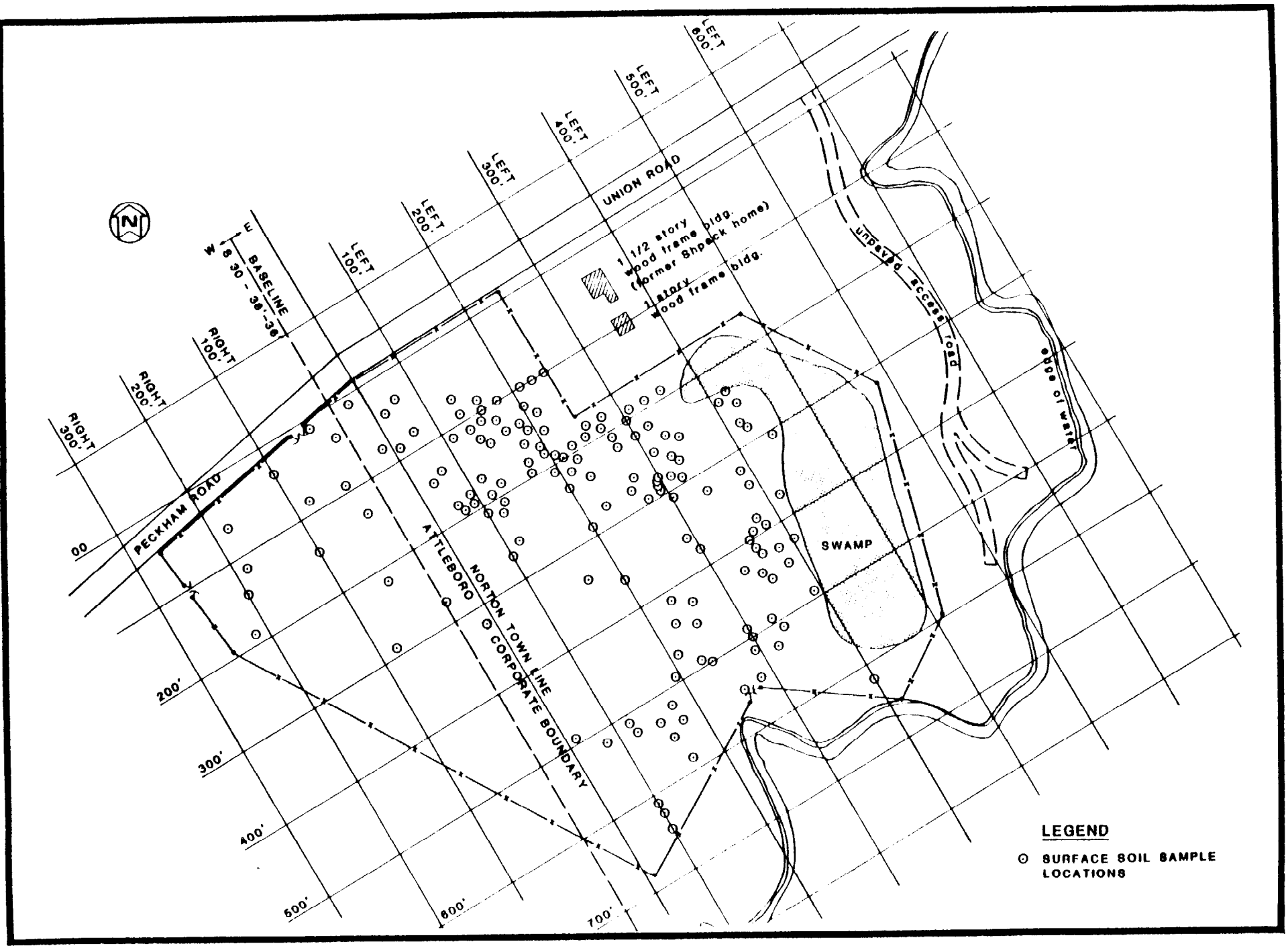

FIGURE 3-4 SURFACE SOIL SAMPLE LOCATIONS

each soil sample was dried, pulverized, and blended, placed in a small plastic container, labeled according to its onsite location, then shipped to ORNL. There the samples were analyzed for uranium-235 using a neutron absorption technique. Each sample was irradiated for a few seconds in the Oak Ridge Research Reactor, then a count was made of delayed neutrons from the fission of uranium-235 nuclei in the sample (Reference 3).

Subsurface soil samples were analyzed using the same techniques as for surface soil samples. Samples were collected below a depth of 15 cm (6 in.) using the side wall (sand) sampling technique. This method of sampling was chosen because split spoon sampling methods were not possible due to the extremely soft and wet soil conditions.

Special attention was given to those areas where radioactivity had been observed at the water table during the ORNL survey. In these areas, samples were collected to the bottom of the landfill or to the depth at which radioactivity was observed during the gamma logging of the boreholes. Subsurface soil sample locations are shown in Figure 3-5.

Surface water and sediment samples were collected from landlocked waters on site and from Chartley Swamp. These sampling locations were limited to those necessary to determine the extent of contamination. All water samples collected during the survey were shipped to the EIC laboratory in Albuquerque, New Mexico for analysis of uranium-234, uranium-235, and uranium-238 by radiochemical techniques. Sediment samples were analyzed at NFSS and at ORNL in the same manner as soil samples. Surface water and sediment sampling locations are shown in Figure 3-6.

Seven groundwater sampling wells (see Figure 3-6) were installed on the north and east sides of the landfill, near the

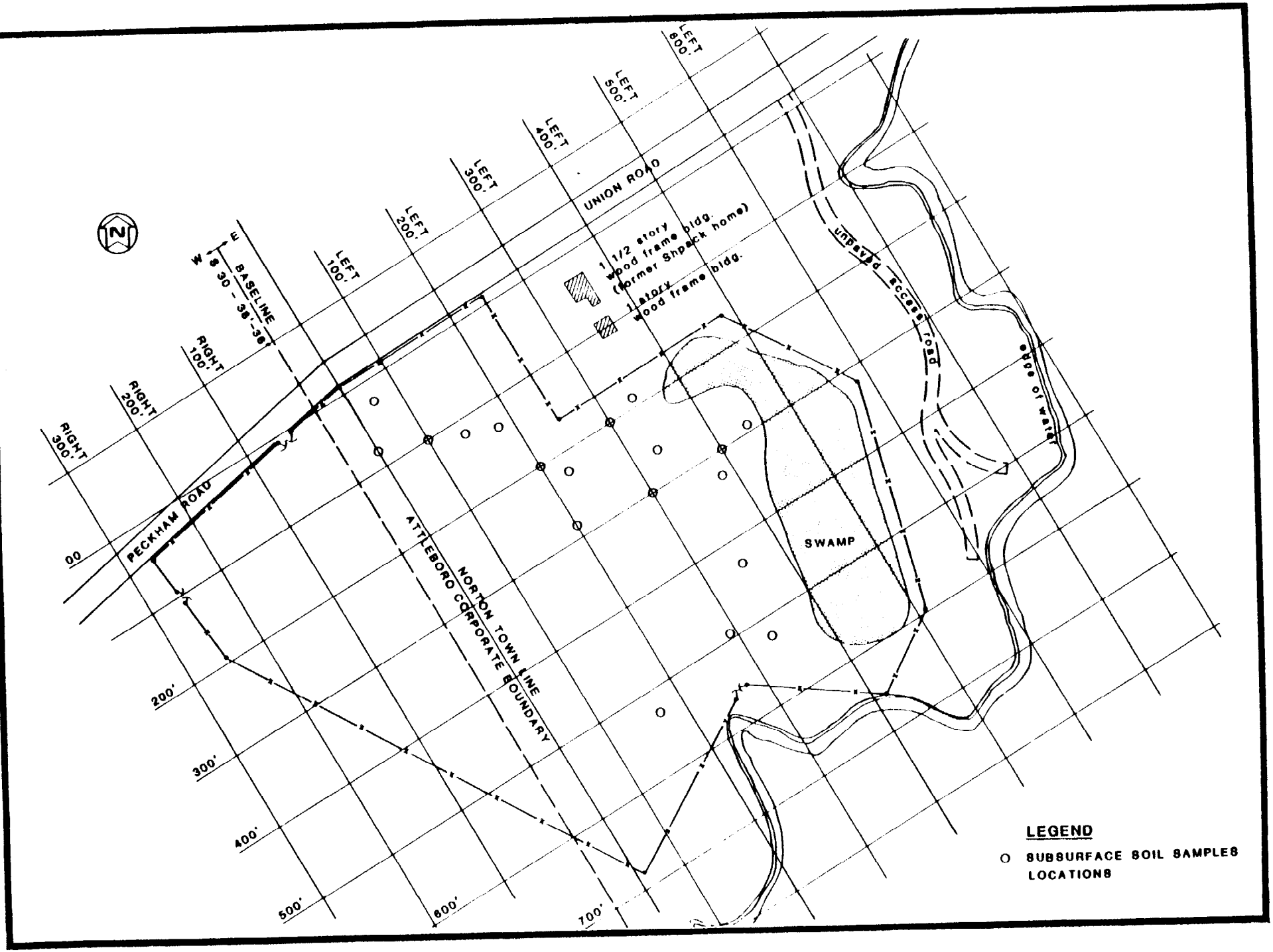

FIGURE 3-5 SUBSURFACE SOIL SAMPLE LOCATIONS

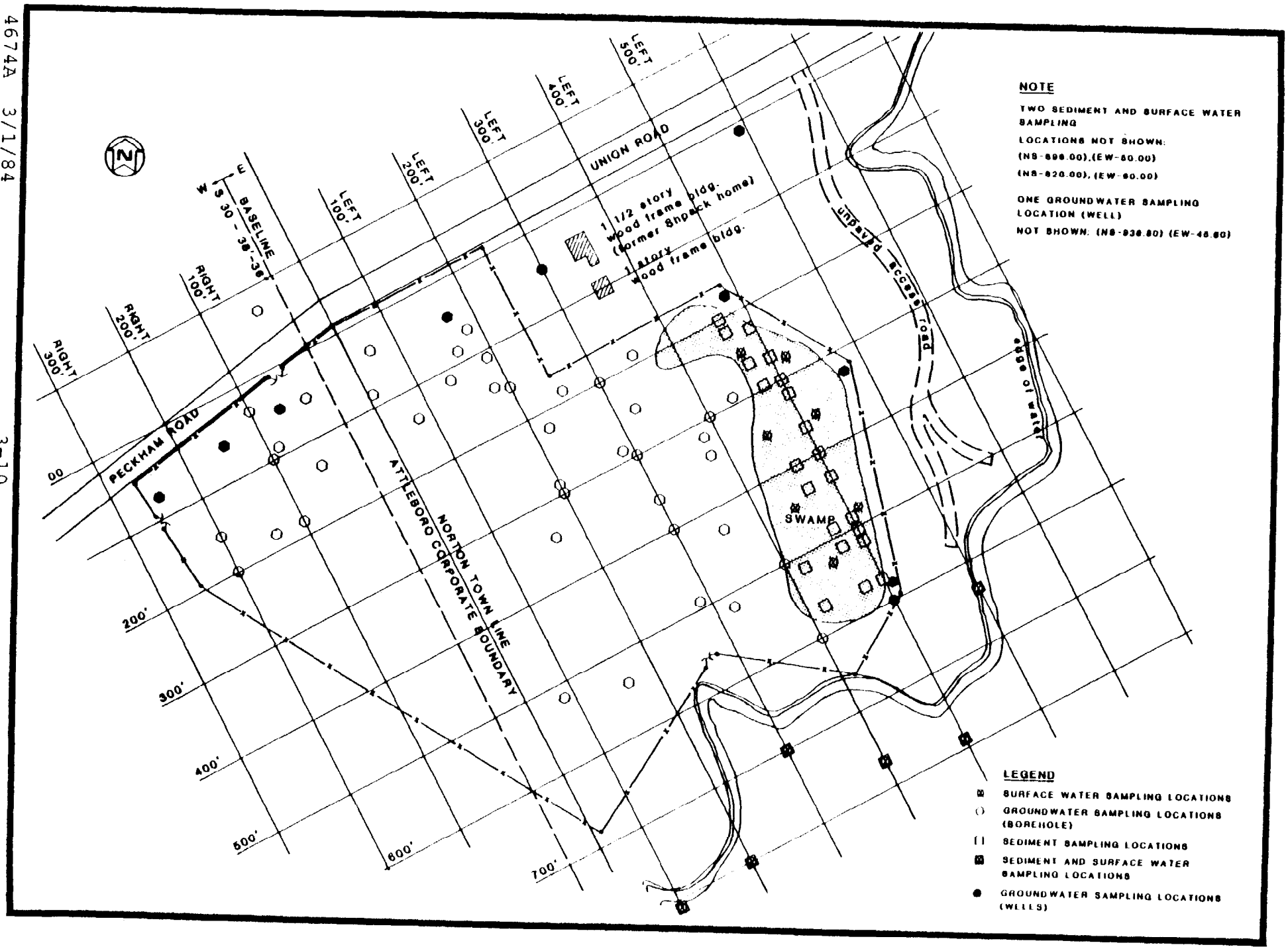

FIGURE 3-6 WATER AND SEDIMENT SAMPLE LOCATIONS

site perimeter. These wells were drilled in areas assumed to be free of radioactivity, for the purpose of monitoring for possible migration of priority pollutants and radioactive material in groundwater from the site. The wells were sampled for priority pollutants by an EPA contractor laboratory (Ref. 4). Water was collected by BNI from each of the wells and analyzed for radium-226, uranium-234, uranium-235, and uranium-238.

Three existing onsite wells, which are part of EPA's ongoing program to monitor Attleboro Landfill, Inc., and one privately owned well were also sampled. These samples were analyzed for radium-226 and total uranium. A composite water sample was also analyzed for the presence of toxic and hazardous chemicals.

Two continuous air monitors (EIC model Ras-1) were deployed at the landfill for the duration of the survey, as shown in Figure 3-7. Air filters were changed every 48 hours. Composite samples for each location were analyzed at EIC's laboratory in Albuquerque for radium-226, uranium-234, uranium-235, and uranium-238.

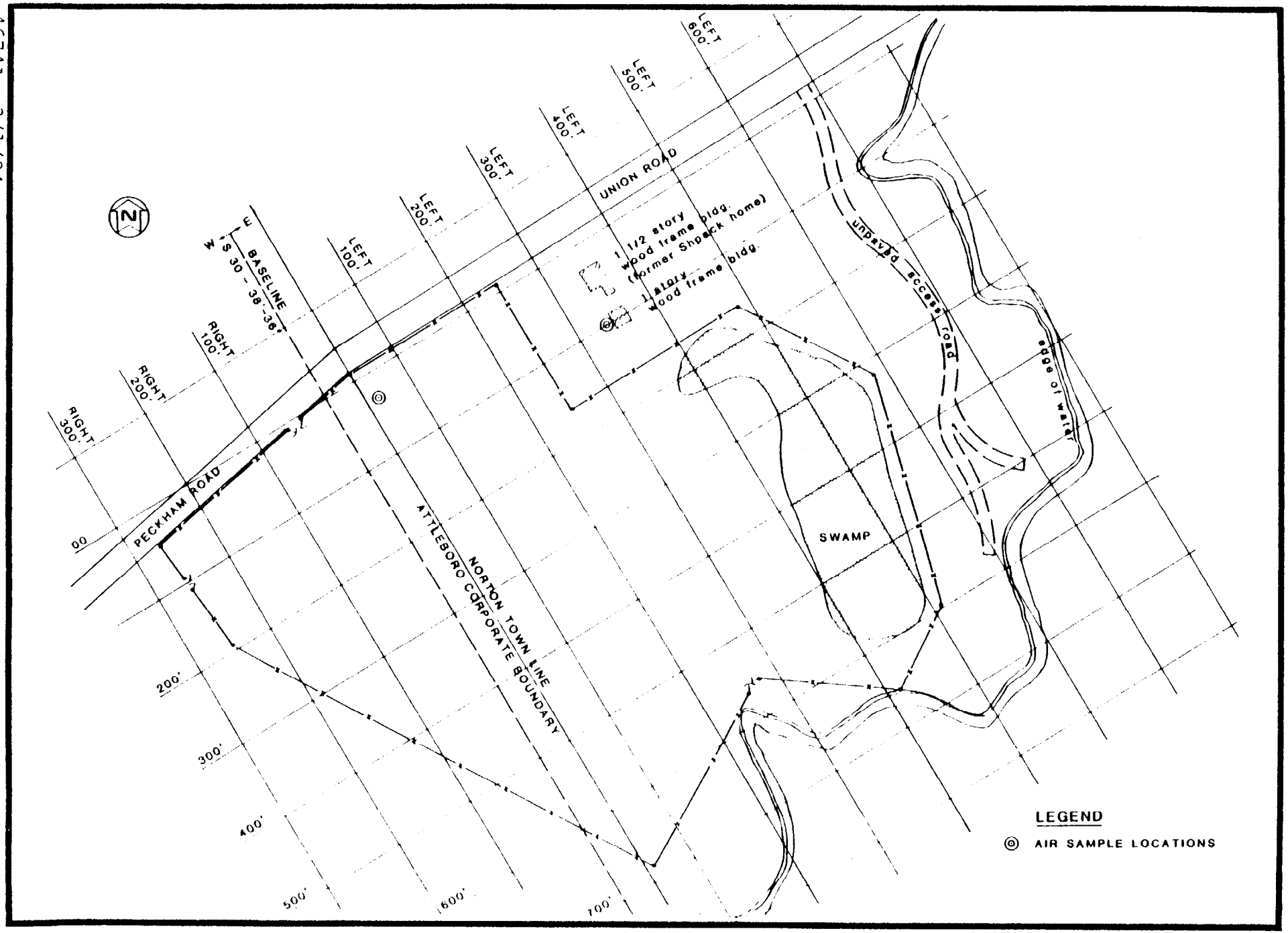

FIGURE 3-7 AIR SAMPLE LOCATIONS

4.0 SURVEY RESULTS

4.1 GENERAL

All direct field survey measurements and laboratory results in this report represent gross readings. Results are presented in tables in Appendix A. Background measurements and concentrations were not subtracted. Background measurements and concentrations applicable to the Shpack area were measured as part of the ORNL survey. Background external gamma levels were determined at distances between 30 m (100 ft) and 1.6 km (1 mi) from the site boundary. The measurements averaged 7 R/h. Soil samples taken at the same locations showed an average for radium-226 of 0.64 pCi/g and an average of 0.66 pCi/g for uranium-238. Background for beta-gamma dose rate averaged 0.02 mrad/h (Ref. 1).

4.2 SPECIAL CALIBRATION PROBLEMS

The Shpack site presented an unusual calibration problem for a number of reasons, including the mixture of radionuclides, the irregular distribution of the contamination, the interference by surface and subsurface water, and interference from other buried materials such as metal drums, building rubble, etc.

Results of the ORNL survey show that the radioactive contamination on the site consists primarily of uranium and radium. However, that survey also shows that uranium is present as enriched, depleted, and natural uranium. Also, radium exists both in the natural state (as a daughter in the uranium decay scheme) and as discrete sources. The contaminated areas are patchy and irregular in size, shape, and depth below the surface. Additionally, the ability to detect the gamma emitted is influenced greatly by the presence of water and buried rubble, metal drums, etc., as these materials

may be more dense and absorbent with respect to radiation than the soil.

This combination of radionuclide content and measurement conditions makes correlation of gamma count rates with specific radionuclides more complicated than expected, based on past experience.

4.3 MEASUREMENTS MADE TO DEFINE LIMITS OF CONTAMINATION

Near-surface gamma measurements are reported in Table 1. These gamma readings are in gross counts per minute (cpm) by grid coordinates. High gamma readings generally correlated with elevated concentrations in soil of the various mixtures of radium-226, uranium-234, uranium-235, and uranium-238. The surface soil sample results are given in Table 2. The lateral excavation limits are based on gamma readings and provide guidance for possible removal of radionuclide concentrations that exceed criteria.

Subsurface soil analysis results are given in Table 3, which lists samples by coordinates and depth. Results from the ORNL survey indicated the major contaminants of the Shpack Landfill are radium and uranium. The analytical results from the 1982 BNI survey given in Tables 2 and 3 confirm this finding.

The uranium-235 results of the surface and subsurface soil sample analyses performed at ORNL are also reported in Table 2 and 3. The ORNL analyses further corroborated the results of the BNI/EIC survey and the previous ORNL survey. General correlations of the subsurface radium and uranium concentrations (presented in Table 3) and the borehole gamma count rate data (presented in Table 4) were used to determine the depth of subsurface contamination (in feet) given in Table 5. These findings are in agreement with the results of the ORNL survey.

4.4 MEASUREMENTS MADE TO ASSESS THE RADIOLOGICAL STATUS OF THE AREA

Beta-gamma surface dose-rate measurements are given in Table 1. The surface dose rates given in this report are in agreement with those reported in the ORNL survey. The dose-rate measurements were taken as spot checks to confirm continuity with the 1980 survey, and to supplement the near-surface gamma readings.

Surface water and groundwater samples were taken on site and off site to determine the extent of contamination present in the area located around the site and to determine if radionuclides had migrated from the site.

Surface water sample results were within the criteria limits given in DOE Order 5480.1A for uncontrolled areas. Results for surface water samples are given in Table 6. Sediment sample results are given in Table 7. All sediment sample results were within the DOE criteria limits for soils -- 5 pCi/g plus background for radium-226 and 75 pCi/g for uranium-238.

Uranium-238 contamination was detected in onsite groundwater samples. Concentrations of uranium-238 ranged from 0.1 pCi/l to 6,300 pCi/l. The 10 CFR 20 release limit for uranium-238 in uncontrolled areas is 40,000 pCi/l, compared with the stricter DOE Order 5480.1A release limit of 600 pCi/l.

Four offsite groundwater samples were analyzed for radium-226, uranium-238, uranium-235, and uranium-234. No elevated concentrations of radionuclides were found. While migration of nuclides is possible, the seven perimeter groundwater sampling wells showed no migration of radiological contaminants beyond the boundary of the site. Groundwater sample results are given in Table 8.

Groundwater samples were also checked for the presence of toxic chemicals. Results of the chemical analyses have been documented by the Environmental Protection Agency (Ref. 4). There was no indication that chemical contaminants in the landfill have enhanced the migration of radioactive materials.

The gamma exposure rate results (taken 1 m above the ground surface) are given in Table 9 in microroentgens per hour (μR/h). The exposure rates ranged from 6.0 R/h to 29.5 R/h. The average exposure rate at the landfill was 11.5 R/h. Exposure rates determined during previous surveys were as high as 53 R/h. As noted earlier, the natural background exposure rate was measured as 7 μR/h.

Particulate air sample filters were sent to EIC's Albuquerque laboratory for analysis. Composite samples were prepared for each air monitor location. Results are given in Table 10. All results are within the DOE limits for uncontrolled releases given in DOE Order 5480.1A -- 2 pCi/m^3 for radium-226 and 30 pCi/m^3 for uranium-238.

4.5 SITE GEOLOGICAL OBSERVATIONS

During drilling of some of the onsite boreholes, a peat layer was encountered. However, during drilling of the seven offsite perimeter wells, only four different types of material -- bedrock, glacial outwash, glacial till and organic soil -- were encountered. This indicates that a peat layer is present on site but is not continuous. The peat layer is characteristic of wetland areas such as the area in which the landfill was developed. A geological cross section, as observed at the seven perimeter wells, is illustrated in Figure 4-1.

A falling head drop test was conducted at the seven perimeter wells, revealing widely varying permeabilities, depending upon

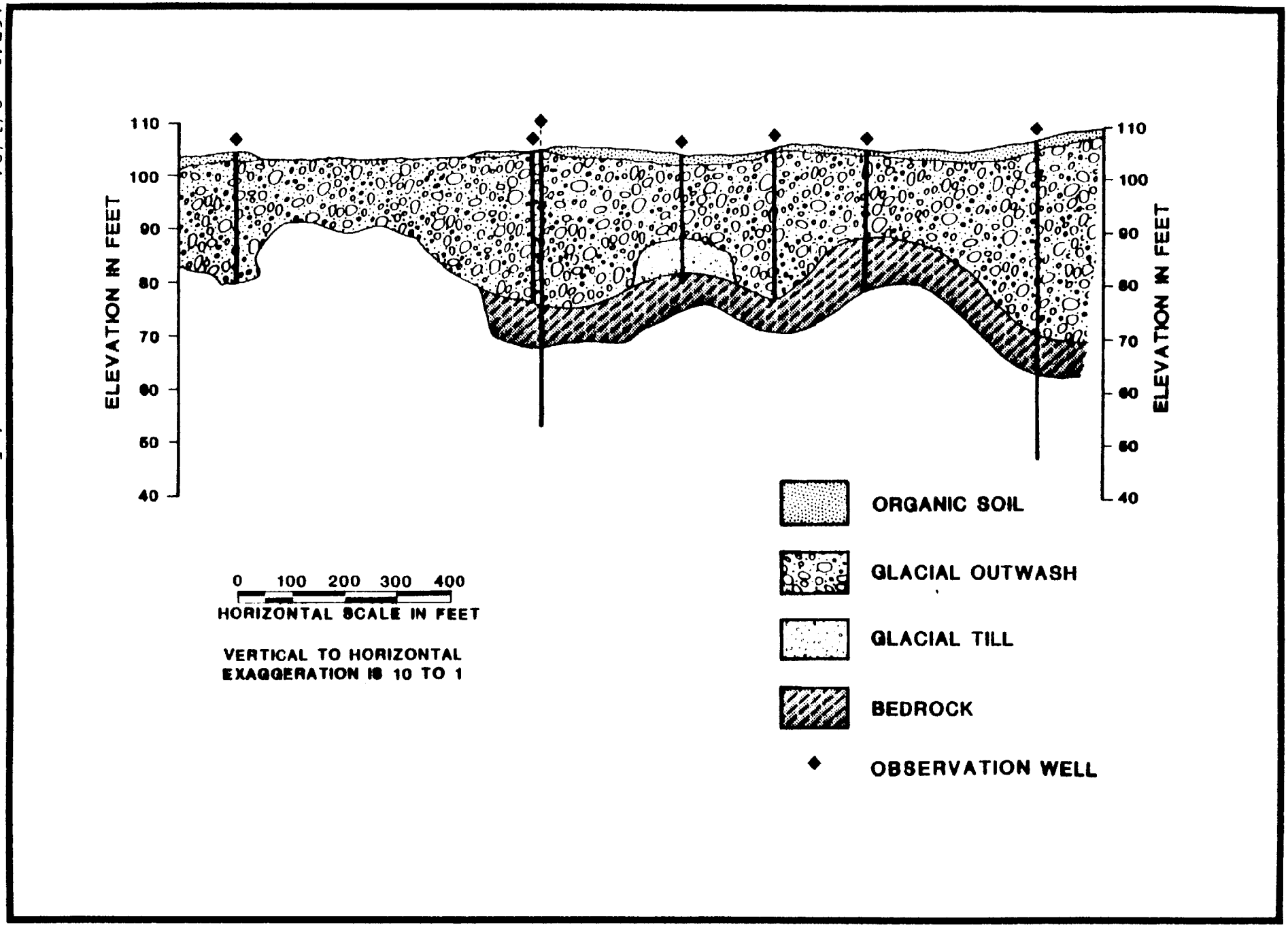

FIGURE 4-1 GEOLOGIC CROSS SECTION OF SHPACK LANDFILL

location and depth of the wells. However, in general there was no significant difference in the water levels of wells, whether placed in sand or bedrock. This indicates that the overburden and bedrock are interconnected.

5.0 SIGNIFICANCE OF FINDINGS

The 1982 survey of the former Shpack Landfill was conducted to provide a definitive description of the boundaries of radioactive contamination at the site. Many of the radiological measurements taken during the survey were performed as verification of the results of the 1980 ORNL survey. In other cases, the 1982 radiological measurements represented an extension of the ORNL survey to areas of the landfill which had not been covered by that work.

The primary contaminants found on the site were radium-226, uranium-238, uranium-235, and uranium-234. The uranium may be in depleted, natural, and enriched forms.

The maximum external gamma measured at 1 m (3 ft) above the surface was 29.5 μR/h, and the maximum beta-gamma dose rate at the surface was approximately 0.8 mrad/h. Compared to natural background for the region, elevated concentrations of radium-226, uranium-238, uranium-235, and uranium-234 were found in surface and subsurface soils. Maximum concentrations were: radium-226, 1,571 pCi/g; uranium-238, 16,460 pCi/g; uranium-235, 200 pCi/g; and uranium-234, 4,200 pCi/g.

Some on-site groundwater results indicated radiological contamination (above background) in the groundwater; however, the seven off-site monitoring wells detected no migration of radionuclides off-site.

The radiological measurement results presented in Tables 1 and 2 were used to determine the extent and boundaries of surface contamination at the site. The measurements for depth of contamination are presented in Tables 3 and 4, and the data from these two tables are summarized in Table 5. The distribution of contamination, both horizontally and vertically was found to be spotty and uneven. This finding is in

agreement with the results of the ORNL survey. Data from the ORNL survey and the 1982 BNI survey have been used to plot the locations, boundaries and approximate depths of contamination at the site. The contaminated areas and depths of contamination are illustrated in Figure 5-1. Hotspot locations are shown in Figure 5-2.

While surface contamination has been accurately defined, the spotty nature of the subsurface contamination does not allow for as precise a delineation of vertical contamination. However, the subsurface contamination has been defined in adequate detail to allow estimation of location and volume of contaminated (above criteria) material.

The observed concentrations of the radium and uranium radioisotopes found at the site associated with the nuclear fuel cycle (included here is all radioactivity above natural background for the region) are compared with the respective residual concentration criteria limits for unrestricted use, as shown in Table 5-1. As shown in this table, average concentrations of radioactive contaminants and their emanations on-site (excluding hotspot areas) are below the residual limits requiring remedial action. However, there are hotspots which contribute to the contamination level of their respective 100 m^2 surface and subsurface areas sufficiently to cause their respective 100 m^2 areas to exceed criteria. No site-boundary or off-site measurements revealed above-criteria readings. Remedial action designed, as it should be, to remove hotspots would result in the removal of only approximately 390 m^3 (400 yd^3) of material.

Since the Shpack Landfill is not presently used for either residential or agricultural purposes and no such uses are expected in the foreseeable future, and since the site is fenced to control accidental access, remedial action to reduce radioactive contamination at the site may be deferred without harmful effect to individuals, the public and the environment.

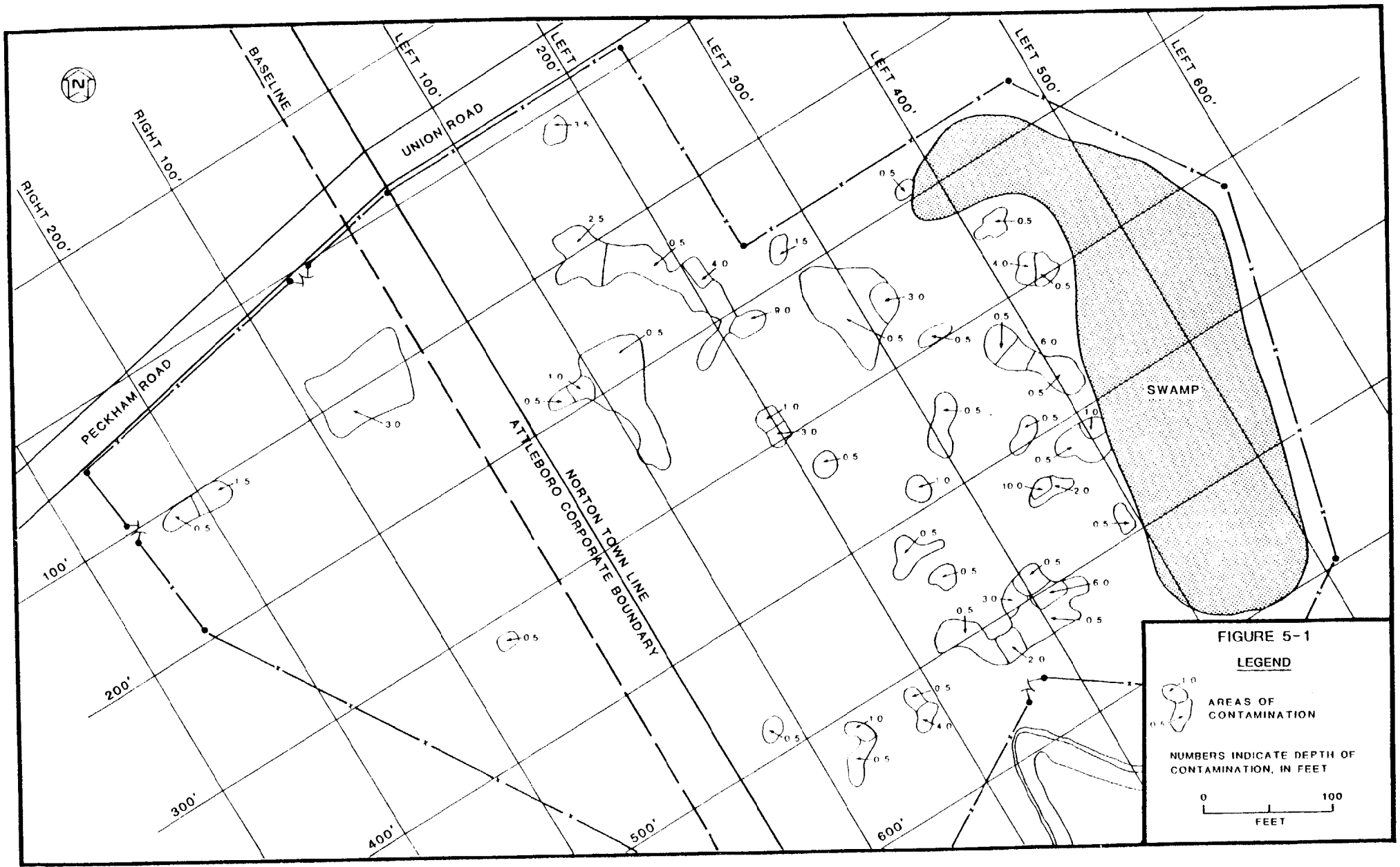

FIGURE 5-1 SHPACK LANDFILL AREAS OF CONTAMINATION

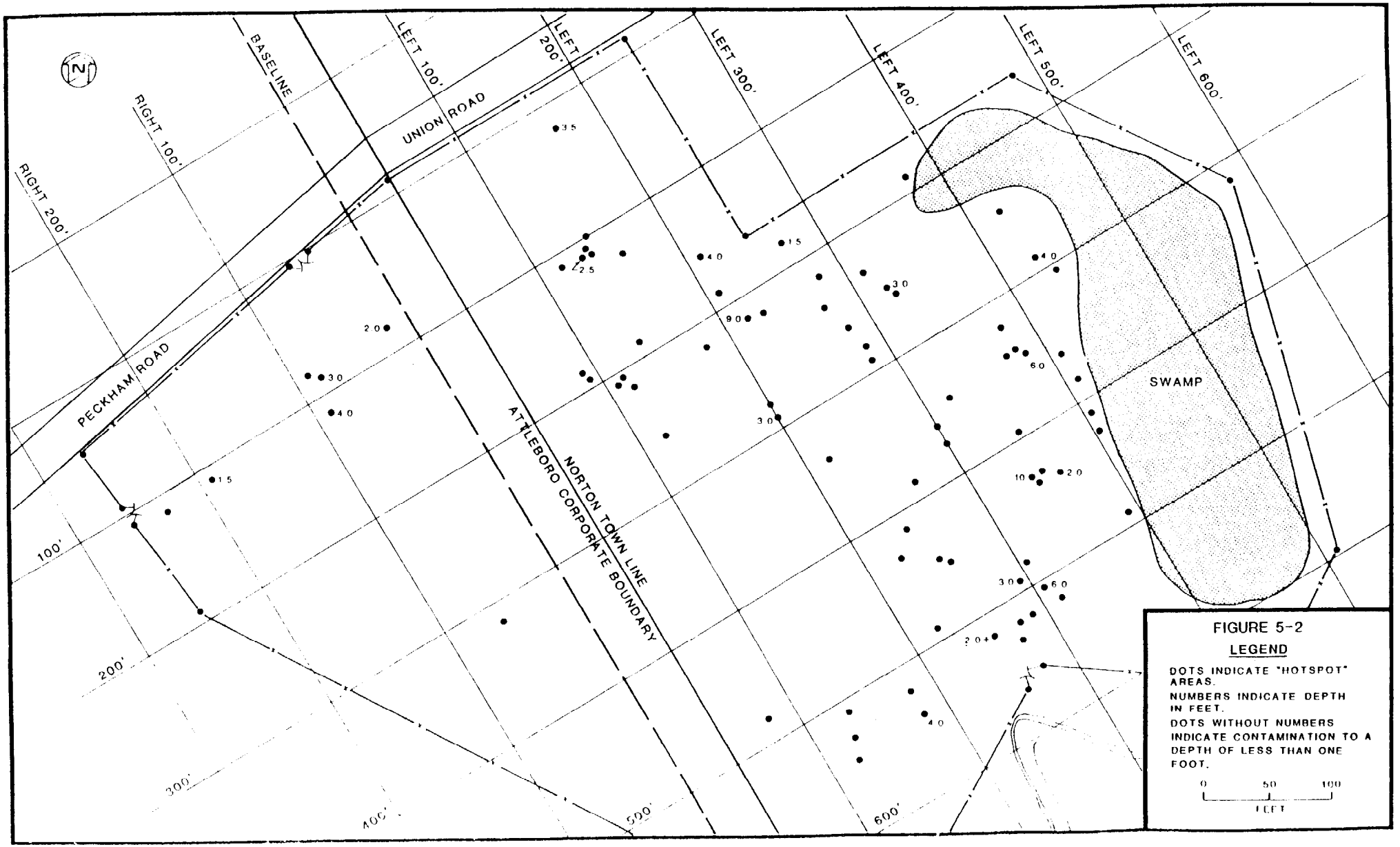

FIGURE 5-2 SHPACK LANDFILL "HOTSPOT" AREAS

TABLE 5-1

CONCENTRATIONS OF RADIONUCLIDES

AT THE SHPACK LANDFILL COMPARED

WITH DOE CRITERIA LIMITS

(pCi/g)

Radionuclide	Area Conc. Average[a]	Area Weighted Average[b]	Hotspot Conc. Average	DOE Criteria Limit
Ra-226	0.60	70.3	873.4	5[c]
U-235	1.40	24.19	28o.8	15O
U-238	7.64	253.9	3092.6	150

Total Area of the Site = 32,376 m^2

Total Area of Hotspots = 2,585 m^2

(a) Area average excluding hotspot areas

(b) Area average including hotspot areas

(c) 5 pCi/g averaged over the first 15 cm of soil below the surface; 15 pCi/g when averaged over 15 cm thick layers more than 15 cm below the surface and less than 1.5 m below the surface. (Appendix B)

It should be noted that, like other landfills of its type and history, the former Shpack Landfill contains chemical wastes, hazardous metals, and other toxic or volatile substances (Ref. 4). Pockets of methane may also be present. Any remedial action plan for the site which would involve excavation would have to take into account these possible hazards and the regulatory requirements of various State and Federal environmental statutes not directly related to radioactive contamination. The timing and nature (including extent) of actions to remedy these hazardous waste problems could easily negate the necessity for a separate remedial action for the radioactive contamination. Continued cooperation between EPA, the State of Massachusetts, local governments, and DOE on these matters will remain important to the final solution for all concerns at the site.

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APPENDIX A

TABLES SHOWING RESULTS OF THE 1982 RADIOLOGICAL SURVEY OF THE FORMER SHPACK LANDFILL

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
0.00	-60.00	5266	.048
0.00	-40.00	5440	.059
0.00	-20.00	5542	.055
0.00	0.00	5712	.041
0.00	20.00	4766	.041
0.00	40.00	5214	.026
0.00	60.00	4172	.033
0.00	80.00	4120	.038
0.00	100.00	4198	.026
0.00	120.00	4216	.041
0.00	140.00	4228	.036
0.00	160.00	4882	.028
0.00	180.00	4732	.041
0.00	200.00	4556	.050
0.00	220.00	4364	.100
0.00	240.00	4276	.026
10.00	50.00	3660	.043
10.00	55.00	3336	.038
10.00	60.00	3868	.036
10.00	65.00	5122	.038
10.00	70.00	4058	.033
15.00	5.00	4794	.040
15.00	10.00	4998	.048
15.00	15.00	5394	.035
15.00	20.00	4292	.038
15.00	25.00	3838	.048
15.00	50.00	4830	.045
15.00	55.00	5116	.048
15.00	60.00	5046	.055
15.00	65.00	4792	.052
15.00	70.00	4454	.048
20.00	-110.00	4478	.028
20.00	-105.00	4380	.054
20.00	-100.00	4394	.037
20.00	-95.00	4402	.026
20.00	-90.00	4436	.040
20.00	-80.00	5248	.041
20.00	-60.00	4866	.036
20.00	-40.00	5242	.040
20.00	-20.00	5728	.048
20.00	0.00	5664	.045
20.00	5.00	4856	.059

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
20.00	10.00	6352	.041
20.00	15.00	4654	.057
20.00	20.00	4418	.053
20.00	25.00	4144	.062
20.00	40.00	5404	.035
20.00	50.00	5124	.026
20.00	55.00	5178	.043
20.00	60.00	6302	.066
20.00	65.00	5336	.060
20.00	70.00	4676	.038
20.00	80.00	5304	.036
20.00	100.00	4286	.041
20.00	120.00	4574	.038
20.00	140.00	4492	.035
20.00	160.00	4186	.031
20.00	180.00	4302	.052
20.00	200.00	4436	.040
20.00	220.00	4474	.057
20.00	240.00	4524	.038
25.00	-110.00	4720	.040
25.00	-105.00	4674	.038
25.00	-100.00	4536	.035
25.00	-95.00	4804	.045
25.00	-90.00	4946	.047
25.00	5.00	4828	.047
25.00	10.00	4944	.035
25.00	15.00	4600	.036
25.00	20.00	3744	.036
25.00	25.00	4170	.038
25.00	50.00	4578	.040
25.00	55.00	5666	.054
25.00	60.00	6844	.059
25.00	65.00	6430	.060
25.00	70.00	5554	.064
30.00	-110.00	5118	.060
30.00	-105.00	4860	.043
30.00	-100.00	4786	.047
30.00	-95.00	5174	.048
30.00	-90.00	4742	.033
30.00	-50.00	4032	.041
30.00	-45.00	5044	.054
30.00	-40.00	4938	.057

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
30.00	-35.00	4302	.047
30.00	-30.00	4942	.031
30.00	-25.00	4810	.060
30.00	-20.00	5100	.057
30.00	-15.00	5038	.055
30.00	-10.00	5046	.050
30.00	5.00	4778	.052
30.00	10.00	5106	.054
30.00	15.00	4638	.040
30.00	20.00	4458	.047
30.00	25.00	4434	.041
30.00	50.00	4806	.054
30.00	55.00	4588	.059
30.00	60.00	6806	.050
30.00	65.00	6658	.066
30.00	70.00	5094	.041
35.00	-50.00	4432	.040
35.00	-45.00	4910	.057
35.00	-40.00	4758	.059
35.00	-35.00	5028	.035
35.00	-30.00	4580	.059
35.00	-25.00	5032	.041
35.00	-20.00	5254	.054
35.00	-15.00	5106	.048
35.00	-10.00	4878	.052
40.00	-200.00	5522	.031
40.00	-180.00	4918	.045
40.00	-160.00	5772	.066
40.00	-140.00	5806	.060
40.00	-120.00	6056	.052
40.00	-100.00	5836	.048
40.00	-80.00	5550	.029
40.00	-60.00	5258	.055
40.00	-50.00	4668	.043
40.00	-45.00	4318	.043
40.00	-40.00	5330	.053
40.00	-35.00	4636	.050
40.00	-30.00	5086	.054
40.00	-25.00	5026	.041
40.00	-20.00	5158	.052
40.00	-15.00	4976	.026
40.00	-10.00	4052	.022

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
40.00	0.00	5224	.054
40.00	20.00	5552	.054
40.00	40.00	4372	.043
40.00	60.00	5660	.033
40.00	80.00	4516	.057
40.00	100.00	4194	.022
40.00	120.00	4014	.040
40.00	140.00	4698	.028
40.00	160.00	4664	.035
40.00	180.00	4646	.033
40.00	200.00	4484	.033
40.00	220.00	4396	.100
40.00	240.00	4412	.024
45.00	-50.00	4748	.057
45.00	-45.00	4126	.041
45.00	-40.00	4622	.059
45.00	-35.00	6424	.052
45.00	-30.00	4986	.050
45.00	-25.00	5072	.038
45.00	-20.00	5176	.054
45.00	-15.00	5294	.017
45.00	-10.00	4844	.022
50.00	-190.00	4766	.036
50.00	-185.00	5150	.043
50.00	-180.00	5270	.041
50.00	-175.00	5368	.045
50.00	-170.00	5328	.047
50.00	-50.00	4480	.043
50.00	-45.00	5020	.041
50.00	-40.00	4328	.029
50.00	-35.00	4762	.052
50.00	-30.00	6090	.041
50.00	-25.00	4796	.038
50.00	-20.00	4214	.040
50.00	-15.00	4028	.031
50.00	-10.00	4592	.028
55.00	-190.00	4772	.035
55.00	-185.00	4490	.031
55.00	-180.00	5100	.043
55.00	-175.00	4826	.048
55.00	-170.00	5098	.048
60.00	-240.00	4912	.033

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
60.00	-220.00	4996	.045
60.00	-200.00	5158	.036
60.00	-190.00	4626	.038
60.00	-185.00	4836	.052
60.00	-180.00	4947	.099
60.00	-175.00	4558	.040
60.00	-170.00	4726	.052
60.00	-160.00	5590	.059
60.00	-140.00	5420	.029
60.00	-120.00	5546	.038
60.00	-100.00	6028	.047
60.00	-80.00	5054	.035
60.00	-60.00	3332	.024
60.00	-40.00	4716	.028
60.00	-20.00	4302	.038
60.00	0.00	5946	.035
60.00	20.00	4414	.033
60.00	40.00	3540	.057
60.00	60.00	7308	.054
60.00	80.00	4546	.048
60.00	100.00	4404	.048
60.00	120.00	3856	.048
60.00	140.00	4482	.038
60.00	160.00	4322	.031
60.00	180.00	4310	.033
60.00	200.00	3934	.040
60.00	220.00	4054	.031
60.00	240.00	4164	.043
65.00	-190.00	4588	.048
65.00	-185.00	5012	.059
65.00	-180.00	5262	.048
65.00	-175.00	5310	.054
65.00	-170.00	5114	.035
70.00	-190.00	5250	.036
70.00	-185.00	4766	.047
70.00	-180.00	5340	.024
70.00	-175.00	5006	.059
70.00	-170.00	5184	.052
70.00	25.00	3384	.024
70.00	30.00	5794	.028
70.00	35.00	2480	.033
70.00	40.00	4326	.028

PRINT DATE: 07/07/83 PAGE 5

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
70.00	45.00	3706	.041
70.00	50.00	4136	.036
70.00	55.00	4168	.041
70.00	60.00	4400	.045
70.00	65.00	4240	.041
70.00	70.00	4276	.041
70.00	120.00	4628	.048
70.00	125.00	5642	.031
70.00	130.00	5134	.045
70.00	135.00	5816	.038
75.00	25.00	4208	.026
75.00	30.00	5060	.024
75.00	35.00	6960	.052
75.00	40.00	4062	.045
75.00	45.00	4226	.050
75.00	50.00	4540	.045
75.00	55.00	4430	.055
75.00	60.00	6438	.055
75.00	65.00	4660	.060
75.00	70.00	5044	.029
75.00	120.00	4638	.067
75.00	125.00	5474	.052
75.00	130.00	4832	.043
75.00	135.00	5040	.041
80.00	-240.00	4694	.047
80.00	-220.00	6154	.033
80.00	-200.00	3986	.022
80.00	-180.00	4872	.036
80.00	-160.00	5808	.040
80.00	-140.00	5386	.035
80.00	-120.00	5268	.054
80.00	-100.00	4068	.021
80.00	-95.00	4658	.045
80.00	-90.00	4874	.050
80.00	-85.00	4616	.035
80.00	-80.00	4876	.035
80.00	-60.00	3580	.052
80.00	-40.00	3440	.029
80.00	-35.00	3194	.019
80.00	-30.00	5188	.028
80.00	-25.00	4450	.031
80.00	-20.00	4128	.033

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
80.00	0.00	3324	.062
80.00	20.00	3518	.033
80.00	25.00	4106	.031
80.00	30.00	4752	.036
80.00	35.00	4332	.036
80.00	40.00	5337	.043
80.00	45.00	4402	.035
80.00	50.00	5064	.066
80.00	55.00	4414	.033
80.00	60.00	5074	.038
80.00	65.00	4780	.052
80.00	70.00	4772	.040
80.00	80.00	4978	.040
80.00	100.00	5276	.060
80.00	120.00	5475	.038
80.00	125.00	6244	.057
80.00	130.00	5672	.072
80.00	135.00	5254	.033
80.00	140.00	4568	.050
80.00	160.00	4922	.036
80.00	180.00	4782	.029
80.00	200.00	4518	.029
80.00	220.00	4160	.029
80.00	240.00	4084	.031
85.00	-95.00	3880	.035
85.00	-90.00	4022	.035
85.00	-85.00	9844	.031
85.00	-80.00	4176	.031
85.00	-35.00	2462	.026
85.00	-30.00	4690	.022
85.00	-25.00	4150	.040
85.00	-20.00	4010	.019
85.00	25.00	3914	.031
85.00	30.00	3668	.040
85.00	35.00	4708	.036
85.00	40.00	3154	.043
85.00	45.00	7084	.024
85.00	50.00	4554	.050
85.00	55.00	4308	.029
85.00	60.00	4942	.055
85.00	65.00	4620	.035
85.00	70.00	4362	.029

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
85.00	120.00	5222	.052
85.00	125.00	5030	.062
85.00	130.00	15136	.071
85.00	135.00	5094	.043
85.00	140.00	4908	.041
85.00	145.00	5020	.026
85.00	150.00	3830	.033
85.00	155.00	4422	.035
90.00	-95.00	4126	.038
90.00	-90.00	5378	.036
90.00	-85.00	8650	.043
90.00	-80.00	4494	.040
90.00	-35.00	2798	.028
90.00	-30.00	4378	.028
90.00	-25.00	4112	.028
90.00	-20.00	3218	.024
90.00	25.00	3226	.031
90.00	30.00	3868	.033
90.00	35.00	4396	.026
90.00	40.00	4778	.024
90.00	45.00	4766	.047
90.00	50.00	4934	.045
90.00	55.00	4538	.041
90.00	60.00	4262	.040
90.00	65.00	4408	.055
90.00	70.00	5084	.043
90.00	90.00	5368	.050
90.00	95.00	4792	.062
90.00	100.00	5500	.062
90.00	105.00	3258	.043
90.00	110.00	4328	.031
90.00	120.00	4700	.047
90.00	125.00	5492	.050
90.00	130.00	11448	.110
90.00	135.00	15076	.059
90.00	140.00	18057	.142
90.00	145.00	9044	.035
90.00	150.00	11118	.096
90.00	155.00	4710	.036
90.00	180.00	3612	.036
90.00	185.00	4106	.028
90.00	190.00	4284	.019

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr
90.00	195.00	4114	.036
90.00	210.00	3768	.041
90.00	215.00	4228	.036
90.00	220.00	3956	.024
90.00	225.00	4056	.022
90.00	230.00	4230	.041
90.00	235.00	4022	.026
90.00	240.00	3766	.024
90.00	245.00	3948	.035
90.00	250.00	4136	.035
95.00	-95.00	4466	.033
95.00	-90.00	4540	.043
95.00	-85.00	4694	.029
95.00	-80.00	4312	.036
95.00	-35.00	2924	.024
95.00	-30.00	1998	.029
95.00	-25.00	3364	.033
95.00	-20.00	3294	.043
95.00	90.00	5294	.047
95.00	95.00	4966	.026
95.00	100.00	5044	.041
95.00	110.00	4736	.041
95.00	130.00	5964	.029
95.00	135.00	9398	.083
95.00	140.00	14888	.060
95.00	145.00	16196	.104
95.00	150.00	7066	.045
95.00	155.00	4806	.026
95.00	180.00	3898	.019
95.00	185.00	3728	.033
95.00	190.00	4888	.043
95.00	195.00	4224	.036
95.00	210.00	4158	.040
95.00	215.00	4190	.038
95.00	220.00	4242	.035
95.00	225.00	3794	.036
95.00	230.00	4002	.047
95.00	235.00	4054	.047
95.00	240.00	3996	.050
95.00	245.00	3850	.017
95.00	250.00	4046	.047
100.00	-240.00	3594	.038

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
100.00	-220.00	5438	.041
100.00	-200.00	4548	.048
100.00	-180.00	4952	.043
100.00	-160.00	5694	.050
100.00	-140.00	5372	.043
100.00	-120.00	4888	.040
100.00	-100.00	4938	.038
100.00	-80.00	4894	.022
100.00	-60.00	3814	.026
100.00	-40.00	4860	.031
100.00	-30.00	2938	.036
100.00	-25.00	2898	.043
100.00	-20.00	4022	.033
100.00	0.00	3144	.028
100.00	20.00	4180	.043
100.00	40.00	5382	.045
100.00	60.00	5142	.057
100.00	80.00	4772	.047
100.00	90.00	5836	.060
100.00	95.00	4680	.038
100.00	100.00	6619	.053
100.00	105.00	5436	.045
100.00	110.00	4774	.043
100.00	120.00	6196	.045
100.00	130.00	5793	.047
100.00	135.00	10254	.064
100.00	140.00	22039	.067
100.00	145.00	18194	.128
100.00	150.00	23062	.178
100.00	155.00	5916	.059
100.00	160.00	5402	.028
100.00	180.00	4461	.035
100.00	185.00	4828	.040
100.00	190.00	5444	.040
100.00	195.00	4412	.038
100.00	200.00	4440	.048
100.00	210.00	4394	.045
100.00	215.00	3752	.022
100.00	220.00	3634	.085
100.00	225.00	4316	.038
100.00	230.00	3814	.036
100.00	235.00	3824	.029

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr
100.00	240.00	4008	.091
100.00	245.00	4088	.035
100.00	250.00	4180	.059
105.00	-195.00	5196	.054
105.00	-190.00	5030	.048
105.00	-185.00	4840	.036
105.00	-180.00	3946	.031
105.00	-35.00	5060	.081
105.00	-30.00	9568	.066
105.00	-25.00	2476	.021
105.00	90.00	5878	.043
105.00	95.00	4478	.043
105.00	100.00	5968	.048
105.00	105.00	5068	.059
105.00	110.00	4830	.040
105.00	125.00	5370	.048
105.00	130.00	4512	.024
105.00	135.00	7432	.072
105.00	140.00	15134	.211
105.00	145.00	43194	.247
105.00	150.00	17334	.078
105.00	155.00	6790	.045
105.00	180.00	4092	.035
105.00	185.00	5258	.040
105.00	190.00	6580	.035
105.00	195.00	5098	.041
105.00	210.00	4030	.036
105.00	215.00	3766	.036
105.00	220.00	3634	.026
105.00	225.00	3940	.040
105.00	230.00	4084	.029
105.00	235.00	4316	.047
105.00	240.00	4220	.041
105.00	245.00	4318	.028
105.00	250.00	4178	.040
110.00	-195.00	4352	.043
110.00	-190.00	4894	.057
110.00	-185.00	8244	.043
110.00	-180.00	4478	.048
110.00	-50.00	3422	.040
110.00	-45.00	4458	.035
110.00	-40.00	4994	.050

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr
110.00	-35.00	5186	.062
110.00	-30.00	14342	.062
110.00	-25.00	5612	.045
110.00	90.00	3658	.016
110.00	95.00	4072	.019
110.00	100.00	5414	.035
110.00	105.00	5534	.054
110.00	110.00	9046	.067
110.00	115.00	5640	.050
110.00	120.00	6358	.093
110.00	125.00	10972	.066
110.00	130.00	15338	.048
110.00	135.00	8634	.057
110.00	140.00	16531	.105
110.00	145.00	10528	.078
110.00	150.00	9263	.129
110.00	155.00	12400	.216
110.00	160.00	5520	.040
110.00	180.00	4124	.010
110.00	190.00	5348	.040
110.00	195.00	5506	.040
110.00	200.00	4870	.045
110.00	205.00	3690	.026
110.00	210.00	3873	.033
110.00	215.00	3566	.028
110.00	220.00	3884	.029
110.00	225.00	4332	.035
110.00	230.00	4074	.031
110.00	235.00	4316	.019
110.00	240.00	4194	.045
110.00	245.00	4156	.022
110.00	250.00	4062	.031
115.00	-195.00	4802	.038
115.00	-190.00	10504	.035
115.00	-185.00	10432	.024
115.00	-180.00	3538	.029
115.00	-50.00	3678	.038
115.00	-45.00	5004	.036
115.00	-40.00	6940	.045
115.00	-35.00	4458	.036
115.00	-30.00	6778	.031
115.00	105.00	5142	.047

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr
115.00	110.00	7980	.055
115.00	115.00	4356	.050
115.00	120.00	5470	.040
115.00	125.00	8758	.057
115.00	130.00	23852	.069
115.00	135.00	21492	.105
115.00	140.00	15930	.040
115.00	145.00	8190	.098
115.00	150.00	6056	.129
115.00	155.00	9352	.236
115.00	160.00	5168	.035
115.00	165.00	5390	.029
115.00	170.00	5098	.040
115.00	190.00	4102	.035
115.00	195.00	5174	.041
115.00	200.00	5482	.060
115.00	205.00	4186	.028
115.00	210.00	3490	.028
120.00	-240.00	4500	.038
120.00	-220.00	4594	.052
120.00	-200.00	4064	.028
120.00	-195.00	4212	.054
120.00	-190.00	5046	.047
120.00	-185.00	4644	.047
120.00	-180.00	4165	.035
120.00	-160.00	5350	.050
120.00	-140.00	4640	.048
120.00	-120.00	4594	.036
120.00	-100.00	4600	.040
120.00	-80.00	3194	.038
120.00	-60.00	4416	.036
120.00	-50.00	4100	.031
120.00	-45.00	5612	.036
120.00	-40.00	5768	.043
120.00	-35.00	4424	.043
120.00	-30.00	4314	.043
120.00	-20.00	4182	.038
120.00	0.00	2970	.036
120.00	20.00	4458	.038
120.00	40.00	3066	.036
120.00	60.00	4208	.057
120.00	80.00	3574	.043

PRINT DATE: 07/07/83 PAGE 13

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr
120.00	100.00	5942	.038
120.00	110.00	4088	.040
120.00	120.00	4638	.041
120.00	130.00	6296	.056
120.00	135.00	8786	.054
120.00	140.00	90480	.167
120.00	145.00	25168	.069
120.00	150.00	7024	.069
120.00	155.00	5942	.040
120.00	160.00	7952	.037
120.00	165.00	13242	.362
120.00	170.00	5098	.093
120.00	175.00	4190	.047
120.00	180.00	4238	.050
120.00	190.00	4308	.038
120.00	195.00	4896	.112
120.00	200.00	4388	.043
120.00	205.00	12318	.031
120.00	210.00	3480	.029
120.00	220.00	3808	.035
120.00	240.00	3798	.035
125.00	-50.00	3514	.028
125.00	-45.00	3736	.050
125.00	-40.00	7062	.057
125.00	-35.00	6698	.031
125.00	-30.00	10876	.064
125.00	-25.00	5184	.054
125.00	130.00	4210	.038
125.00	135.00	6560	.054
125.00	140.00	14118	.088
125.00	145.00	11892	.062
125.00	150.00	6582	.035
125.00	155.00	5370	.045
125.00	160.00	9260	.164
125.00	165.00	11424	.098
125.00	170.00	10644	.128
125.00	175.00	9344	.185
125.00	180.00	4990	.050
125.00	185.00	6862	.057
125.00	190.00	4720	.028
125.00	195.00	5338	.047
125.00	200.00	6236	.064

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
125.00	205.00	4806	.098
125.00	210.00	5440	.031
130.00	-210.00	4580	.043
130.00	-205.00	4244	.024
130.00	-200.00	6578	.041
130.00	-195.00	6244	.062
130.00	-190.00	3800	.040
130.00	-110.00	3954	.019
130.00	-105.00	3684	.033
130.00	-100.00	4128	.035
130.00	-95.00	3874	.033
130.00	-90.00	4082	.026
130.00	-50.00	3458	.041
130.00	-45.00	3404	.035
130.00	-40.00	3436	.031
130.00	-35.00	4150	.043
130.00	-30.00	4974	.040
130.00	45.00	3940	.035
130.00	50.00	3682	.026
130.00	55.00	4324	.038
130.00	60.00	3512	.047
130.00	65.00	3214	.021
130.00	70.00	2964	.035
130.00	75.00	4408	.047
130.00	130.00	3238	.033
130.00	135.00	3876	.043
130.00	140.00	6012	.054
130.00	145.00	14100	.097
130.00	150.00	5450	.041
130.00	160.00	5230	.050
130.00	165.00	15160	.126
130.00	170.00	10304	.155
130.00	175.00	9438	.041
130.00	180.00	5646	.052
130.00	185.00	19832	.123
130.00	190.00	6062	.059
130.00	195.00	9420	.107
130.00	200.00	4610	.071
130.00	205.00	4808	.055
130.00	210.00	5362	.043
135.00	-210.00	5688	.060
135.00	-205.00	6938	.041

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
135.00	-200.00	7812	.102
135.00	-195.00	6602	.040
135.00	-190.00	4082	.031
135.00	-110.00	3720	.038
135.00	-105.00	3494	.033
135.00	-100.00	3988	.024
135.00	-95.00	4674	.029
135.00	-90.00	4092	.031
135.00	45.00	1388	.038
135.00	50.00	3442	.059
135.00	55.00	3884	.024
135.00	60.00	3056	.033
135.00	65.00	3858	.047
135.00	70.00	2762	.178
135.00	75.00	3240	.066
135.00	145.00	4564	.045
135.00	165.00	3840	.038
135.00	170.00	3988	.045
135.00	175.00	2768	.026
135.00	180.00	6206	.054
135.00	185.00	5434	.045
135.00	190.00	9116	.180
135.00	195.00	5516	.041
135.00	200.00	4550	.043
135.00	205.00	4122	.057
135.00	210.00	4704	.083
140.00	-240.00	4274	.050
140.00	-220.00	5900	.033
140.00	-210.00	4716	.031
140.00	-205.00	5670	.031
140.00	-200.00	7783	.050
140.00	-195.00	7196	.048
140.00	-190.00	4578	.016
140.00	-180.00	4522	.036
140.00	-160.00	5328	.033
140.00	-140.00	4678	.041
140.00	-120.00	3568	.029
140.00	-110.00	3420	.031
140.00	-105.00	3758	.036
140.00	-100.00	7182	.093
140.00	-95.00	5454	.036
140.00	-90.00	4184	.038

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr
140.00	-80.00	4788	.033
140.00	-60.00	3492	.038
140.00	-40.00	3216	.028
140.00	-20.00	3006	.035
140.00	0.00	3568	.041
140.00	20.00	3300	.041
140.00	40.00	4772	.036
140.00	45.00	3782	.059
140.00	50.00	3166	.033
140.00	55.00	3428	.028
140.00	60.00	3268	.043
140.00	65.00	7744	.054
140.00	70.00	9700	.066
140.00	75.00	3634	.033
140.00	80.00	3026	.026
140.00	100.00	3720	.048
140.00	120.00	3538	.040
140.00	140.00	3212	.047
140.00	160.00	5210	.038
140.00	165.00	2680	.031
140.00	170.00	2236	.005
140.00	175.00	6250	.022
140.00	180.00	12364	.463
140.00	185.00	11566	.281
140.00	190.00	26894	.147
140.00	195.00	4324	.040
140.00	200.00	5678	.103
140.00	205.00	5308	.076
140.00	210.00	5024	.062
140.00	220.00	3102	.022
140.00	240.00	3820	.024
145.00	-210.00	5828	.045
145.00	-205.00	5284	.048
145.00	-200.00	4906	.036
145.00	-195.00	5410	.041
145.00	-190.00	4692	.050
145.00	-110.00	4030	.043
145.00	-105.00	4422	.041
145.00	-100.00	4298	.036
145.00	-95.00	5006	.041
145.00	-90.00	4510	.028
145.00	45.00	4978	.047

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
145.00	50.00	3644	.036
145.00	55.00	3382	.040
145.00	60.00	2610	.029
145.00	65.00	2540	.048
145.00	70.00	2408	.019
145.00	75.00	1918	.022
145.00	170.00	2084	.024
145.00	175.00	2598	.036
145.00	180.00	9196	.071
145.00	185.00	7846	.116
145.00	190.00	6696	.066
145.00	195.00	9712	.131
145.00	200.00	7124	.083
145.00	205.00	4308	.038
145.00	210.00	5200	.050
150.00	-210.00	4972	.041
150.00	-205.00	4900	.040
150.00	-200.00	4540	.036
150.00	-195.00	4804	.045
150.00	-190.00	4680	.035
150.00	-110.00	6238	.050
150.00	-105.00	4418	.050
150.00	-100.00	3204	.035
150.00	-95.00	3608	.054
150.00	-90.00	4254	.031
150.00	45.00	4756	.036
150.00	50.00	4512	.036
150.00	55.00	2180	.048
150.00	60.00	4320	.029
150.00	65.00	2836	.026
150.00	70.00	2222	.038
150.00	75.00	1982	.043
150.00	170.00	3054	.016
150.00	175.00	3198	.040
150.00	180.00	5554	.069
150.00	185.00	5202	.038
150.00	190.00	7350	.126
150.00	195.00	6006	.047
150.00	200.00	6470	.055
150.00	205.00	5030	.057
150.00	210.00	5586	.026
155.00	105.00	2014	.009

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr
155.00	110.00	2840	.024
155.00	115.00	3444	.017
155.00	170.00	3794	.028
155.00	175.00	3152	.026
155.00	180.00	7344	.330
155.00	185.00	11310	.145
155.00	190.00	15498	.095
155.00	195.00	8122	.043
155.00	200.00	9198	.138
155.00	205.00	5616	.036
155.00	210.00	10070	.036
160.00	-240.00	5170	.052
160.00	-220.00	4780	.028
160.00	-200.00	5690	.041
160.00	-180.00	5318	.057
160.00	-160.00	4586	.043
160.00	-140.00	4282	.031
160.00	-120.00	10284	.057
160.00	-100.00	3944	.059
160.00	-80.00	4352	.031
160.00	-60.00	4182	.036
160.00	-40.00	2836	.029
160.00	-20.00	6828	.052
160.00	0.00	3158	.033
160.00	20.00	3402	.024
160.00	40.00	4736	.036
160.00	60.00	4288	.048
160.00	80.00	4214	.035
160.00	95.00	4226	.047
160.00	100.00	4483	.045
160.00	105.00	3018	.021
160.00	110.00	3562	.031
160.00	115.00	3002	.026
160.00	120.00	3096	.022
160.00	140.00	4566	.041
160.00	160.00	2238	.022
160.00	180.00	2683	.030
160.00	185.00	2246	.031
160.00	190.00	3322	.028
160.00	195.00	32382	.233
160.00	200.00	6907	.035
160.00	220.00	4420	.031

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
160.00	240.00	3420	.033
165.00	95.00	4882	.050
165.00	100.00	4296	.038
165.00	105.00	3600	.038
165.00	110.00	4726	.026
165.00	115.00	3712	.040
165.00	185.00	5678	.045
165.00	190.00	7506	.048
165.00	195.00	9924	.029
165.00	200.00	6956	.033
170.00	70.00	3492	.040
170.00	75.00	3140	.029
170.00	80.00	3944	.026
170.00	85.00	5002	.064
170.00	90.00	5448	.040
170.00	95.00	4868	.043
170.00	100.00	10638	.055
170.00	105.00	4010	.036
170.00	110.00	11496	.064
170.00	115.00	3230	.038
170.00	130.00	6560	.054
170.00	135.00	5712	.045
170.00	140.00	4194	.040
170.00	145.00	3734	.035
170.00	150.00	3784	.031
170.00	155.00	4302	.057
170.00	160.00	3704	.052
170.00	165.00	3542	.036
170.00	170.00	1688	.029
170.00	190.00	4982	.045
170.00	195.00	5335	.048
170.00	200.00	4808	.045
170.00	205.00	5178	.043
170.00	210.00	5090	.045
170.00	230.00	3184	.038
170.00	235.00	2972	.033
170.00	240.00	3124	.033
170.00	245.00	3372	.038
170.00	250.00	3708	.043
170.00	255.00	3336	.028
170.00	260.00	3636	.050
170.00	265.00	3782	.043

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr
170.00	270.00	3674	.031
170.00	290.00	3782	.033
170.00	295.00	3494	.043
170.00	300.00	4360	.036
170.00	305.00	2518	.029
170.00	310.00	4820	.040
170.00	315.00	5684	.029
170.00	320.00	4084	.052
170.00	325.00	4138	.045
170.00	330.00	3848	.045
170.00	335.00	4858	.036
170.00	340.00	4856	.035
170.00	345.00	4128	.036
170.00	350.00	4152	.036
175.00	70.00	3722	.045
175.00	75.00	4076	.045
175.00	80.00	4334	.029
175.00	85.00	3544	.029
175.00	90.00	3696	.031
175.00	95.00	7004	.040
175.00	100.00	20188	.105
175.00	105.00	4444	.024
175.00	110.00	3510	.026
175.00	115.00	5808	.062
175.00	130.00	2988	.083
175.00	135.00	5426	.083
175.00	140.00	6810	.040
175.00	145.00	5620	.031
175.00	150.00	1932	.017
175.00	155.00	2898	.062
175.00	160.00	4126	.043
175.00	165.00	4090	.036
175.00	170.00	2934	.029
175.00	190.00	5850	.029
175.00	195.00	3718	.036
175.00	200.00	3714	.029
175.00	205.00	11978	.017
175.00	210.00	7022	.050
175.00	230.00	2974	.021
175.00	235.00	2678	.026
175.00	240.00	2968	.035
175.00	245.00	4122	.045

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
175.00	250.00	3486	.028
175.00	255.00	3244	.029
175.00	260.00	3374	.022
175.00	265.00	3524	.041
175.00	270.00	3450	.038
175.00	290.00	3622	.036
175.00	295.00	3212	.045
175.00	300.00	3184	.033
175.00	305.00	3636	.035
175.00	310.00	4540	.031
175.00	315.00	4422	.035
175.00	320.00	3764	.028
175.00	325.00	3944	.035
175.00	330.00	3872	.035
175.00	335.00	3842	.035
175.00	340.00	4322	.026
175.00	345.00	4156	.017
175.00	350.00	4376	.041
180.00	-220.00	4728	.026
180.00	-200.00	5066	.057
180.00	-180.00	4570	.047
180.00	-160.00	4598	.060
180.00	-140.00	4370	.040
180.00	-120.00	5116	.026
180.00	-100.00	4228	.035
180.00	-80.00	3482	.031
180.00	-60.00	3846	.022
180.00	-40.00	3320	.041
180.00	-20.00	3000	.038
180.00	0.00	3740	.055
180.00	20.00	3208	.022
180.00	40.00	5178	.043
180.00	60.00	3764	.045
180.00	70.00	4152	.043
180.00	75.00	3430	.024
180.00	80.00	3900	.028
180.00	85.00	14294	.045
180.00	90.00	5540	.039
180.00	95.00	5922	.022
180.00	100.00	24887	.121
180.00	105.00	13390	.047
180.00	110.00	5262	.035

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
180.00	115.00	4674	.021
180.00	120.00	4546	.026
180.00	130.00	3526	.071
180.00	135.00	10192	.086
180.00	140.00	11254	.072
180.00	145.00	3552	.017
180.00	150.00	2874	.033
180.00	155.00	2740	.052
180.00	160.00	3961	.042
180.00	165.00	4624	.041
180.00	170.00	4136	.048
180.00	180.00	5838	.055
180.00	190.00	5222	.040
180.00	195.00	5510	.047
180.00	200.00	5105	.036
180.00	205.00	5222	.038
180.00	210.00	20502	.064
180.00	215.00	4866	.041
180.00	220.00	3706	.035
180.00	230.00	3088	.026
180.00	235.00	2644	.035
180.00	240.00	5302	.107
180.00	245.00	7382	.055
180.00	250.00	3178	.031
180.00	255.00	3380	.038
180.00	260.00	3257	.093
180.00	265.00	3254	.048
180.00	270.00	3378	.026
180.00	280.00	3638	.035
180.00	290.00	3532	.035
180.00	295.00	3562	.036
180.00	300.00	3750	.066
180.00	305.00	3852	.038
180.00	310.00	4182	.040
180.00	315.00	3908	.028
180.00	320.00	3931	.076
180.00	325.00	4076	.036
180.00	330.00	3982	.040
180.00	335.00	3876	.029
180.00	340.00	4039	.071
180.00	345.00	4038	.040
180.00	350.00	4200	.035

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
180.00	360.00	3724	.040
180.00	380.00	3320	.055
180.00	400.00	2908	.031
180.00	420.00	2572	.016
180.00	440.00	3736	.031
180.00	460.00	3828	.026
180.00	480.00	3070	.024
180.00	500.00	4382	.050
181.00	396.00	2832	.038
185.00	-205.00	4038	.040
185.00	-200.00	5030	.048
185.00	-195.00	3866	.036
185.00	70.00	4176	.047
185.00	75.00	4158	.045
185.00	80.00	4934	.040
185.00	85.00	9194	.399
185.00	90.00	320226	.830
185.00	95.00	15688	.048
185.00	100.00	275648	.758
185.00	105.00	9898	.035
185.00	110.00	5132	.035
185.00	115.00	3602	.028
185.00	130.00	5454	.028
185.00	135.00	7542	.031
185.00	140.00	4474	.062
185.00	145.00	3618	.031
185.00	150.00	2980	.028
185.00	155.00	3646	.026
185.00	160.00	4096	.036
185.00	165.00	3892	.043
185.00	170.00	4146	.038
185.00	190.00	4876	.043
185.00	195.00	10636	.054
185.00	200.00	5522	.033
185.00	205.00	5384	.046
185.00	210.00	9335	.040
185.00	215.00	4748	.042
185.00	230.00	3390	.035
185.00	235.00	3350	.040
185.00	240.00	4858	.047
185.00	245.00	5234	.040
185.00	250.00	3210	.021

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr
185.00	255.00	3130	.024
185.00	260.00	3078	.036
185.00	265.00	3260	.040
185.00	270.00	3154	.029
185.00	290.00	3242	.024
185.00	295.00	3180	.088
185.00	300.00	4000	.048
185.00	305.00	3694	.029
185.00	310.00	4286	.033
185.00	315.00	3894	.040
185.00	320.00	4102	.029
185.00	325.00	3946	.035
185.00	330.00	3998	.040
185.00	335.00	4072	.036
185.00	340.00	3894	.017
185.00	345.00	4132	.031
185.00	350.00	4732	.024
185.00	420.00	2898	.038
187.00	440.00	3366	.041
190.00	-220.00	4288	.038
190.00	-215.00	4694	.036
190.00	-210.00	4326	.038
190.00	-205.00	3934	.055
190.00	-200.00	4252	.043
190.00	-195.00	4660	.043
190.00	-190.00	4728	.055
190.00	70.00	310478	.751
190.00	75.00	4260	.045
190.00	80.00	4370	.021
190.00	85.00	42552	.116
190.00	90.00	201076	.571
190.00	95.00	33588	.224
190.00	100.00	6645	.037
190.00	105.00	4084	.024
190.00	110.00	4418	.033
190.00	115.00	2408	.036
190.00	130.00	3040	.033
190.00	135.00	3820	.033
190.00	140.00	4886	.040
190.00	145.00	3654	.041
190.00	150.00	3536	.028
190.00	155.00	5310	.040

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
190.00	160.00	4864	.052
190.00	165.00	3640	.035
190.00	170.00	3914	.035
190.00	190.00	5370	.048
190.00	195.00	4210	.038
190.00	200.00	4085	.028
190.00	205.00	7504	.054
190.00	210.00	14745	.054
190.00	215.00	7082	.061
190.00	220.00	5964	.128
190.00	230.00	3408	.047
190.00	235.00	3388	.031
190.00	240.00	2876	.029
190.00	245.00	3590	.026
190.00	250.00	2876	.016
190.00	255.00	3106	.029
190.00	260.00	3304	.019
190.00	265.00	3168	.035
190.00	270.00	3486	.033
190.00	290.00	3306	.039
190.00	295.00	3296	.039
190.00	300.00	3817	.035
190.00	305.00	3870	.041
190.00	310.00	3939	.036
190.00	315.00	3988	.038
190.00	320.00	3848	.028
190.00	325.00	3810	.035
190.00	330.00	3864	.040
190.00	335.00	3910	.048
190.00	340.00	3384	.036
190.00	345.00	3632	.024
190.00	350.00	3650	.024
194.00	464.00	3208	.017
195.00	-220.00	4240	.033
195.00	-215.00	4138	.043
195.00	-210.00	5118	.052
195.00	-205.00	4538	.043
195.00	-200.00	5734	.041
195.00	-195.00	5048	.048
195.00	-190.00	4522	.038
195.00	70.00	4774	.036
195.00	75.00	4192	.069

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr
195.00	80.00	3678	.026
195.00	85.00	5956	.033
195.00	90.00	89006	.043
195.00	95.00	15746	.033
195.00	100.00	9418	.071
195.00	105.00	5100	.036
195.00	110.00	4676	.050
195.00	115.00	3724	.024
195.00	130.00	4226	.036
195.00	135.00	3456	.033
195.00	140.00	3574	.028
195.00	145.00	3876	.031
195.00	150.00	3744	.055
195.00	155.00	4938	.054
195.00	160.00	4286	.054
195.00	165.00	2972	.022
195.00	170.00	3222	.021
195.00	190.00	4662	.060
195.00	195.00	4170	.048
195.00	200.00	3823	.038
195.00	205.00	12660	.042
195.00	210.00	8686	.047
195.00	215.00	6942	.078
195.00	220.00	7376	.067
195.00	225.00	5618	.040
195.00	230.00	3902	.035
195.00	235.00	2610	.031
195.00	240.00	2642	.022
195.00	245.00	2748	.029
195.00	250.00	4376	.028
195.00	255.00	6358	.026
195.00	260.00	2914	.022
195.00	265.00	3018	.036
195.00	270.00	3166	.035
195.00	290.00	3600	.028
195.00	295.00	3606	.029
195.00	300.00	3810	.043
195.00	305.00	3870	.033
195.00	310.00	3858	.048
196.00	402.00	1856	.024
200.00	-220.00	4378	.038
200.00	-215.00	4538	.059

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
200.00	-210.00	4206	.054	
200.00	-205.00	5222	.041	
200.00	-200.00	7416	.036	
200.00	-195.00	5434	.029	
200.00	-190.00	3990	.038	
200.00	-180.00	5236	.045	
200.00	-160.00	4766	.041	
200.00	-140.00	4100	.040	
200.00	-120.00	4020	.021	
200.00	-100.00	3884	.038	
200.00	-80.00	3628	.029	
200.00	-60.00	4036	.055	
200.00	-40.00	2996	.031	
200.00	-20.00	2868	.035	
200.00	0.00	3240	.024	
200.00	20.00	4382	.054	
200.00	40.00	4418	.048	
200.00	60.00	4078	.036	
200.00	80.00	4266	.029	
200.00	85.00	3674	.033	
200.00	90.00	9021	.036	
200.00	95.00	12100	.055	
200.00	100.00	25256	.106	
200.00	105.00	57330	.041	
200.00	110.00	6588	.041	
200.00	115.00	5122	.036	
200.00	120.00	6124	.043	
200.00	140.00	5126	.040	
200.00	160.00	3856	.043	
200.00	180.00	4104	.035	
200.00	190.00	4902	.054	
200.00	195.00	4352	.033	
200.00	200.00	5302	.037	
200.00	205.00	7945	.035	
200.00	210.00	6877	.037	
200.00	215.00	7350	.086	
200.00	220.00	5912	.066	
200.00	225.00	4822	.041	
200.00	230.00	2114	.021	
200.00	240.00	1880	0.000	WATER
200.00	245.00	2532	0.000	WATER
200.00	250.00	2212	0.000	WATER

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr	
200.00	255.00	2150	0.000	WATER
200.00	260.00	2550	.021	
200.00	265.00	2784	.029	
200.00	270.00	2944	.031	
200.00	280.00	3092	.052	
200.00	290.00	3736	.022	
200.00	295.00	3734	.028	
200.00	300.00	3746	.066	
200.00	305.00	3848	.035	
200.00	310.00	3748	.045	
200.00	320.00	4084	.026	
200.00	340.00	3264	.035	
200.00	360.00	3596	.040	
200.00	380.00	1710	.022	
200.00	400.00	2306	.033	
200.00	460.00	992	0.000	
200.00	480.00	3044	.033	
200.00	500.00	4386	.035	
205.00	-220.00	4646	.026	
205.00	-215.00	5402	.040	
205.00	-210.00	5002	.036	
205.00	-205.00	4836	.029	
205.00	-200.00	5330	.041	
205.00	-195.00	5036	.047	
205.00	-190.00	4008	.045	
205.00	85.00	3062	.033	
205.00	90.00	3782	.036	
205.00	95.00	4018	.021	
205.00	100.00	29758	.247	
205.00	105.00	74836	.116	
205.00	110.00	29526	.062	
205.00	115.00	19324	.047	
205.00	120.00	5634	.026	
205.00	190.00	4712	.054	
205.00	195.00	4666	.043	
205.00	200.00	5136	.048	
205.00	205.00	6308	.045	
205.00	210.00	11406	.069	
205.00	215.00	7121	.056	
205.00	220.00	5868	.031	
205.00	225.00	3968	.047	
205.00	230.00	3885	.024	

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3(12')) 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr	
205.00	245.00	1778	0.000	WATER
205.00	260.00	2488	0.000	WATER
205.00	265.00	2902	.010	
205.00	270.00	2736	.022	
205.00	290.00	3500	.028	
205.00	295.00	3458	.024	
205.00	300.00	3416	.035	
205.00	305.00	3934	.021	
205.00	310.00	3602	.028	
208.00	480.00	2534	.035	
210.00	-220.00	4012	.033	
210.00	-215.00	4016	.048	
210.00	-210.00	4458	.036	
210.00	-205.00	3836	.015	
210.00	-200.00	4072	.019	
210.00	-195.00	4330	.031	
210.00	-190.00	4240	.192	
210.00	-185.00	4032	.043	
210.00	95.00	4164	.026	
210.00	100.00	19256	.078	
210.00	105.00	25432	0.000	WATER
210.00	110.00	5712	0.000	WATER
210.00	115.00	11790	.057	
210.00	120.00	13650	.095	
210.00	125.00	26374	.050	
210.00	190.00	4292	.017	
210.00	195.00	5246	.055	
210.00	200.00	4476	.054	
210.00	205.00	6364	.040	
210.00	210.00	6364	.032	
210.00	215.00	5108	.052	
210.00	220.00	7844	.269	
210.00	225.00	10083	.050	
210.00	230.00	17960	.045	
210.00	265.00	2316	0.000	WATER
210.00	270.00	2808	.026	
210.00	290.00	3248	.022	
210.00	295.00	3240	.033	
210.00	300.00	3662	.033	
210.00	305.00	3110	.029	
210.00	310.00	2834	.028	
215.00	-190.00	4286	.028	

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr
215.00	210.00	6026	.047
215.00	215.00	9670	.059
215.00	220.00	5648	.085
215.00	225.00	33606	.143
215.00	230.00	32926	.306
215.00	235.00	4780	.041
220.00	-220.00	4830	.041
220.00	-200.00	5986	.036
220.00	-180.00	5314	.045
220.00	-160.00	4278	.036
220.00	-140.00	4228	.042
220.00	-120.00	3986	.047
220.00	-100.00	3554	.038
220.00	-80.00	3458	.033
220.00	-60.00	5464	.054
220.00	-40.00	5456	.028
220.00	-20.00	2894	.026
220.00	0.00	3812	.036
220.00	20.00	3822	.043
220.00	40.00	3592	.043
220.00	60.00	2742	.028
220.00	80.00	3862	.024
220.00	100.00	2474	0.000
220.00	120.00	2330	0.000
220.00	140.00	3726	.035
220.00	160.00	6026	.043
220.00	180.00	3138	.041
220.00	200.00	5276	.052
220.00	210.00	4603	.038
220.00	215.00	23040	.085
220.00	220.00	40788	.191
220.00	225.00	57870	.119
220.00	230.00	16295	.196
220.00	235.00	6466	.040
220.00	240.00	5908	.033
220.00	260.00	1318	0.000
220.00	280.00	2154	0.000
220.00	300.00	2328	0.000
220.00	320.00	3908	.057
220.00	340.00	2150	.026
220.00	360.00	1908	0.000
220.00	380.00	2454	.019

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr	
220.00	400.00	2884	.021	
220.00	420.00	2234	.033	
220.00	436.00	1218	0.000	
220.00	440.00	1148	.017	
220.00	497.00	2876	.033	
220.00	500.00	3068	.029	
220.00	520.00	3698	.035	
225.00	115.00	10488	.057	
225.00	120.00	23888	.057	
225.00	210.00	6334	.050	
225.00	215.00	11954	.043	
225.00	220.00	11252	.052	
225.00	225.00	7228	.050	
225.00	230.00	19500	.069	
225.00	235.00	6604	.043	
225.00	300.00	7524	.047	
225.00	305.00	2314	.026	
225.00	405.00	3820	.028	
225.00	410.00	2202	.019	
225.00	415.00	2114	.031	
225.00	420.00	1984	.024	
225.00	425.00	2278	.014	
225.00	430.00	1978	.021	
230.00	115.00	9552	.048	
230.00	120.00	12788	.067	
230.00	190.00	3442	0.000	WATER
230.00	195.00	3376	0.000	WATER
230.00	200.00	4386	.052	
230.00	205.00	4904	.047	
230.00	210.00	6200	.062	
230.00	215.00	8694	.330	
230.00	220.00	6035	.053	
230.00	225.00	5328	.041	
230.00	230.00	7337	.043	
230.00	235.00	5378	.040	
230.00	290.00	4526	.066	
230.00	295.00	7432	.035	
230.00	300.00	10232	.110	
230.00	305.00	5338	.050	
230.00	310.00	3380	.033	
230.00	315.00	3816	.047	
230.00	320.00	3880	.048	

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr	
230.00	325.00	3480	.036	
230.00	405.00	2656	.033	
230.00	410.00	2096	.028	
230.00	415.00	3774	.022	
230.00	420.00	2228	.021	
230.00	425.00	2718	.024	
230.00	430.00	2708	.021	
235.00	115.00	13868	.083	
235.00	120.00	9014	.054	
235.00	190.00	1724	.052	
235.00	195.00	2602	0.000	WATER
235.00	200.00	4282	0.000	WATER
235.00	205.00	6330	.048	
235.00	210.00	6142	.050	
235.00	215.00	6234	.050	
235.00	220.00	4164	.048	
235.00	225.00	5656	.026	
235.00	230.00	9380	.062	
235.00	235.00	4960	.038	
235.00	290.00	3908	.038	
235.00	295.00	5440	.021	
235.00	300.00	5834	.038	
235.00	305.00	4398	.028	
235.00	310.00	3190	.026	
235.00	315.00	4302	.064	
235.00	325.00	3106	.081	
235.00	405.00	2364	.033	
235.00	410.00	2748	.033	
235.00	415.00	2018	.031	
235.00	420.00	5916	.090	
235.00	425.00	5244	.047	
236.00	320.00	25304	.072	
240.00	-220.00	4228	.041	
240.00	-200.00	4174	.033	
240.00	-180.00	4550	.048	
240.00	-160.00	4492	.035	
240.00	-140.00	4654	.031	
240.00	-120.00	4304	.040	
240.00	-100.00	4552	.033	
240.00	-80.00	3974	.031	
240.00	-60.00	4360	.043	
240.00	-40.00	3800	.054	

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12°) CPM	HP-210 mrad/hr	
240.00	-20.00	3720	.038	
240.00	0.00	4900	.041	
240.00	20.00	3630	.022	
240.00	40.00	2870	.031	
240.00	60.00	3258	.026	
240.00	80.00	2842	.026	
240.00	100.00	3668	0.000	
240.00	115.00	13998	.083	
240.00	120.00	7940	.072	
240.00	140.00	1508	0.000	
240.00	160.00	4684	.040	
240.00	180.00	1958	.026	
240.00	190.00	1652	0.000	WATER
240.00	195.00	2392	0.000	WATER
240.00	200.00	4041	.037	
240.00	205.00	4704	0.000	WATER
240.00	210.00	4826	0.000	WATER
240.00	220.00	6711	.050	
240.00	225.00	6624	.117	
240.00	230.00	20906	.081	
240.00	235.00	3700	.019	
240.00	240.00	3526	.036	
240.00	260.00	3988	.035	
240.00	280.00	5384	.064	
240.00	290.00	3974	.031	
240.00	295.00	3858	.017	
240.00	300.00	3803	.038	
240.00	305.00	2656	.028	
240.00	310.00	3156	.048	
240.00	315.00	6890	.078	
240.00	320.00	14517	.080	
240.00	325.00	6008	.079	
240.00	340.00	2539	.029	
240.00	345.00	1836	.017	
240.00	350.00	2622	.017	
240.00	355.00	2662	.031	
240.00	360.00	2810	.017	
240.00	380.00	2468	.028	
240.00	400.00	2486	.021	
240.00	405.00	2482	.028	
240.00	410.00	4010	.017	
240.00	415.00	3284	.029	

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr	
240.00	420.00	7965	.132	
240.00	425.00	5662	.064	
240.00	440.00	4120	.043	
240.00	452.00	4116	.055	
240.00	506.00	2458	.026	
240.00	520.00	2754	.024	
245.00	100.00	3340	0.000	WATER
245.00	115.00	8788	.212	
245.00	120.00	11282	.055	
245.00	190.00	1726	0.000	WATER
245.00	195.00	3264	0.000	WATER
245.00	200.00	3744	0.000	WATER
245.00	205.00	3800	0.000	WATER
245.00	210.00	4198	0.000	WATER
245.00	220.00	5602	.071	
245.00	225.00	4052	.048	
245.00	230.00	5444	.040	
245.00	275.00	4524	.022	
245.00	290.00	3712	.041	
245.00	295.00	5567	.038	
245.00	300.00	14870	.028	
245.00	305.00	23009	.083	
245.00	310.00	25578	.044	
245.00	315.00	16222	.592	
245.00	320.00	96602	.309	
245.00	325.00	6556	.090	
245.00	330.00	4100	.043	
245.00	340.00	2396	.036	
245.00	345.00	2286	.036	
245.00	350.00	2298	.026	
245.00	355.00	2868	.029	
245.00	405.00	5220	.045	
245.00	410.00	6384	.105	
245.00	415.00	2960	.041	
245.00	420.00	17644	.495	
245.00	425.00	11682	.545	
250.00	100.00	2792	.035	
250.00	115.00	6818	.100	
250.00	120.00	5630	.074	
250.00	190.00	1566	0.000	WATER
250.00	195.00	2052	0.000	WATER
250.00	200.00	3448	0.000	WATER

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
250.00	205.00	3028	0.000	WATER
250.00	210.00	2686	0.000	WATER
250.00	270.00	3634	.047	
250.00	275.00	7632	.021	
250.00	280.00	3050	.028	
250.00	285.00	2484	.026	
250.00	290.00	2368	.041	
250.00	295.00	3304	.026	
250.00	300.00	3160	.033	
250.00	305.00	7913	.047	
250.00	310.00	9904	.041	
250.00	315.00	17624	.338	
250.00	320.00	728404	156.434	
250.00	325.00	16500	.504	
250.00	330.00	5642	.064	
250.00	340.00	2522	.028	
250.00	345.00	1966	.024	
250.00	350.00	2048	.029	
250.00	355.00	2702	.040	
250.00	400.00	4360	.026	
250.00	405.00	11918	.242	
250.00	410.00	13886	.211	
250.00	415.00	12982	.097	
250.00	420.00	12626	.071	
250.00	425.00	3142	.091	
255.00	100.00	2990	.038	
255.00	105.00	10564	.057	
255.00	110.00	11096	.055	
255.00	115.00	60896	.649	
255.00	270.00	3448	.057	
255.00	275.00	7126	.079	
255.00	280.00	4168	.026	
255.00	285.00	4354	.040	
255.00	290.00	2455	.037	
255.00	295.00	2954	.045	
255.00	300.00	3200	.036	
255.00	305.00	3909	.038	
255.00	310.00	6760	.059	
255.00	315.00	6582	.097	
255.00	320.00	73340	1.465	
255.00	325.00	8022	.413	
255.00	330.00	5608	.123	

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr
255.00	340.00	3040	.055
255.00	345.00	2364	.038
255.00	350.00	3068	.028
255.00	355.00	3546	.019
255.00	400.00	4004	.047
255.00	405.00	9586	.121
255.00	410.00	1870	.022
255.00	420.00	11450	.043
255.00	425.00	2800	.043
258.00	453.00	8810	.057
260.00	-200.00	3938	.040
260.00	-180.00	4712	.033
260.00	-160.00	3714	.022
260.00	-140.00	3498	.035
260.00	-120.00	4104	.043
260.00	-100.00	3728	.041
260.00	-80.00	3740	.038
260.00	-60.00	3724	.040
260.00	-40.00	3558	.038
260.00	-20.00	4656	.050
260.00	0.00	4033	.032
260.00	5.00	2996	.029
260.00	10.00	3244	.035
260.00	15.00	3284	.026
260.00	20.00	4392	.055
260.00	40.00	3046	.031
260.00	60.00	2700	.026
260.00	80.00	2692	.021
260.00	100.00	2608	.031
260.00	105.00	4942	.029
260.00	110.00	13948	.432
260.00	115.00	12160	.136
260.00	120.00	2142	0.000
260.00	140.00	1728	0.000
260.00	160.00	2078	.045
260.00	180.00	1374	.024
260.00	200.00	2036	0.000
260.00	220.00	3272	.040
260.00	240.00	3118	.043
260.00	260.00	3816	.043
260.00	270.00	3950	.026
260.00	275.00	4422	.022

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
260.00	280.00	4470	.032	
260.00	285.00	5164	.022	
260.00	290.00	2598	.028	
260.00	295.00	4768	.022	
260.00	300.00	20986	.085	
260.00	305.00	4346	.026	
260.00	310.00	6185	.067	
260.00	315.00	6798	.098	
260.00	320.00	10332	.180	
260.00	325.00	5602	.278	
260.00	330.00	3148	.076	
260.00	340.00	2002	.022	
260.00	360.00	3090	.031	
260.00	380.00	3614	.033	
260.00	400.00	4016	.031	
260.00	405.00	3758	.043	
260.00	415.00	2778	.036	
260.00	420.00	3109	.035	
260.00	425.00	3118	.029	
260.00	440.00	4522	.057	
260.00	516.00	2250	.019	
260.00	520.00	2998	.031	
260.00	540.00	3108	.033	
265.00	0.00	3030	.033	
265.00	5.00	3406	.024	
265.00	10.00	3664	.031	
265.00	15.00	3700	.024	
265.00	100.00	1632	0.000	WATER
265.00	105.00	1920	.028	
265.00	110.00	10068	.067	
265.00	115.00	11220	.090	
265.00	270.00	2316	.019	
265.00	275.00	3964	.278	
265.00	280.00	4674	.038	
265.00	285.00	5652	.031	
265.00	290.00	2832	.028	
265.00	295.00	2392	.022	
265.00	300.00	7212	.074	
265.00	305.00	3284	.033	
265.00	310.00	5030	.072	
265.00	315.00	9148	.048	
265.00	320.00	26882	.166	

PRINT DATE: 07/07/83

PAGE 38

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr	
265.00	325.00	4976	.133	
265.00	330.00	8006	.052	
265.00	335.00	3302	.045	
270.00	0.00	3766	.040	
270.00	5.00	3344	.029	
270.00	10.00	4716	.029	
270.00	15.00	3674	.036	
270.00	100.00	1310	0.000	WATER
270.00	105.00	1198	0.000	WATER
270.00	110.00	4720	.050	
270.00	115.00	4486	.041	
270.00	190.00	2340	0.000	WATER
270.00	195.00	2762	0.000	WATER
270.00	200.00	2998	0.000	WATER
270.00	205.00	6456	0.000	WATER
270.00	210.00	2882	0.000	WATER
270.00	270.00	2330	.050	
270.00	275.00	2810	.041	
270.00	280.00	3542	.036	
270.00	285.00	8474	.031	
270.00	290.00	3749	.029	
270.00	295.00	2806	.050	
270.00	300.00	5372	.047	
270.00	305.00	4260	.028	
270.00	310.00	3752	.150	
270.00	315.00	4268	.059	
270.00	320.00	8336	.079	
270.00	325.00	5692	.123	
270.00	330.00	4188	.055	
275.00	0.00	3054	.038	
275.00	5.00	3380	.038	
275.00	10.00	3542	.024	
275.00	15.00	3392	.021	
275.00	190.00	2794	.035	
275.00	195.00	3244	0.000	WATER
275.00	200.00	2216	0.000	WATER
275.00	205.00	2392	0.000	WATER
275.00	210.00	2102	0.000	WATER
275.00	270.00	2540	.036	
275.00	275.00	2944	.022	
275.00	280.00	5880	.059	
275.00	285.00	4690	.052	

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
275.00	290.00	7315	.041	
275.00	295.00	4749	.043	
275.00	300.00	4692	.042	
275.00	305.00	4578	.074	
275.00	310.00	4706	.041	
275.00	315.00	6170	.072	
275.00	320.00	4014	.029	
275.00	325.00	4132	.040	
275.00	330.00	2650	.050	
280.00	-180.00	4298	.031	
280.00	-160.00	4846	.041	
280.00	-140.00	3528	.038	
280.00	-120.00	2970	.026	
280.00	-100.00	4056	.028	
280.00	-80.00	3394	.041	
280.00	-70.00	4326	.031	
280.00	-65.00	5454	.055	
280.00	-60.00	5528	.031	
280.00	-40.00	3392	.035	
280.00	-20.00	3580	.028	
280.00	0.00	3534	.029	
280.00	20.00	3360	.031	
280.00	40.00	3338	.033	
280.00	60.00	2882	.033	
280.00	80.00	3340	.021	
280.00	100.00	2062	0.000	
280.00	120.00	3120	.029	
280.00	140.00	1794	0.000	
280.00	160.00	1118	0.000	
280.00	180.00	4602	.035	
280.00	190.00	3076	.031	
280.00	195.00	3508	0.000	WATER
280.00	200.00	2248	0.000	WATER
280.00	205.00	2008	0.000	WATER
280.00	210.00	1924	0.000	WATER
280.00	220.00	3568	0.000	
280.00	240.00	2528	0.000	
280.00	260.00	3362	.021	
280.00	270.00	2406	.029	
280.00	275.00	7246	.047	
280.00	280.00	9338	.034	
280.00	285.00	7436	.045	

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr	
280.00	290.00	7768	.043	
280.00	295.00	3236	.047	
280.00	300.00	3991	.079	
280.00	305.00	5272	.067	
280.00	310.00	3716	.038	
280.00	315.00	4014	.059	
280.00	320.00	3807	.059	
280.00	325.00	2836	.069	
280.00	330.00	3730	.035	
280.00	340.00	3084	.035	
280.00	360.00	4226	.050	
280.00	380.00	3810	.024	
280.00	400.00	3450	.024	
280.00	420.00	2510	.033	
280.00	440.00	4132	.026	
280.00	521.00	2342	.024	
280.00	540.00	3070	.036	
285.00	-70.00	4594	.043	
285.00	-65.00	4402	.028	
285.00	190.00	2322	.040	
285.00	195.00	2582	0.000	WATER
285.00	200.00	2892	0.000	WATER
285.00	205.00	1944	0.000	WATER
285.00	210.00	2490	0.000	WATER
285.00	270.00	3328	.033	
285.00	275.00	4540	.031	
285.00	280.00	5240	.041	
285.00	285.00	3746	.043	
285.00	290.00	3554	.017	
285.00	295.00	1910	.047	
285.00	300.00	2848	.043	
285.00	305.00	4142	.048	
285.00	310.00	2250	.028	
285.00	315.00	1816	.038	
285.00	320.00	3174	.038	
285.00	325.00	3100	.041	
285.00	330.00	3272	.055	
285.00	435.00	5208	.052	
285.00	440.00	6706	.050	
286.00	-60.00	4680	.043	
290.00	-70.00	4176	.050	
290.00	-65.00	5420	.026	

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
290.00	-60.00	4278	.052	
290.00	190.00	2386	0.000	WATER
290.00	195.00	2128	0.000	WATER
290.00	200.00	2064	0.000	WATER
290.00	205.00	1948	0.000	WATER
290.00	210.00	1808	0.000	WATER
290.00	270.00	2582	.026	
290.00	275.00	6500	.036	
290.00	280.00	2560	.026	
290.00	285.00	3807	.035	
290.00	290.00	3104	.022	
290.00	295.00	16752	.404	
290.00	300.00	3861	.045	
290.00	305.00	3048	.038	
290.00	310.00	2358	.028	
290.00	315.00	2454	.035	
290.00	320.00	1938	.035	
290.00	325.00	3034	.021	
290.00	330.00	3640	.060	
290.00	430.00	5208	.026	
290.00	435.00	14378	0.000	WATER
290.00	440.00	8000	.035	
293.00	453.00	3844	.040	
295.00	280.00	3622	.036	
295.00	285.00	4304	.100	
295.00	290.00	5316	.062	
295.00	295.00	3086	.050	
295.00	300.00	4566	.054	
295.00	305.00	3130	.038	
295.00	310.00	2468	.029	
295.00	425.00	4836	.033	
295.00	430.00	10788	.054	
295.00	435.00	10058	.048	
295.00	440.00	12228	.081	
300.00	-180.00	4294	.031	
300.00	-160.00	4580	.047	
300.00	-140.00	4948	.024	
300.00	-120.00	3836	.028	
300.00	-100.00	4570	.038	
300.00	-80.00	4090	.029	
300.00	-60.00	4018	.033	
300.00	-40.00	3568	.028	

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
300.00	-20.00	3640	.026
300.00	0.00	3906	.026
300.00	20.00	3096	.035
300.00	40.00	2844	.041
300.00	60.00	3038	.036
300.00	80.00	2972	.021
300.00	100.00	3196	.019
300.00	120.00	3462	.029
300.00	140.00	4630	.041
300.00	160.00	1310	0.000
300.00	180.00	1276	0.000
300.00	200.00	2674	.033
300.00	220.00	2426	0.000
300.00	240.00	1402	0.000
300.00	260.00	4042	.054
300.00	280.00	3486	.044
300.00	285.00	5606	.048
300.00	290.00	7478	.052
300.00	295.00	4148	.026
300.00	300.00	4461	.044
300.00	305.00	7680	.055
300.00	310.00	3978	.040
300.00	320.00	1800	.031
300.00	340.00	1240	.019
300.00	360.00	3530	.047
300.00	380.00	1908	.028
300.00	400.00	1240	.045
300.00	420.00	6616	.040
300.00	425.00	5110	.028
300.00	430.00	22974	.192
300.00	435.00	44120	.064
300.00	440.00	24101	.135
300.00	449.00	4540	.045
300.00	540.00	2752	.024
300.00	560.00	3452	.028
305.00	290.00	5280	.029
305.00	295.00	7012	.035
305.00	300.00	8042	.071
305.00	305.00	3984	.036
305.00	310.00	2848	.022
305.00	425.00	3838	.052
305.00	430.00	13266	.064

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
305.00	435.00	63090	.580
305.00	440.00	99140	.511
310.00	25.00	3300	.024
310.00	30.00	2936	.021
310.00	35.00	3138	.033
310.00	40.00	2990	.028
310.00	290.00	3862	.031
310.00	295.00	2830	.029
310.00	300.00	2456	.029
310.00	305.00	2602	.035
310.00	310.00	4238	.028
310.00	370.00	1196	.024
310.00	375.00	2050	.033
310.00	380.00	2876	.038
310.00	385.00	1404	.019
310.00	390.00	1802	.038
310.00	425.00	4390	.035
310.00	430.00	7134	.064
310.00	435.00	5588	.062
310.00	440.00	3336	.055
315.00	25.00	3402	.024
315.00	30.00	3220	.019
315.00	35.00	3000	.024
315.00	40.00	2906	.033
315.00	340.00	1700	.033
315.00	345.00	854	.038
315.00	350.00	716	.014
315.00	355.00	1872	.031
315.00	370.00	2076	.031
315.00	375.00	2940	.031
315.00	380.00	3702	.028
315.00	385.00	3676	.040
315.00	390.00	3422	.047
320.00	-160.00	4204	.028
320.00	-140.00	4672	.041
320.00	-120.00	3638	.022
320.00	-100.00	3756	.036
320.00	-80.00	4206	.038
320.00	-60.00	4138	.033
320.00	-40.00	3954	.035
320.00	-20.00	3754	.022
320.00	0.00	3114	.035

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
320.00	20.00	3178	.029
320.00	25.00	2898	.026
320.00	30.00	3224	.019
320.00	35.00	3410	.021
320.00	40.00	2675	.021
320.00	60.00	3666	.021
320.00	80.00	3162	.036
320.00	100.00	2816	.031
320.00	120.00	3694	.028
320.00	140.00	4304	.062
320.00	160.00	1114	0.000
320.00	180.00	1516	0.000
320.00	200.00	2416	0.000
320.00	220.00	2360	.016
320.00	240.00	2648	.021
320.00	260.00	2072	.019
320.00	280.00	2710	.029
320.00	300.00	1746	.019
320.00	320.00	2216	.036
320.00	340.00	1310	.028
320.00	345.00	1410	.029
320.00	350.00	926	.026
320.00	355.00	4106	.038
320.00	360.00	3122	.033
320.00	370.00	3116	.043
320.00	375.00	5260	.059
320.00	380.00	6168	.076
320.00	385.00	10530	.098
320.00	390.00	18778	.066
320.00	395.00	2320	.062
320.00	400.00	3548	.057
320.00	420.00	5016	.021
320.00	440.00	1616	.036
320.00	442.00	1244	.022
320.00	540.00	2566	.029
320.00	560.00	2732	.021
320.00	580.00	3024	.031
325.00	25.00	2416	.026
325.00	30.00	2752	.029
325.00	35.00	2602	.026
325.00	40.00	2678	.017
325.00	340.00	1974	.028

PRINT DATE: 07/07/83

TABLE 1

I-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
325.00	345.00	1378	.035	
325.00	350.00	1222	.024	
325.00	355.00	822	.024	
325.00	370.00	4592	.062	
325.00	375.00	5148	.083	
325.00	380.00	5442	.052	
325.00	385.00	13604	.174	
325.00	390.00	7264	.064	
325.00	395.00	3654	.105	
330.00	25.00	2574	.024	
330.00	30.00	2532	.024	
330.00	35.00	2880	.026	
330.00	40.00	2382	.028	
330.00	160.00	1466	0.000	WATER
330.00	165.00	1336	0.000	WATER
330.00	170.00	2022	0.000	WATER
330.00	340.00	2350	.026	
330.00	345.00	1972	.026	
330.00	350.00	1512	.026	
330.00	355.00	1466	.026	
330.00	370.00	4932	.062	
330.00	375.00	4354	.047	
330.00	380.00	4153	.050	
330.00	385.00	508	.031	
330.00	390.00	3362	.074	
330.00	390.00	4864	.071	
335.00	160.00	1486	0.000	WATER
335.00	165.00	1648	0.000	WATER
335.00	170.00	1192	0.000	WATER
335.00	375.00	5440	.045	
335.00	380.00	5538	.095	
340.00	-140.00	4382	.041	
340.00	-120.00	3978	.028	
340.00	-100.00	3804	.041	
340.00	-80.00	3888	.038	
340.00	-60.00	4034	.036	
340.00	-40.00	3020	.038	
340.00	-20.00	3896	.036	
340.00	0.00	3008	.021	
340.00	20.00	2794	.022	
340.00	40.00	3150	.038	
340.00	60.00	3084	.038	

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
340.00	80.00	3456	.024	
340.00	100.00	3932	.040	
340.00	120.00	3392	.026	
340.00	140.00	2186	.024	
340.00	160.00	1919	0.000	WATER
340.00	165.00	1668	0.000	WATER
340.00	170.00	1390	0.000	WATER
340.00	180.00	2916	0.000	
340.00	200.00	4110	.024	
340.00	220.00	2760	.022	
340.00	240.00	2428	0.000	
340.00	260.00	3294	.026	
340.00	280.00	4472	.043	
340.00	300.00	1832	.033	
340.00	320.00	3422	.055	
340.00	340.00	3696	.033	
340.00	360.00	1544	.028	
340.00	370.00	2159	.031	
340.00	375.00	16072	.802	
340.00	380.00	14763	.904	
340.00	385.00	7346	.080	
340.00	390.00	5327	.060	
340.00	395.00	5184	.135	
340.00	400.00	2160	.043	
340.00	420.00	1680	.019	
340.00	440.00	3462	.090	
340.00	446.00	1782	.026	
340.00	542.00	2428	.029	
340.00	560.00	2934	.033	
340.00	580.00	3376	.016	
345.00	160.00	1956	0.000	WATER
345.00	165.00	1774	0.000	WATER
345.00	170.00	1380	0.000	WATER
345.00	370.00	3548	.046	
345.00	375.00	9114	.356	
345.00	380.00	9934	.458	
345.00	385.00	12907	.685	
345.00	390.00	9408	.060	
345.00	395.00	4092	.066	
350.00	160.00	2212	.036	
350.00	165.00	1722	.033	
350.00	170.00	1252	0.000	WATER

TABLE 1

-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
350.00	190.00	2160	0.000	WATER
350.00	195.00	2208	.038	
350.00	200.00	2202	0.000	WATER
350.00	205.00	2332	.022	
350.00	210.00	1760	.031	
350.00	290.00	2392	.029	
350.00	295.00	2164	.038	
350.00	300.00	2012	.041	
350.00	370.00	1974	.035	
350.00	375.00	2968	.042	
350.00	380.00	4573	.076	
350.00	385.00	7313	.061	
350.00	390.00	3821	.036	
350.00	410.00	3290	.043	
350.00	415.00	2328	.028	
350.00	420.00	2352	.026	
350.00	425.00	3328	.036	
350.00	430.00	4198	.048	
355.00	190.00	2156	0.000	WATER
355.00	195.00	2104	.021	
355.00	200.00	2010	0.000	WATER
355.00	205.00	2734	0.000	WATER
355.00	210.00	2372	.035	
355.00	285.00	4752	.083	
355.00	290.00	8284	.494	
355.00	295.00	6424	.124	
355.00	300.00	6748	.109	
355.00	305.00	3464	.029	
355.00	310.00	3756	.033	
355.00	370.00	1422	.026	
355.00	375.00	1630	.035	
355.00	380.00	1912	.031	
355.00	385.00	1949	.053	
355.00	390.00	1782	.040	
355.00	410.00	4026	.041	
355.00	415.00	3184	.036	
355.00	420.00	2826	.028	
355.00	425.00	3592	.024	
355.00	430.00	3328	.050	
360.00	-140.00	3812	.047	
360.00	-120.00	3966	.050	
360.00	-100.00	3906	.028	

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
360.00	-80.00	3734	.036	
360.00	-60.00	3282	.038	
360.00	-40.00	3610	.036	
360.00	-20.00	2984	.035	
360.00	0.00	3186	.033	
360.00	20.00	2848	.024	
360.00	40.00	2884	.038	
360.00	60.00	3054	.031	
360.00	80.00	2796	.028	
360.00	100.00	3938	.045	
360.00	120.00	2540	.021	
360.00	140.00	2162	.017	
360.00	160.00	2462	.019	
360.00	180.00	2952	0.000	
360.00	190.00	2578	0.000	WATER
360.00	195.00	2562	.008	
360.00	200.00	2254	.022	
360.00	205.00	2314	0.000	WATER
360.00	210.00	1944	0.000	WATER
360.00	220.00	2084	.024	
360.00	240.00	3102	0.000	
360.00	260.00	2968	.007	
360.00	280.00	4578	.045	
360.00	290.00	2834	.017	
360.00	295.00	3144	.021	
360.00	300.00	3228	.048	
360.00	305.00	5724	.060	
360.00	310.00	4102	.038	
360.00	320.00	6974	.043	
360.00	340.00	4272	.017	
360.00	360.00	1226	.036	
360.00	370.00	1544	.024	
360.00	375.00	1210	.016	
360.00	380.00	1591	.038	
360.00	385.00	1558	.033	
360.00	390.00	1258	.040	
360.00	400.00	4276	.035	
360.00	410.00	4286	.045	
360.00	415.00	8078	.131	
360.00	420.00	6637	.108	
360.00	425.00	3948	.057	
360.00	430.00	3142	.045	

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
360.00	440.00	2958	.057	
360.00	560.00	3270	.029	
360.00	580.00	3620	.022	
364.00	544.00	2400	.016	
365.00	190.00	2596	0.000	WATER
365.00	195.00	2660	.031	
365.00	200.00	2278	0.000	WATER
365.00	205.00	1728	0.000	WATER
365.00	210.00	1786	.006	
365.00	295.00	3498	.019	
365.00	300.00	4328	.031	
365.00	305.00	5098	.024	
365.00	310.00	3964	.029	
365.00	350.00	2038	.019	
365.00	355.00	1812	.022	
365.00	360.00	1904	.038	
365.00	365.00	2286	.043	
365.00	370.00	2394	.040	
365.00	405.00	2534	.047	
365.00	410.00	9354	.033	
365.00	415.00	10098	.116	
365.00	420.00	9290	.362	
365.00	425.00	5076	.097	
365.00	430.00	2906	.038	
370.00	190.00	2424	0.000	WATER
370.00	195.00	3008	.026	
370.00	200.00	2588	.035	
370.00	205.00	2456	.019	
370.00	210.00	2028	.029	
370.00	290.00	2956	0.000	
370.00	295.00	2940	.036	
370.00	300.00	51886	.204	
370.00	305.00	6666	.036	
370.00	310.00	4596	.038	
370.00	350.00	1562	.024	
370.00	355.00	1556	.019	
370.00	360.00	2262	.048	
370.00	365.00	2540	.035	
370.00	370.00	2614	.045	
370.00	405.00	9096	.071	
370.00	410.00	9356	.157	
370.00	415.00	5270	.055	

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
370.00	420.00	4714	.035
370.00	425.00	4032	.047
370.00	430.00	3026	.024
375.00	290.00	3570	.031
375.00	295.00	3754	.041
375.00	300.00	5070	.033
375.00	305.00	4486	.033
375.00	310.00	3924	.035
375.00	350.00	1070	.036
375.00	355.00	1412	.057
375.00	360.00	2350	.038
375.00	365.00	2234	.041
375.00	370.00	2478	.038
375.00	405.00	4652	.038
375.00	410.00	3712	.029
380.00	-120.00	4290	.038
380.00	-100.00	3754	.040
380.00	-80.00	3408	.029
380.00	-60.00	4208	.038
380.00	-40.00	3120	.038
380.00	-20.00	2678	.024
380.00	0.00	3482	.026
380.00	20.00	2506	.029
380.00	40.00	2690	.031
380.00	60.00	2806	.017
380.00	80.00	3052	.033
380.00	100.00	3182	.033
380.00	120.00	2930	.029
380.00	140.00	2050	.019
380.00	160.00	2892	.028
380.00	180.00	2556	0.000
380.00	200.00	2866	.031
380.00	220.00	1762	.021
380.00	240.00	1886	0.000
380.00	260.00	2698	.028
380.00	280.00	3456	.033
380.00	300.00	2198	0.000
380.00	320.00	5504	.045
380.00	340.00	2850	.048
380.00	350.00	1550	.043
380.00	355.00	1996	.036
380.00	360.00	1837	.019

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
380.00	365.00	1504	.026
380.00	370.00	1540	.028
380.00	380.00	1252	.035
380.00	400.00	2354	.041
380.00	420.00	2198	.029
380.00	434.00	2898	.043
380.00	440.00	2854	.014
380.00	540.00	2618	.016
380.00	560.00	3452	.022
385.00	350.00	1822	.029
385.00	355.00	3794	.031
385.00	360.00	3148	.036
385.00	365.00	1214	.021
385.00	370.00	950	.029
390.00	350.00	4772	.036
390.00	355.00	13078	.066
390.00	360.00	5380	.045
390.00	365.00	2768	.041
390.00	370.00	966	.022
395.00	350.00	5492	.069
395.00	355.00	5226	.047
395.00	360.00	6516	.043
400.00	-120.00	3308	.040
400.00	-100.00	4060	.033
400.00	-80.00	4038	.038
400.00	-60.00	4146	.055
400.00	-40.00	3714	.045
400.00	-20.00	2510	.040
400.00	0.00	2644	.031
400.00	20.00	2496	.026
400.00	40.00	2754	.031
400.00	60.00	2564	.024
400.00	80.00	2702	.043
400.00	100.00	3350	.045
400.00	120.00	2870	.026
400.00	140.00	3018	.036
400.00	160.00	2972	.012
400.00	180.00	3502	.035
400.00	200.00	2842	.043
400.00	220.00	2552	.026
400.00	240.00	2904	.024
400.00	260.00	2752	.038

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
400.00	280.00	2828	.031	
400.00	300.00	3574	.038	
400.00	320.00	6194	.071	
400.00	340.00	5462	.026	
400.00	345.00	4428	.043	
400.00	350.00	12954	.091	
400.00	355.00	12994	.062	
400.00	360.00	4905	.040	
400.00	365.00	3546	.031	
400.00	380.00	1838	.024	
400.00	400.00	2550	.031	
400.00	420.00	4540	.047	
400.00	535.00	2244	.041	
400.00	540.00	2926	.017	
400.00	560.00	3874	.024	
404.00	426.00	1980	.131	
405.00	350.00	4956	.038	
405.00	355.00	6522	.045	
405.00	360.00	4878	.041	
410.00	330.00	9978	.047	
410.00	335.00	3542	.028	
410.00	340.00	3382	.033	
410.00	345.00	6190	.038	
410.00	350.00	4022	.031	
410.00	355.00	3890	.047	
410.00	360.00	3648	.031	
410.00	365.00	3260	.029	
410.00	370.00	1744	.025	
410.00	375.00	1844	.024	
410.00	380.00	2500	.029	
410.00	385.00	1872	.026	
410.00	390.00	2806	.047	
415.00	330.00	3322	0.000	WATER
415.00	335.00	4178	0.000	WATER
415.00	340.00	3628	.029	
415.00	345.00	6420	.047	
415.00	350.00	4124	.040	
415.00	355.00	3344	.040	
415.00	360.00	1990	.033	
415.00	365.00	2438	.026	
415.00	370.00	2891	.035	
415.00	375.00	1868	.024	

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
415.00	380.00	2568	.048	
415.00	385.00	2470	.033	
415.00	390.00	2412	.029	
420.00	-100.00	3324	.035	
420.00	-80.00	4182	.033	
420.00	-60.00	3674	.033	
420.00	-40.00	4038	.038	
420.00	-20.00	2962	.033	
420.00	0.00	2438	.038	
420.00	20.00	3386	.035	
420.00	40.00	2590	.041	
420.00	60.00	3116	.031	
420.00	80.00	2894	.031	
420.00	100.00	3220	.038	
420.00	120.00	3246	.035	
420.00	140.00	3260	.031	
420.00	160.00	2618	.026	
420.00	180.00	3482	.014	
420.00	200.00	6050	.048	
420.00	220.00	3474	.036	
420.00	240.00	4832	.026	
420.00	245.00	5656	.024	
420.00	250.00	3160	.024	
420.00	255.00	3326	.021	
420.00	260.00	3100	.024	
420.00	280.00	4040	.038	
420.00	300.00	3760	.031	
420.00	320.00	2914	0.000	
420.00	330.00	2546	0.000	WATER
420.00	335.00	3028	0.000	WATER
420.00	340.00	3822	.034	
420.00	345.00	3538	.040	
420.00	350.00	5056	.028	
420.00	355.00	4224	.040	
420.00	360.00	6895	.055	
420.00	365.00	9540	.054	
420.00	370.00	2192	.023	
420.00	375.00	2294	.029	
420.00	380.00	15445	.032	
420.00	385.00	3408	.045	
420.00	390.00	3180	.043	
420.00	400.00	5010	.026	

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr	
420.00	405.00	2794	.029	
420.00	410.00	4324	.041	
420.00	415.00	1770	.017	
420.00	417.00	2808	.031	
420.00	539.00	2366	.033	
420.00	540.00	2784	.024	
420.00	560.00	3976	.035	
425.00	240.00	3520	.024	
425.00	245.00	3962	0.000	WATER
425.00	250.00	4966	.038	
425.00	255.00	5254	.035	
425.00	330.00	1860	0.000	WATER
425.00	335.00	3896	0.000	WATER
425.00	340.00	3598	.022	
425.00	345.00	4582	.016	
425.00	350.00	4672	.050	
425.00	355.00	4340	.029	
425.00	360.00	4402	.052	
425.00	365.00	4404	.022	
425.00	370.00	2388	.024	
425.00	375.00	2778	.028	
425.00	380.00	3162	.017	
425.00	385.00	2130	.026	
425.00	390.00	2722	.035	
425.00	395.00	2330	.031	
425.00	400.00	13630	.198	
425.00	405.00	12502	.207	
425.00	410.00	9440	.211	
425.00	415.00	3484	0.000	WATER
430.00	235.00	6618	.026	
430.00	240.00	9176	0.000	WATER
430.00	245.00	3882	0.000	WATER
430.00	250.00	15250	.036	
430.00	255.00	14024	0.000	WATER
430.00	260.00	3830	.019	
430.00	330.00	3726	0.000	WATER
430.00	335.00	3390	.022	
430.00	340.00	4240	.029	
430.00	345.00	6316	.081	
430.00	350.00	5652	.041	
430.00	355.00	9656	.062	
430.00	360.00	7636	0.000	WATER

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
430.00	365.00	3156	.028	
430.00	370.00	2459	.041	
430.00	375.00	1878	.022	
430.00	380.00	1828	.012	
430.00	385.00	2184	.029	
430.00	390.00	1932	.048	
430.00	395.00	2680	.050	
430.00	400.00	20006	.193	
430.00	405.00	8418	.233	
430.00	410.00	17910	.097	
430.00	415.00	4336	.038	
435.00	230.00	3364	.019	
435.00	235.00	9152	0.000	WATER
435.00	240.00	9152	0.000	WATER
435.00	245.00	2510	0.000	WATER
435.00	250.00	5544	.040	
435.00	255.00	5498	0.000	WATER
435.00	330.00	2956	0.000	WATER
435.00	335.00	3956	0.000	WATER
435.00	340.00	6938	.040	
435.00	345.00	11058	.097	
435.00	350.00	76280	0.000	WATER
435.00	355.00	35652	.072	
435.00	360.00	40220	.697	
435.00	365.00	4222	.026	
435.00	370.00	2595	.032	
435.00	375.00	3078	.024	
435.00	380.00	3184	.024	
435.00	385.00	3400	.022	
435.00	390.00	1784	.028	
435.00	395.00	2020	.029	
435.00	400.00	6938	.181	
435.00	405.00	9432	.057	
435.00	410.00	4448	.019	
435.00	415.00	3110	.035	
436.00	430.00	2188	.031	
440.00	-80.00	3992	.054	
440.00	-60.00	3696	.048	
440.00	-40.00	4250	.038	
440.00	-20.00	3406	.024	
440.00	0.00	2278	.052	
440.00	20.00	2654	.021	

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr	
440.00	40.00	2062	.035	
440.00	60.00	2812	.038	
440.00	80.00	2176	.026	
440.00	100.00	3056	.026	
440.00	120.00	3628	.048	
440.00	140.00	3424	.048	
440.00	160.00	3278	.041	
440.00	180.00	3790	.026	
440.00	200.00	3610	.055	
440.00	220.00	4196	.033	
440.00	235.00	2728	0.000	WATER
440.00	245.00	4306	0.000	WATER
440.00	250.00	2922	0.000	WATER
440.00	255.00	3420	0.000	WATER
440.00	260.00	4196	.035	
440.00	280.00	3074	.022	
440.00	300.00	4914	.028	
440.00	320.00	4536	.021	
440.00	330.00	3024	0.000	WATER
440.00	335.00	3458	0.000	WATER
440.00	340.00	37087	.043	
440.00	345.00	233664	.601	
440.00	350.00	197752	0.000	WATER
440.00	355.00	100456	0.000	WATER
440.00	360.00	10952	.064	
440.00	365.00	10886	.133	
440.00	370.00	4680	.032	
440.00	375.00	1898	.014	
440.00	380.00	1853	.030	
440.00	385.00	1660	.019	
440.00	390.00	1708	.022	
440.00	400.00	2735	.028	
440.00	405.00	4422	.035	
440.00	540.00	2570	.031	
440.00	542.00	2348	.024	
445.00	240.00	2646	0.000	WATER
445.00	245.00	7748	0.000	WATER
445.00	250.00	4920	0.000	WATER
445.00	255.00	4654	0.000	WATER
445.00	330.00	2284	0.000	WATER
445.00	335.00	3094	.028	
445.00	340.00	3618	.038	

PRINT DATE: 07/07/83 PAGE 57

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr	
445.00	345.00	3976	.041	
445.00	350.00	3104	.045	
445.00	355.00	6576	.057	
445.00	360.00	6156	0.000	WATER
445.00	365.00	7038	.047	
445.00	370.00	9126	.039	
445.00	375.00	3848	.028	
445.00	380.00	1616	.041	
445.00	385.00	1708	.031	
445.00	390.00	1700	.095	
450.00	240.00	2626	0.000	WATER
450.00	245.00	10362	0.000	WATER
450.00	250.00	33564	0.000	WATER
450.00	255.00	4160	0.000	WATER
450.00	330.00	3618	0.000	WATER
450.00	335.00	4790	.028	
450.00	340.00	2368	.036	
450.00	345.00	3318	.045	
450.00	350.00	3682	.036	
450.00	355.00	2248	.031	
450.00	360.00	3188	.038	
450.00	365.00	3126	.021	
450.00	370.00	3718	.034	
450.00	375.00	2654	.019	
450.00	380.00	5974	.024	
450.00	385.00	1832	.038	
450.00	390.00	2020	.028	
455.00	240.00	2306	0.000	WATER
455.00	245.00	4956	0.000	WATER
455.00	250.00	3864	0.000	WATER
455.00	255.00	2388	0.000	WATER
455.00	370.00	3946	.041	
455.00	375.00	2480	.035	
455.00	380.00	2178	.021	
455.00	385.00	1598	.019	
455.00	390.00	2296	.036	
460.00	-80.00	3876	.047	
460.00	-60.00	4450	.050	
460.00	-40.00	3274	.036	
460.00	-20.00	3678	.035	
460.00	0.00	2662	.035	
460.00	20.00	2908	.026	

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
460.00	40.00	2306	.022	
460.00	60.00	2898	.031	
460.00	80.00	2664	.029	
460.00	100.00	2398	.022	
460.00	120.00	3262	.035	
460.00	140.00	3156	.033	
460.00	160.00	2960	.031	
460.00	180.00	3458	.043	
460.00	200.00	5908	.029	
460.00	220.00	3740	.022	
460.00	240.00	2578	0.000	
460.00	260.00	3180	.040	
460.00	280.00	3574	0.000	
460.00	300.00	4388	.038	
460.00	320.00	3790	.043	
460.00	340.00	4464	.029	
460.00	360.00	4390	.040	
460.00	380.00	2068	.040	
460.00	400.00	2764	.026	
460.00	429.00	2330	.028	
460.00	523.00	2478	.024	
460.00	540.00	3390	.043	
465.00	25.00	2346	.019	
465.00	30.00	2432	.041	
465.00	35.00	2328	.026	
465.00	40.00	3492	.038	
470.00	25.00	2480	.022	
470.00	30.00	2398	.028	
470.00	35.00	2332	.022	
470.00	40.00	5242	.029	
470.00	190.00	1234	0.000	WATER
470.00	195.00	1858	0.000	WATER
470.00	200.00	3768	.026	
470.00	205.00	5230	.038	
470.00	210.00	5320	.041	
470.00	290.00	3578	.014	
470.00	295.00	2518	0.000	WATER
470.00	300.00	3666	.050	
470.00	305.00	3856	.047	
470.00	310.00	3618	.038	
470.00	385.00	2134	.033	
470.00	390.00	2470	.024	

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
470.00	395.00	2354	.028	
470.00	400.00	6510	.041	
470.00	405.00	5934	.045	
475.00	25.00	2786	.028	
475.00	30.00	2456	.035	
475.00	35.00	2210	.024	
475.00	40.00	3028	.017	
475.00	190.00	1620	0.000	WATER
475.00	195.00	2370	0.000	WATER
475.00	200.00	2816	.041	
475.00	205.00	5432	.031	
475.00	210.00	5752	.040	
475.00	235.00	5170	.024	
475.00	290.00	2612	0.000	WATER
475.00	295.00	9976	0.000	WATER
475.00	300.00	6606	0.000	WATER
475.00	305.00	4580	0.000	WATER
475.00	310.00	3798	.026	
475.00	385.00	3232	.028	
475.00	390.00	3012	.038	
475.00	395.00	4544	.031	
475.00	400.00	9428	.060	
475.00	405.00	4574	.021	
480.00	-60.00	4164	.045	
480.00	-40.00	4002	.035	
480.00	-20.00	3956	.024	
480.00	0.00	3232	.022	
480.00	20.00	2574	.040	
480.00	25.00	2376	.033	
480.00	30.00	2288	.021	
480.00	35.00	2456	.026	
480.00	40.00	3123	.029	
480.00	60.00	3262	.036	
480.00	80.00	2824	.059	
480.00	100.00	2574	.035	
480.00	120.00	3062	.035	
480.00	140.00	2898	.029	
480.00	160.00	6720	.031	
480.00	180.00	2574	.040	
480.00	190.00	2878	0.000	WATER
480.00	195.00	2720	0.000	WATER
480.00	200.00	3244	.040	

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
480.00	205.00	4580	.035	
480.00	210.00	5382	.028	
480.00	220.00	5180	.038	
480.00	230.00	5884	.048	
480.00	235.00	7086	.031	
480.00	240.00	3696	.021	
480.00	260.00	3748	0.000	
480.00	280.00	3230	0.000	
480.00	290.00	3418	0.000	WATER
480.00	295.00	3582	0.000	WATER
480.00	300.00	10512	.055	
480.00	305.00	6722	.033	
480.00	310.00	3624	.038	
480.00	320.00	4040	.024	
480.00	340.00	3182	.031	
480.00	360.00	4702	.031	
480.00	380.00	2458	.036	
480.00	385.00	3998	.036	
480.00	390.00	15682	.081	
480.00	395.00	6344	.035	
480.00	400.00	4876	.047	
480.00	405.00	2780	.033	
480.00	462.00	2296	.041	
480.00	509.00	2510	.014	
480.00	520.00	2624	.031	
480.00	540.00	3444	.045	
485.00	190.00	2832	.022	
485.00	195.00	3230	.022	
485.00	200.00	2718	.024	
485.00	205.00	3944	.031	
485.00	210.00	5228	.045	
485.00	230.00	4838	.041	
485.00	235.00	11498	.024	
485.00	240.00	7256	.028	
485.00	245.00	3186	.024	
485.00	250.00	2128	.026	
485.00	300.00	6648	.059	
485.00	310.00	21776	.055	
485.00	315.00	4606	.048	
485.00	320.00	4396	.031	
485.00	385.00	2968	.038	
485.00	390.00	14534	.081	

PRINT DATE: 07/07/83 PAGE 61

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
485.00	395.00	3374	.036	
485.00	400.00	3046	.029	
485.00	405.00	4092	.026	
490.00	50.00	3502	.024	
490.00	55.00	4756	.021	
490.00	60.00	3352	.022	
490.00	65.00	2512	.022	
490.00	190.00	2922	.021	
490.00	195.00	2996	.041	
490.00	200.00	3014	.031	
490.00	205.00	2708	.029	
490.00	210.00	4412	.036	
490.00	230.00	4880	.047	
490.00	235.00	7298	.026	
490.00	240.00	7868	.041	
490.00	245.00	2806	.031	
490.00	250.00	2096	.021	
490.00	300.00	5636	.052	
490.00	305.00	5028	.028	
490.00	310.00	5784	.131	
490.00	315.00	4326	.031	
490.00	320.00	4064	.036	
490.00	325.00	3114	.031	
490.00	330.00	1768	.017	
490.00	335.00	2670	.028	
490.00	340.00	5092	.035	
490.00	385.00	1458	.016	
490.00	390.00	2302	.045	
490.00	395.00	3254	.029	
490.00	400.00	5114	.035	
490.00	405.00	5440	.038	
495.00	50.00	3870	.033	
495.00	55.00	7834	.028	
495.00	60.00	4236	.054	
495.00	65.00	2548	.019	
495.00	190.00	2234	0.000	WATER
495.00	195.00	2604	.028	
495.00	200.00	2986	.035	
495.00	205.00	2996	.026	
495.00	210.00	3068	.022	
495.00	230.00	5134	.038	
495.00	235.00	5538	.028	

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
495.00	240.00	4898	.048
495.00	245.00	3704	.022
495.00	250.00	3802	.040
495.00	310.00	25650	.067
495.00	315.00	4878	.026
495.00	320.00	3646	.031
495.00	325.00	1938	.014
495.00	330.00	8418	.028
495.00	335.00	2740	.035
495.00	340.00	2754	.035
500.00	-40.00	3736	.035
500.00	-20.00	4228	.033
500.00	0.00	3130	.054
500.00	20.00	3646	.041
500.00	40.00	3136	.026
500.00	50.00	3126	.033
500.00	55.00	5878	.036
500.00	60.00	3337	.040
500.00	65.00	2568	.014
500.00	80.00	3008	.035
500.00	100.00	2750	.028
500.00	120.00	2848	.031
500.00	140.00	2708	.021
500.00	160.00	2520	.035
500.00	180.00	2276	.026
500.00	200.00	3110	.031
500.00	220.00	5386	.054
500.00	230.00	5610	.054
500.00	235.00	4974	.036
500.00	240.00	5479	.041
500.00	245.00	7740	.057
500.00	250.00	29780	.066
500.00	260.00	3532	.045
500.00	280.00	8000	.045
500.00	290.00	18022	.064
500.00	300.00	22422	.100
500.00	305.00	47364	.188
500.00	310.00	11542	.055
500.00	315.00	4830	.028
500.00	320.00	4058	.039
500.00	325.00	3626	.026
500.00	335.00	2460	.031

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
500.00	340.00	2508	.031
500.00	360.00	2196	.028
500.00	380.00	1040	.017
500.00	400.00	1768	.038
500.00	460.00	2046	.033
500.00	511.00	3070	.038
500.00	520.00	3248	.038
500.00	540.00	3378	.033
503.00	403.00	2046	.038
505.00	50.00	3336	.022
505.00	55.00	4096	.038
505.00	60.00	2584	.028
505.00	65.00	2746	.033
505.00	120.00	2304	.019
505.00	125.00	2678	.035
505.00	130.00	3486	.029
505.00	135.00	2964	.022
505.00	310.00	20868	.090
505.00	320.00	4768	.028
505.00	325.00	3050	.028
505.00	330.00	10678	.026
505.00	335.00	4256	.036
505.00	340.00	3932	.033
505.00	420.00	2514	.024
510.00	70.00	2580	.014
510.00	75.00	2224	.022
510.00	80.00	2132	.028
510.00	85.00	2564	.016
510.00	90.00	2752	.028
510.00	120.00	2634	.035
510.00	125.00	2638	.012
510.00	130.00	16450	.095
510.00	135.00	3334	.033
510.00	240.00	5588	.035
510.00	250.00	117084	.183
510.00	260.00	9626	.050
510.00	270.00	5420	.036
510.00	280.00	33592	.198
510.00	290.00	10274	.057
510.00	300.00	25062	.238
510.00	310.00	17670	.223
510.00	325.00	4410	.038

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
510.00	330.00	6884	.048
510.00	335.00	3722	.028
510.00	340.00	7562	.036
510.00	345.00	2792	.014
514.00	440.00	2756	.052
515.00	70.00	2620	.028
515.00	75.00	2466	.031
515.00	80.00	2370	.033
515.00	85.00	4674	.041
515.00	90.00	3912	.038
515.00	120.00	3224	.021
515.00	125.00	3642	.043
515.00	130.00	9886	.033
515.00	135.00	6338	.028
515.00	285.00	31504	.435
515.00	310.00	23866	.133
515.00	320.00	6868	.028
515.00	325.00	5168	.045
515.00	330.00	8030	.050
515.00	335.00	10356	.029
515.00	340.00	4034	.035
520.00	-40.00	3474	.029
520.00	-20.00	4152	.052
520.00	0.00	3526	.031
520.00	20.00	3282	.057
520.00	40.00	2422	.038
520.00	60.00	3318	.031
520.00	70.00	2506	.019
520.00	75.00	2562	.045
520.00	80.00	4434	.044
520.00	85.00	4226	.028
520.00	90.00	3250	.028
520.00	100.00	2380	.028
520.00	120.00	4593	.028
520.00	125.00	5936	.036
520.00	130.00	7922	.045
520.00	135.00	10260	.041
520.00	140.00	6485	.072
520.00	160.00	3390	.033
520.00	180.00	3584	.033
520.00	200.00	2658	.019
520.00	220.00	2444	.031

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr	
520.00	240.00	6014	.054	
520.00	250.00	27262	.076	
520.00	260.00	26192	.285	
520.00	270.00	32474	.148	
520.00	285.00	13506	.088	
520.00	290.00	30088	.181	
520.00	295.00	30478	.247	
520.00	300.00	15297	.085	
520.00	305.00	17480	.114	
520.00	310.00	10866	.072	
520.00	315.00	10690	.135	
520.00	320.00	8044	.109	
520.00	325.00	6440	.104	
520.00	330.00	11328	0.000	WATER
520.00	335.00	8284	.066	
520.00	340.00	4964	.033	
520.00	360.00	3940	.057	
520.00	380.00	1128	0.000	
520.00	400.00	790	0.000	
520.00	500.00	2904	.029	
520.00	520.00	4024	.033	
523.00	380.00	1718	.029	
525.00	70.00	2504	.019	
525.00	75.00	3004	.019	
525.00	80.00	2474	.016	
525.00	85.00	2622	.006	
525.00	90.00	2960	.022	
525.00	120.00	4402	.021	
525.00	125.00	6612	.043	
525.00	130.00	8966	.055	
525.00	135.00	5958	.041	
525.00	150.00	3226	.026	
525.00	155.00	4034	.026	
525.00	160.00	3046	.029	
525.00	165.00	2596	.021	
525.00	170.00	2858	.024	
525.00	285.00	10704	.105	
525.00	290.00	24406	.121	
525.00	295.00	16282	.171	
525.00	300.00	40472	.078	
525.00	315.00	10576	.088	
525.00	320.00	7626	.067	

TABLE 1

'IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
525.00	325.00	5560	.028
525.00	330.00	7902	.093
525.00	335.00	5520	.031
530.00	70.00	2222	.024
530.00	75.00	2530	.019
530.00	80.00	2452	.022
530.00	85.00	2498	.024
530.00	90.00	2398	.021
530.00	120.00	4814	.035
530.00	125.00	8242	.055
530.00	130.00	8278	.048
530.00	135.00	5804	.026
530.00	140.00	5554	.041
530.00	150.00	9244	.052
530.00	155.00	3060	.016
530.00	160.00	3210	.063
530.00	165.00	3116	.022
530.00	170.00	2538	.022
530.00	250.00	5916	.047
530.00	260.00	28372	.097
530.00	270.00	44854	.245
530.00	280.00	15912	.186
530.00	290.00	13780	.095
530.00	300.00	37220	.192
530.00	320.00	16920	.083
530.00	325.00	9124	.066
530.00	330.00	7436	.045
530.00	335.00	4606	.024
535.00	125.00	5034	.028
535.00	130.00	5798	.035
535.00	150.00	4660	.028
535.00	155.00	4800	.050
535.00	160.00	3524	.017
535.00	165.00	4174	.079
535.00	170.00	2022	.035
535.00	305.00	6332	.045
535.00	310.00	9456	.048
535.00	315.00	12768	.074
535.00	320.00	8022	.067
535.00	325.00	5902	.048
535.00	330.00	4684	.031
535.00	335.00	3964	.031

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
540.00	-20.00	3842	.035
540.00	0.00	3984	.047
540.00	20.00	4008	.043
540.00	40.00	2908	.031
540.00	60.00	2754	.024
540.00	80.00	2374	.029
540.00	100.00	2984	.054
540.00	120.00	7242	.045
540.00	140.00	7046	.048
540.00	150.00	4764	.026
540.00	155.00	5698	.040
540.00	160.00	7733	.060
540.00	165.00	2661	.019
540.00	170.00	2064	.026
540.00	180.00	1948	.038
540.00	200.00	1282	.022
540.00	220.00	966	.026
540.00	240.00	5256	.059
540.00	250.00	5778	.059
540.00	255.00	5334	.055
540.00	260.00	5797	.084
540.00	265.00	4646	.043
540.00	270.00	5316	.064
540.00	275.00	5542	.069
540.00	280.00	5009	.082
540.00	285.00	4592	.052
540.00	290.00	4432	.059
540.00	300.00	4790	.029
540.00	310.00	6836	.041
540.00	315.00	7728	.071
540.00	320.00	6095	.035
540.00	340.00	3808	.038
540.00	360.00	3752	.022
540.00	380.00	3700	.026
540.00	500.00	3094	.021
540.00	520.00	3686	.041
543.00	500.00	2950	.028
545.00	150.00	4436	.036
545.00	155.00	3958	.028
545.00	160.00	4570	.048
545.00	165.00	5006	.031
545.00	170.00	1862	.016

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
545.00	250.00	5508	.062
545.00	255.00	5540	.057
545.00	260.00	5690	.040
545.00	265.00	5640	.112
545.00	270.00	5636	.057
545.00	275.00	5572	.069
545.00	280.00	5282	.086
545.00	285.00	5388	.028
545.00	290.00	4818	.035
545.00	310.00	5130	.040
545.00	315.00	4766	.033
550.00	150.00	4616	.035
550.00	155.00	4480	.036
550.00	160.00	4940	.038
550.00	165.00	3832	.031
550.00	170.00	1928	.036
550.00	250.00	5428	.029
550.00	255.00	5320	.022
550.00	260.00	5184	.040
550.00	265.00	6224	.055
550.00	270.00	6104	.072
550.00	275.00	5416	.022
550.00	280.00	4762	.029
550.00	285.00	4074	.024
550.00	290.00	3914	.024
560.00	-20.00	4100	.050
560.00	0.00	3770	.043
560.00	20.00	3894	.043
560.00	40.00	4508	.038
560.00	60.00	2828	.033
560.00	80.00	2832	.035
560.00	100.00	4626	.047
560.00	120.00	5278	.043
560.00	140.00	5524	.069
560.00	160.00	5260	.052
560.00	180.00	3570	.021
560.00	200.00	1392	.026
560.00	220.00	964	.022
560.00	240.00	1616	0.000
560.00	260.00	5422	.062
560.00	280.00	3948	.036
560.00	300.00	3972	.040

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PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
560.00	320.00	3848	.036
560.00	340.00	4112	.028
560.00	360.00	4434	.041
560.00	380.00	4492	.043
560.00	400.00	2338	.036
560.00	500.00	2684	.031
560.00	520.00	3880	.033
566.00	400.00	3220	.028
570.00	150.00	3754	.038
570.00	155.00	3280	.033
570.00	160.00	3280	.026
570.00	165.00	3708	.031
570.00	170.00	4154	.028
575.00	150.00	3098	.029
575.00	155.00	3550	.033
575.00	160.00	4044	.041
575.00	165.00	4580	.048
575.00	170.00	3736	.035
580.00	0.00	4390	.043
580.00	20.00	4052	.041
580.00	40.00	4096	.059
580.00	60.00	4106	.031
580.00	80.00	4134	.043
580.00	100.00	2454	.033
580.00	120.00	2850	.043
580.00	140.00	5864	.031
580.00	150.00	3258	.041
580.00	155.00	3284	.038
580.00	160.00	4131	.060
580.00	165.00	4474	.047
580.00	170.00	3778	.038
580.00	180.00	3556	.050
580.00	200.00	3452	.048
580.00	220.00	2220	.038
580.00	240.00	3410	.029
580.00	300.00	3708	.043
580.00	320.00	3852	.038
580.00	340.00	4046	.033
580.00	360.00	4350	.048
580.00	380.00	4322	.052
580.00	400.00	3812	.036
580.00	420.00	3308	.041

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12') CPM	HP-210 mrad/hr
580.00	500.00	2608	.026
584.00	420.00	2954	.029
585.00	150.00	3672	.035
585.00	155.00	3518	.033
585.00	160.00	3968	.048
585.00	165.00	4438	.059
585.00	170.00	4216	.052
590.00	150.00	2472	.021
590.00	155.00	3760	.021
590.00	160.00	4082	.029
590.00	165.00	4688	.026
590.00	170.00	4184	.041
594.00	440.00	2918	.017
600.00	0.00	4232	.033
600.00	20.00	3838	.038
600.00	40.00	3598	.041
600.00	60.00	4644	.036
600.00	80.00	3708	.028
600.00	100.00	3276	.028
600.00	120.00	2346	.036
600.00	140.00	2694	.043
600.00	160.00	2638	.043
600.00	180.00	4738	.048
600.00	200.00	4968	.048
600.00	320.00	3878	.052
600.00	340.00	4056	.033
600.00	360.00	4246	.048
600.00	380.00	4084	.050
600.00	400.00	3974	.033
600.00	420.00	4204	.031
600.00	440.00	3204	.031
600.00	460.00	2352	0.000
600.00	480.00	1580	0.000
600.00	500.00	2876	.028
605.00	460.00	3238	.019
607.00	480.00	3048	.026
610.00	90.00	3534	.024
610.00	95.00	4818	.057
610.00	100.00	3740	.031
610.00	105.00	3692	.040
610.00	110.00	3018	.024
610.00	390.00	3980	.028

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
610.00	395.00	3768	.031
610.00	400.00	3932	.040
610.00	405.00	3918	.040
610.00	410.00	3942	.043
615.00	90.00	5090	.059
615.00	95.00	4820	.054
615.00	100.00	4004	.036
615.00	105.00	4126	.029
615.00	110.00	3328	.021
615.00	390.00	4396	.028
615.00	395.00	3586	.019
615.00	400.00	3888	.036
615.00	405.00	3634	.040
615.00	410.00	3798	.040
620.00	20.00	4146	.054
620.00	40.00	4538	.052
620.00	60.00	4078	.035
620.00	80.00	5300	.036
620.00	90.00	5056	.048
620.00	95.00	4470	.048
620.00	100.00	4870	.058
620.00	105.00	3796	.040
620.00	110.00	3668	.036
620.00	120.00	3516	.045
620.00	140.00	3976	.055
620.00	160.00	3068	.036
620.00	360.00	4090	.035
620.00	380.00	4118	.040
620.00	390.00	3786	.029
620.00	395.00	3796	.038
620.00	400.00	5040	.090
620.00	405.00	3744	.048
620.00	410.00	3760	.028
620.00	420.00	4236	.033
620.00	440.00	3958	.045
620.00	460.00	3928	.031
625.00	90.00	4586	.041
625.00	95.00	4596	.033
625.00	100.00	5356	.060
625.00	105.00	5006	.062
625.00	110.00	4000	.045
625.00	390.00	3914	.035

PRINT DATE: 07/07/83

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
625.00	395.00	3560	.022
625.00	400.00	3574	.031
625.00	405.00	3662	.041
625.00	410.00	3838	.038
630.00	90.00	4598	.055
630.00	95.00	4734	.040
630.00	100.00	5300	.052
630.00	105.00	4988	.048
630.00	110.00	4940	.029
630.00	390.00	3892	.022
630.00	395.00	2260	.048
630.00	400.00	3426	.040
630.00	405.00	3408	.033
630.00	410.00	3630	.038
635.00	90.00	4790	.047
635.00	95.00	4190	.040
635.00	100.00	5084	.059
635.00	105.00	4600	.035
635.00	110.00	5228	.054
640.00	40.00	4790	.035
640.00	60.00	4480	.040
640.00	80.00	4996	.052
640.00	90.00	4466	.059
640.00	95.00	3908	.047
640.00	100.00	5345	.052
640.00	105.00	5618	.062
640.00	110.00	5132	.076
640.00	120.00	5540	.052
640.00	140.00	4226	.033
640.00	380.00	3974	.033
640.00	400.00	3322	.035
640.00	420.00	3578	.026
640.00	440.00	3644	.036
645.00	90.00	4822	.062
645.00	95.00	4526	.043
645.00	100.00	5218	.057
645.00	105.00	5114	.047
645.00	110.00	5250	.043
650.00	90.00	4434	.041
650.00	95.00	4758	.054
650.00	100.00	5410	.047
650.00	105.00	4970	.048

PRINT DATE: 07/07/83 PAGE 73

TABLE 1

IN-SITU GAMMA-RAY MEASUREMENTS USING A CONE SHIELDED 2 inch x 2 inch NaI CRYSTAL (SPA-3), 12 inches ABOVE THE GROUND, AND BETA DOSE RATE MEASUREMENTS AT THE GROUND SURFACE

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	SPA-3(12") CPM	HP-210 mrad/hr
650.00	110.00	4700	.050
660.00	40.00	4684	.029
660.00	60.00	3920	.043
660.00	80.00	4088	.050
660.00	100.00	4750	.055
660.00	420.00	3846	.047
680.00	60.00	4628	.040

PRINT DATE: 07/07/83 PAGE 74

TABLE 2

RADIONUCLIDE CONCENTRATION IN SURFACE SOIL SAMPLES
SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	CONCENTRATION (pCi/g +/- 2 Sigma) RADIUM-226	URANIUM-234	URANIUM-235	URANIUM-238
4.00	-30.00	.3 +/- .1		.030	*
10.00	15.00	.5 +/- .1		1.95	*
20.00	60.00	.3 +/- .2		.257	1.3 +/- 1.2
25.00	-100.00	.2 +/- .1		.047	4.4 +/- 1.7
40.00	-10.00	.8 +/- .2		.039	*
40.00	50.00	.4 +/- .1		.101	*
60.00	-180.00	.3 +/- .1		.034	*
70.00	125.00	.5 +/- .1		.66	2.7 +/- 1.3
80.00	25.00	.6 +/- .1		.150	*
80.00	70.00	.6 +/- .1		1.49	*
85.00	-85.00	.5 +/- .2		.058	*
85.00	45.00	.6 +/- .1		.135	*
90.00	-30.00	.6 +/- .2		.092	*
90.00	125.00	*		.170	*
90.00	150.00	.3 +/- .1		.210	*
100.00	150.00	*	736.0 +/- 4.0	46.7	141.0 +/- 2.0
100.00	185.00	.4 +/- .1		.116	*
100.00	210.00	16.0 +/- .7		.088	*
100.00	230.00	*		.045	1.8 +/- .9
100.00	250.00	.4 +/- .1		.047	*
110.00	110.00	.6 +/- .1		.101	*
110.00	125.00	*	1450.0 +/-10.0	61.0	19.5 +/- .8
110.00	140.00	*	1050.0 +/-10.0	40.4	107.0 +/- 2.0
115.00	-185.00	.4 +/- .2		.227	*
120.00	165.00	*	617.0 +/- 5.0	25.9	295.6 +/- 6.1
120.00	205.00	*		.120	*
125.00	130.00	.8 +/- .1		.26	*
130.00	145.00	.7 +/- .2		1.41	*
130.00	165.00	.1 +/- .3		.120	*
130.00	185.00	.4 +/- .2		.342	8.7 +/- 2.2
130.00	210.00	.2 +/- .2		.111	*
135.00	70.00	1.0 +/- .2		.201	*
140.00	-200.00	.8 +/- .2		.062	*
140.00	-100.00	.3 +/- .2		.049	*
140.00	55.00	*		.156	1.1 +/- 1.2
140.00	190.00	.1 +/- .2		22.5	64.0 +/- 3.5
155.00	180.00	.3 +/- .1		.077	*
155.00	210.00	*		3.49	11.0 +/- 1.8
160.00	115.00	.5 +/- .1		.110	1.0 +/- 1.2
165.00	95.00	.9 +/- .2		9.07	*
165.00	195.00	.7 +/- .2		.235	3.2 +/- 3.6
170.00	170.00	*		.182	*

* NO DETECTABLE ACTIVITY

U-235 CONCENTRATIONS, WITH NO INDICATED UNCERTAINTY, WERE ANALYZED AT ORNL WITH 95% CONFIDENCE, RANGING FROM 2.5% TO 4.0%. (REF. 5)

TABLE 2
RADIONUCLIDE CONCENTRATION IN SURFACE SOIL SAMPLES
SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	CONCENTRATION (pCi/g +/- 2 Sigma) RADIUM-226	URANIUM-234	URANIUM-235	URANIUM-238
170.00	195.00	.8 +/- .2		.075	*
170.00	250.00	.3 +/- .2		.051	*
170.00	270.00	.2 +/- .1		.047	3.7 +/- 1.9
175.00	75.00	.4 +/- .1		.24	*
180.00	135.00	.3 +/- .2	1400.0 +/-10.0	75.5	76.4 +/- 1.4
180.00	310.00	.4 +/- .1		.054	*
180.00	330.00	.3 +/- .1		.041	*
180.00	350.00	.2 +/- .2		.041	*
185.00	90.00	74.0 +/- 1.4		.116	*
190.00	-215.00	.4 +/- .2		.071	*
190.00	85.00	1.0 +/- .2		.081	*
190.00	115.00	.1 +/- .1		.280	*
190.00	210.00	3.4 +/- .3		9.93	*
190.00	230.00	.3 +/- .2		.051	*
190.00	250.00	*		.32	*
190.00	270.00	.3 +/- .1		.054	*
195.00	170.00	.1 +/- .1		.470	*
195.00	210.00	3.5 +/- .4		.541	*
200.00	300.00	.2 +/- .1		.170	*
210.00	100.00	4.6 +/- .5		1.24	*
210.00	120.00	*	149.0 +/- 2.0	9.22	76.2 +/- 1.3
210.00	195.00	.7 +/- .2		5.26	*
210.00	230.00	.6 +/- .3		0.51	*
210.00	270.00	.1 +/- .2		0.45	*
215.00	-140.00	.7 +/- .2		0.45	*
220.00	270.00	166.8 +/- 2.3		1.05	*
225.00	420.00	.2 +/- .1		.984	*
230.00	120.00	*	321.0 +/- 3.0	21.4	222.0 +/- 3.0
230.00	215.00	1.1 +/- .2		.26	*
230.00	300.00	2.1 +/- .3		.379	*
230.00	320.00	1.0 +/- .3	3100.0 +/-10.0	199.0	25.4 +/- .7
240.00	200.00	.1 +/- .2		.402	1.9 +/- 1.7
240.00	230.00	1.1 +/- .3		.201	*
240.00	330.00	.5 +/- .2		.494	7.2 +/- 1.9
240.00	405.00	.3 +/- .2		.235	*
245.00	310.00	.2 +/- .3		.126	9.6 +/- 3.5
245.00	345.00	*		.235	*
245.00	425.00	.2 +/- .2	683.0 +/- 5.0	17.0 +/- 3.0	456.0 +/- 4.0
250.00	120.00	.7 +/- .3	100.0 +/- 2.0	21.0 +/- 1.0	316.0 +/- 4.0
250.00	275.00	.2 +/- .1	525.0 +/- 3.0	27.2	22.5 +/- .7
250.00	320.00	*		646.	2560.0 +/-25.0
260.00	100.00	.1 +/- .2		.150	2.3 +/- 2.1
260.00	415.00	*		.428	*

* NO DETECTABLE ACTIVITY

U-235 CONCENTRATIONS, WITH NO INDICATED UNCERTAINTY, WERE ANALYZED AT ORNL WITH 95% CONFIDENCE, RANGING FROM 2.5% TO 4.0%. (REF. 5)

TABLE 2
RADIONUCLIDE CONCENTRATION IN SURFACE SOIL SAMPLES
SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	CONCENTRATION (pCi/g +/- 2 Sigma) RADIUM-226	URANIUM-234	URANIUM-235	URANIUM-238
265.00	5.00	*		.072	*
265.00	330.00	.2 +/- .1		1.16	7.9 +/- 1.6
270.00	230.00	*		.184	*
270.00	270.00	*		.340	5.7 +/- 1.9
270.00	295.00	*		4.28	*
275.00	290.00	.2 +/- .1		.208	2.2 +/- .7
275.00	310.00	*		.208	.6 +/- 1.7
275.00	430.00	.8 +/- .4		32.3	111.5 +/-11.1
280.00	200.00	.4 +/- .2	17.6 +/- .6	.873	8.7 +/- .4
280.00	290.00	.1 +/- .2		.047	.8 +/- 1.4
285.00	-65.00	.5 +/- .2		.118	2.1 +/- 1.3
290.00	270.00	.2 +/- .2		.21	*
290.00	290.00	*		.653	*
290.00	320.00	.1 +/- .1		.454	*
305.00	440.00	*		59.5	98.6 +/- 7.2
310.00	305.00	.4 +/- .1		.148	*
320.00	35.00	.5 +/- .2		.103	*
320.00	345.00	.1 +/- .1		.083	*
325.00	385.00	*	517.0 +/- 4.0	27.4	157.0 +/- 2.0
340.00	165.00	*		12.8	*
345.00	380.00	.1 +/- .2	669.0 +/- 5.0	31.2	373.0 +/- 4.0
345.00	385.00	.1 +/- .2	210.0 +/-10.0	24.6	310.0 +/-10.0
355.00	290.00	*	93.2 +/- 2.4	16.0 +/- 1.0	403.0 +/- 5.0
360.00	200.00	.3 +/- .2		.589	5.6 +/- 1.7
365.00	420.00	1.0 +/- .2	380.0 +/- 4.0	19.58	158.0 +/- 2.0
370.00	300.00	.6 +/- .2	82.5 +/- 1.8	8.4 +/- .6	253.0 +/- 3.0
370.00	365.00	.4 +/- .1		.520	5.9 +/- 1.7
390.00	355.00	*	4200.0 +/-100.0	1500.0 +/-100.0	7200.0 +/-100.0
396.00	372.00	.3 +/- .2		.24	*
400.00	350.00	*		6.87	22.2 +/- 3.0
410.00	350.00	.4 +/- .1		.355	*
420.00	240.00	*	319.0 +/- 7.0	160.0 +/-10.0	1490.0 +/-10.0
425.00	355.00	1.2 +/- .3		.355	3.1 +/- 2.0
430.00	255.00	.8 +/- .1		1.68	11.2 +/- 2.1
430.00	330.00	.4 +/- .1		7.77	3.8 +/- 2.1
430.00	370.00	.1 +/- .2	19.9 +/- .7	.942	11.4 +/- .5
430.00	405.00	*		28.46	174.0 +/-10.0
440.00	240.00	*	10.9 +/- .6	.4 +/- .1	4.9 +/- .4
440.00	345.00	3.5 +/- .3		.443	*
445.00	380.00	.3 +/- .1		.178	2.2 +/- 2.0
450.00	250.00	.5 +/- .2			125.6 +/- 5.2
450.00	250.00	*	151.1 +/- 2.0	16.0 +/- 1.0	304.0 +/- 3.0
450.00	350.00	.5 +/- .2		.044	*

* NO DETECTABLE ACTIVITY

U-235 CONCENTRATIONS, WITH NO INDICATED UNCERTAINTY, WERE ANALYZED AT ORNL WITH 95% CONFIDENCE, RANGING FROM 2.5% TO 4.0%. (REF. 5)

TABLE 2
RADIONUCLIDE CONCENTRATION IN SURFACE SOIL SAMPLES
SHIPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	CONCENTRATION (pCi/g +/- 2 Sigma) RADIUM-226	URANIUM-234	URANIUM-235	URANIUM-238
470.00	210.00	.1 +/- .2		.083	*
475.00	1035.00	.1 +/- .2		.289	*
480.00	300.00	*	182.0 +/- 3.0	19.58	196.0 +/- 3.0
485.00	235.00	*	799.0 +/- 5.0	30.0 +/- 3.0	427.0 +/- 4.0
485.00	390.00	*	417.0 +/- 5.0	18.0 +/- 1.0	289.0 +/- 4.0
490.00	330.00	*		.098	*
495.00	55.00	.3 +/- .1		3.49	11.4 +/- 2.8
495.00	195.00	.2 +/- .2		.338	*
500.00	240.00	*		2.02	19.0 +/- 2.8
500.00	305.00	.3 +/- .2		2.14	*
510.00	130.00	*		2.08	*
510.00	340.00	.5 +/- .2		.242	*
520.00	80.00	.6 +/- .1		.051	*
520.00	295.00	*	2920.0 +/-10.0	98.7	655.0 +/- 5.0
520.00	320.00	*	265.0 +/- 2.0	17.83	118.0 +/- 1.0
525.00	160.00	*		.90	*
530.00	125.00	.2 +/- .1	42.8 +/- 1.2	3.8+/- .3	118.8 +/- 3.7
535.00	150.00	*		4.17	*
535.00	320.00	9.0 +/- .4		.706	*
540.00	170.00	*		.022	*
545.00	280.00	.2 +/- .2		2.63	39.0 +/- 4.6
550.00	160.00	.3 +/- .1		46.4	*
550.00	260.00	.6 +/- .2		.094	*
580.00	160.00	.3 +/- .1		.06	*
610.00	100.00	*		.032	*
620.00	400.00	.4 +/- .2		.111	*
630.00	100.00	.3 +/- .2		.367	*
650.00	100.00	.4 +/- .2		.047	*
1200.00	85.00	.2 +/- .1		.139	*
1400.00	100.00	.4 +/- .1		0.10	2.9 +/- 2.0

* NO DETECTABLE ACTIVITY

U-235 CONCENTRATIONS, WITH NO INDICATED UNCERTAINTY, WERE ANALYZED AT ORNL WITH 95% CONFIDENCE, RANGING FROM 2.5% TO 4.0%. (REF.5)

TABLE 3

RADIONUCLIDE CONCENTRATION IN SUBSURFACE SOIL SAMPLES

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	DEPTH (FT)	CONCENTRATION (pCi/g +/- 2 Sigma) RADIUM-226	URANIUM-234	URANIUM-235	URANIUM-238
35.00	60.00	1.0	.4+/- .3		.077	2.7+/- 1.5
35.00	60.00	2.0	.6+/- .2		.041	
35.00	60.00	3.0	1.2+/- .2		.045	
35.00	60.00	4.0	4.1+/- .3		.028	
35.00	60.00	5.0	4.4+/- .4		.032	
35.00	60.00	6.0	8.5+/- .4		.039	
35.00	60.00	7.0	3.3+/- .3		.028	
35.00	60.00	8.0	2.5+/- .3		.030	
80.00	40.00	1.0	.6+/- .2		.69	
80.00	40.00	2.0	.3+/- .1		.17	
80.00	40.00	3.0			.71	
80.00	40.00	4.0	2.0+/- .2		.26	
80.00	40.00	5.0	4.5+/- .3		.34	
80.00	40.00	6.0	5.1+/- .4		.41	
100.00	100.00	1.0	.9+/- .2		.235	
100.00	100.00	2.0	.2+/- .2		1.11	12.2+/- 2.1
100.00	100.00	3.0	.5+/- .1		.101	
100.00	100.00	4.0	.4+/- .1		.163	.6+/- 1.4
100.00	100.00	5.0	.2+/- .2		.205	
110.00	140.00	1.0	.9+/- .2		53.7	143.4+/- 6.3
110.00	140.00	1.0		1020.0+/-10.	34.0+/- 4.0	85.8+/- 1.4
110.00	140.00	2.0	2.4+/- .2		2.40	9.4+/- 1.8
110.00	140.00	3.0	.8+/- .2		4.09	7.6+/- 1.8
110.00	140.00	4.0	2.6+/- .3		2.23	.9+/- 1.8
110.00	140.00	5.0	2.5+/- .2		5.56	5.0+/- 3.6
110.00	140.00	6.0	1.2+/- .2		1.76	2.8+/- 3.9
110.00	140.00	7.0	5.4+/- .4		2.29	
110.00	140.00	8.0	2.0+/- .2		2.16	7.1+/- 1.9
135.00	180.00	1.0	.3+/- .2		9.54	112.1+/- 5.4
135.00	180.00	2.0	.4+/- .2		2.6	35.0+/- 2.7
135.00	180.00	3.0	.7+/- .2		1.84	42.0+/- 3.3
135.00	180.00	3.0		34.3+/- 1.6	.9+/- .3	53.4+/- 2.0
135.00	180.00	4.0			1.56	27.2+/- 2.8
135.00	180.00	5.0	.3+/- .2		1.24	15.4+/- 2.4
135.00	180.00	6.0	.3+/- .2		1.18	17.2+/- 2.7
135.00	180.00	7.0	.4+/- .1		.60	17.8+/- 1.8
180.00	340.00	1.0			.045	
180.00	340.00	2.0	.3+/- .2		.04	

* DUPLICATE ENTRIES INDICATE MORE THAN ONE SAMPLE WAS TAKEN AT EACH LOCATION

U-235 CONCENTRATIONS, WITH NO INDICATED UNCERTAINTY, WERE ANALYZED AT ORNL WITH 95% CONFIDENCE, RANGING FROM 2.5% TO 4.0%. (REF.5)

TABLE 3

RADIONUCLIDE CONCENTRATION IN SUBSURFACE SOIL SAMPLES

SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	DEPTH (FT)	CONCENTRATION (pCi/g +/- 2 Sigma) RADIUM-226	URANIUM-234	URANIUM-235	URANIUM-238
180.00	340.00	3.0	.7+/- .1		.036	3.0+/- 1.6
180.00	340.00	4.0	.2+/- .2		.036	
180.00	340.00	5.0	.7+/- .2		.047	
180.00	340.00	6.0	.2+/- .2		.051	
180.00	340.00	7.0			.047	
180.00	340.00	8.0	.3+/- .1		.045	3.1+/- 1.0
200.00	200.00	1.0	1.2+/- .2		15.0	4.0+/- 2.7
200.00	200.00	2.0	.5+/- .1		4.5	3.6+/- .9
200.00	200.00	3.0	.1+/- .2		2.61	.9+/- .7
200.00	200.00	4.0	.3+/- .2		2.10	
200.00	200.00	5.0	.6+/- .1		.039	.6+/- 1.0
200.00	200.00	6.0	.4+/- .1		.068	
200.00	200.00	7.0			.081	
200.00	300.00	1.0	.5+/- .1		.094	
200.00	300.00	2.0	.2+/- .2		.073	
200.00	300.00	3.0	.3+/- .1		.049	
200.00	300.00	4.0	.6+/- .2		.043	
200.00	300.00	5.0	.8+/- .2		.051	
200.00	300.00	6.0			.049	
200.00	300.00	7.0	.4+/- .2		.045	
200.00	300.00	8.0	.8+/- .2		.047	
225.00	220.00	1.0	337.6+/- 2.8		.45	
225.00	220.00	2.0	1571.0+/- 6.4		.30	71.0+/-41.6
225.00	220.00	3.0	277.4+/- 3.5		1.16	
225.00	220.00	4.0	64.1+/- 1.3		2.1	
225.00	220.00	5.0	86.2+/- 1.3		.96	
225.00	220.00	6.0	14.0+/- .7		.62	
225.00	220.00	7.0	453.8+/- 3.6		.96	
225.00	220.00	8.0	3.4+/- 3.1		.73	
225.00	220.00	9.0	155.4+/- 2.2		.73	60.7+/-16.0
250.00	320.00	1.0			127.8	16460.0+/-48.3
250.00	320.00	1.0		900.0+/-30.0	200.0+/-10.0	6200.0+/-[illegible]0.0
250.00	320.00	2.0			2.46	138.0+/- 6.1
250.00	320.00	2.0		17.9+/- 1.0	1.7+/- .3	106.0+/- 2.0
250.00	320.00	3.0	.3+/- .2		4.30	133.5+/- 4.9
250.00	320.00	3.0		30.7+/- 1.0	3.1+/- .4	179.0+/- 3.0
250.00	320.00	4.0			1.22	44.0+/- 3.2
250.00	320.00	5.0	.2+/- .1		1.07	34.5+/- 2.8
250.00	320.00	6.0	.1+/- .1		1.07	15.1+/- 2.9

* DUPLICATE ENTRIES INDICATE MORE THAN ONE SAMPLE WAS TAKEN AT EACH LOCATION

U-235 CONCENTRATIONS, WITH NO INDICATED UNCERTAINTY, WERE ANALYZED AT ORNL WITH 95% CONFIDENCE, RANGING FROM 2.5% TO 4.0%. (REF.5)

TABLE 3
RADIONUCLIDE CONCENTRATION IN SUBSURFACE SOIL SAMPLES
SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	DEPTH (FT)	CONCENTRATION (pCi/g +/- 2 Sigma) RADIUM-226	URANIUM-234	URANIUM-235	URANIUM-238
280.00	280.00	1.0	.5+/- .2		14.25	5.0+/- 1.9
280.00	280.00	2.0	.7+/- .1	?	7.79	6.4+/- 1.9
280.00	280.00	3.0	17.0+/- .6		6.46	
280.00	280.00	4.0	2.3+/- .3		5.03	
280.00	280.00	5.0	8.4+/- .5		2.61	
285.00	200.00	1.0			.30	
285.00	200.00	2.0	.5+/- .1		.152	
285.00	200.00	3.0	.6+/- .1		.163	
285.00	200.00	4.0	.2+/- .1		.143	1.4+/- .9
285.00	200.00	5.0	.0+/- .1		.096	
285.00	200.00	6.0	.5+/- .1		.098	
285.00	200.00	7.0			.103	
285.00	430.00	1.0	.2+/- .1			5.6+/- 1.7
285.00	430.00	2.0	.2+/- .1			12.0+/- 2.3
285.00	430.00	3.0		465.0+/-10.0	19.0+/- 1.0	369.0+/- 9.0
285.00	430.00	3.0	.1+/- .2			124.4+/- 6.6
285.00	430.00	4.0				144.0+/- 5.9
285.00	430.00	5.0				64.3+/- 5.2
300.00	300.00	1.0	.7+/- .2		.54	
300.00	300.00	2.0	4.0+/- .3		11.92	
300.00	300.00	3.0	.4+/- .1		16.37	.7+/- 2.0
300.00	300.00	4.0	.5+/- .1		12.67	
300.00	400.00	1.0			.71	
300.00	400.00	2.0			.235	.9+/- 1.0
300.00	400.00	3.0			.214	
300.00	400.00	4.0	.1+/- .1		.56	
340.00	380.00	1.0			36.4	472.0+/- 8.2
340.00	380.00	1.0		1100.0+/-10.0	25.0+/- 3.0	539.0+/- 7.0
340.00	380.00	2.0	4.4+/- .4		47.7	294.0+/-11.1
340.00	380.00	2.0		598.0+/- 6.0	14.0+/- 2.0	299.0+/- 4.0
340.00	380.00	3.0	2.8+/- .3		98.2	153.4+/- 5.7
340.00	380.00	3.0		241.0+/- 4.0	13.0+/- 1.0	235.0+/- 4.0
340.00	380.00	4.0	.8+/- .2		5.62	37.6+/- 3.7
340.00	380.00	4.0		117.0+/- 3.0	2.2+/- .4	116.0+/- 3.0
340.00	380.00	5.0	.2+/- .1		5.56	37.2+/- 3.8
340.00	380.00	6.0	.1+/- .2		102.1	67.0+/- 4.0
340.00	380.00	7.0			2.78	20.8+/- 2.2
340.00	380.00	8.0	.2+/- .1		1.07	23.0+/- 3.2

* DUPLICATE ENTRIES INDICATE MORE THAN ONE SAMPLE WAS TAKEN AT EACH LOCATION

U-235 CONCENTRATIONS, WITH NO INDICATED UNCERTAINTY, WERE ANALYZED AT ORNL WITH 95% CONFIDENCE, RRANGING FROM 2.5% TO 4.0%. (REF.5)

TABLE 3
RADIONUCLIDE CONCENTRATION IN SUBSURFACE SOIL SAMPLES
SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	DEPTH (FT)	CONCENTRATION (pCi/g +/- 2 Sigma) RADIUM-226	URANIUM-234	URANIUM-235	URANIUM-238
340.00	380.00	9.0	.5+/- .1		2.65	23.0+/- 2.3
435.00	348.00	1.0	17.0+/- .6		1.16	
435.00	348.00	2.0	8.0+/- .5		.90	
435.00	348.00	3.0	88.0+/- 1.3		.54	
435.00	348.00	4.0	422.4+/- 2.9		.96	
435.00	348.00	5.0	365.4+/- 2.7		.66	
435.00	348.00	6.0	225.8+/- 2.7		.51	17.0+/-15.0
435.00	348.00	7.0	109.1+/- 1.4		.39	
435.00	348.00	8.0	139.8+/- 1.6		.39	
435.00	348.00	9.0	96.0+/- 1.3		.51	
435.00	348.00	10.0	148.9+/- 1.7		.51	
496.00	296.00	.5		34.6+/- .7	1.1+/- .1	11.3+/- .4
496.00	296.00	1.0	1.8+/- .2		6.6	13.0+/- 2.3
496.00	296.00	2.0	19.2+/- .9		1.95	12.0+/- 5.4
496.00	296.00	3.0	15.0+/- .6		4.37	5.8+/- 5.5
496.00	296.00	4.0	5.4+/- .4		.49	50.0+/- 3.8
496.00	296.00	5.0	5.5+/- .3		.56	
520.00	320.00	.5		265.0+/- 3.0	8.0+/- .5	110.0+/- 2.0
520.00	320.00	.5		379.0+/- 3.0	11.0+/- 1.0	101.0+/- 2.0
520.00	320.00	.5		368.0+/- 4.0	13.0+/- 1.0	77.2+/- 2.0
520.00	320.00	.5		226.0+/- 2.0	5.9+/- .4	68.3+/- 1.3
520.00	320.00	1.0	4.7+/- .4		16.6	76.0+/- 6.9
520.00	320.00	2.0	5.1+/- .3		17.6	65.0+/- 5.0
520.00	320.00	3.0	7.1+/- .5		19.9	97.0+/- 5.9
520.00	320.00	4.0	8.2+/- .4		10.51	37.0+/- 4.2
520.00	320.00	5.0	5.4+/- .4		10.02	56.0+/- 4.9
520.00	320.00	6.0		392.0+/- 5.0	13.0+/- 1.0	126.0+/- 3.0
540.00	160.00	.5		241.0+/- 6.0	67.0+/- 3.0	1060.0+/-10.0
540.00	160.00	1.0			28.5	1763.0+/-19.5
540.00	160.00	2.0	.3+/- .5			645.3+/-13.2
540.00	160.00	2.0		174.0+/- 4.0	18.0+/- 1.0	804.0+/- 9.0
540.00	160.00	3.0	.1+/- .2			200.1+/- 7.4
540.00	160.00	3.0		57.7+/- 2.0	6.4+/- .7	274.0+/- 4.0
540.00	160.00	4.0	.3+/- .2			106.0+/- 5.8
540.00	160.00	4.0		28.9+/- 1.3	3.0+/- .4	120.0+/- 3.0
540.00	160.00	5.0	.2+/- .1			93.4+/- 5.9
540.00	160.00	5.0		22.9+/- .9	2.2+/- .3	94.5+/- 1.8

* DUPLICATE ENTRIES INDICATE MORE THAN ONE SAMPLE WAS TAKEN AT EACH LOCATION

U-235 CONCENTARATIONS, WITH NO INDICATED UNCERTAINTY, WERE ANALYZED AT ORNL WITH 95% CONFIDENCE, RANGING FROM 2.5% TO 4.0%. (REF.5)

TABLE 4

GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
-60.00	-40.00	0.0	12202
-60.00	-40.00	.5	13954
-60.00	-40.00	1.0	14674
-60.00	-40.00	1.5	14024
-60.00	-40.00	2.0	13500
-60.00	-40.00	2.5	13042
-60.00	-40.00	3.0	12752
-60.00	-40.00	3.5	12596
-60.00	-40.00	4.0	12504
-60.00	-40.00	4.5	12632
-60.00	-40.00	5.0	12454
-60.00	-40.00	5.5	11690
-60.00	-40.00	6.0	11146
-60.00	-40.00	6.5	10776
-60.00	-40.00	7.0	10052
-60.00	-40.00	7.5	9466
-60.00	-40.00	8.0	9174
-60.00	-40.00	8.5	9078
-60.00	-40.00	9.0	9196
-60.00	-40.00	9.5	9248
-60.00	-40.00	10.0	9572
-60.00	-40.00	10.5	9526
-60.00	-40.00	11.0	9730
-60.00	-40.00	11.5	9584
-60.00	-40.00	12.0	9772
-60.00	-40.00	12.5	9850
-60.00	-40.00	13.0	10104
-60.00	-40.00	13.5	10326
30.00	-100.00	0.0	10628
30.00	-100.00	.5	12518
30.00	-100.00	1.0	10948
30.00	-100.00	1.5	9038
30.00	-100.00	2.0	7340
30.00	-100.00	2.5	6624
30.00	-100.00	3.0	6146
30.00	-100.00	3.5	6458
30.00	-100.00	4.0	7026
30.00	-100.00	4.5	8054
30.00	-100.00	5.0	9902
30.00	-100.00	5.5	10284
30.00	-100.00	6.0	10698

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

PRINT DATE: 07/07/83 PAGE 1

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
30.00	-100.00	6.5	10464
30.00	-100.00	7.0	10438
30.00	-100.00	7.5	10420
30.00	-100.00	8.0	10718
30.00	-100.00	8.5	10608
30.00	-100.00	9.0	10538
30.00	-100.00	9.5	10132
30.00	-100.00	10.0	10556
30.00	-100.00	10.5	10542
30.00	-100.00	11.0	10500
30.00	-100.00	11.5	11252
30.00	-100.00	12.0	11734
30.00	-100.00	12.5	12334
30.00	-100.00	13.0	13304
35.00	60.00	0.0	29468
35.00	60.00	.5	13956
35.00	60.00	.5	32598
35.00	60.00	1.0	16790
35.00	60.00	1.0	51274
35.00	60.00	1.5	20766
35.00	60.00	1.5	89966
35.00	60.00	2.0	31862
35.00	60.00	2.0	139066
35.00	60.00	2.5	65328
35.00	60.00	2.5	149448
35.00	60.00	3.0	79358
35.00	60.00	3.0	126030
35.00	60.00	3.5	58952
35.00	60.00	3.5	105542
35.00	60.00	4.0	42082
35.00	60.00	4.0	63746
35.00	60.00	4.5	36342
35.00	60.00	4.5	44808
35.00	60.00	5.0	26338
35.00	60.00	5.0	39482
35.00	60.00	5.5	19262
35.00	60.00	5.5	42970
35.00	60.00	6.0	17390
35.00	60.00	6.0	28302
35.00	60.00	6.5	18176
35.00	60.00	6.5	20284

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
35.00	60.00	7.0	16858
35.00	60.00	7.0	16592
35.00	60.00	7.5	14534
35.00	60.00	7.5	14032
35.00	60.00	8.0	14296
35.00	60.00	8.0	13166
35.00	60.00	9.0	13746
35.00	60.00	10.0	14368
35.00	60.00	11.0	13848
35.00	60.00	11.6	13402
45.00	-25.00	0.0	10040
45.00	-25.00	.5	10452
45.00	-25.00	1.0	8660
45.00	-25.00	2.0	8582
45.00	-25.00	2.5	9098
45.00	-25.00	3.0	9356
45.00	-25.00	3.5	8170
45.00	-25.00	4.0	6810
45.00	-25.00	5.0	6282
45.00	-25.00	6.0	8702
45.00	-25.00	6.5	11088
45.00	-25.00	7.0	11526
45.00	-25.00	7.5	11818
45.00	-25.00	8.0	12758
45.00	-25.00	8.5	11710
45.00	-25.00	9.0	11300
45.00	-25.00	9.5	11138
45.00	-25.00	10.0	11446
45.00	-25.00	10.5	11332
45.00	-25.00	11.0	11018
45.00	-25.00	11.5	10714
45.00	-25.00	12.0	10632
45.00	-25.00	12.5	10264
45.00	-25.00	13.0	10198
45.00	-25.00	13.5	10546
60.00	-180.00	0.0	12040
60.00	-180.00	.5	13764
60.00	-180.00	1.0	13972
60.00	-180.00	1.5	12196
60.00	-180.00	2.0	9678

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
60.00	-180.00	2.5	7952
60.00	-180.00	3.0	7682
60.00	-180.00	3.5	7184
60.00	-180.00	4.0	6932
60.00	-180.00	5.0	8482
60.00	-180.00	5.5	9960
60.00	-180.00	6.0	11442
60.00	-180.00	6.5	11932
60.00	-180.00	7.0	11914
60.00	-180.00	7.5	12440
60.00	-180.00	8.0	12302
60.00	-180.00	8.5	12032
60.00	-180.00	9.0	12754
60.00	-180.00	9.5	12382
60.00	-180.00	10.0	11826
60.00	-180.00	10.5	11214
70.00	190.00	0.0	9084
70.00	190.00	0.0	10200
70.00	190.00	.5	11528
70.00	190.00	.5	12874
70.00	190.00	1.0	12994
70.00	190.00	1.0	12992
70.00	190.00	1.5	13658
70.00	190.00	1.5	13058
70.00	190.00	2.0	13670
70.00	190.00	2.0	13366
70.00	190.00	2.5	13712
70.00	190.00	2.5	12042
70.00	190.00	3.0	13010
70.00	190.00	3.0	11808
70.00	190.00	3.5	11194
70.00	190.00	3.5	11656
70.00	190.00	4.0	11316
70.00	190.00	4.0	11470
70.00	190.00	4.5	11346
70.00	190.00	4.5	11760
70.00	190.00	5.0	11718
70.00	190.00	5.0	11966
70.00	190.00	5.5	11954
70.00	190.00	6.0	11582
70.00	190.00	6.0	11820

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
70.00	190.00	6.5	11226
70.00	190.00	7.0	10762
70.00	190.00	7.0	10950
70.00	190.00	8.0	10632
70.00	190.00	8.0	10506
70.00	190.00	9.0	10760
70.00	190.00	9.0	10602
70.00	190.00	10.0	11098
70.00	190.00	10.0	11712
70.00	190.00	10.5	11814
70.00	190.00	11.0	11906
70.00	190.00	11.0	12634
70.00	190.00	11.5	12886
70.00	190.00	12.0	12204
70.00	190.00	12.0	13074
70.00	190.00	12.5	12068
70.00	190.00	12.5	12582
70.00	190.00	13.0	12648
70.00	190.00	13.5	12578
80.00	40.00	0.0	7812
80.00	40.00	.5	9266
80.00	40.00	1.0	10202
80.00	40.00	1.5	10452
80.00	40.00	2.0	11362
80.00	40.00	2.5	11986
80.00	40.00	3.0	13896
80.00	40.00	3.5	18126
80.00	40.00	4.0	23222
80.00	40.00	4.5	20134
80.00	40.00	5.0	16248
80.00	40.00	5.5	8726
80.00	40.00	6.0	7180
80.00	40.00	7.0	4568
80.00	40.00	8.0	4998
80.00	40.00	9.0	6784
80.00	40.00	10.0	11412
80.00	40.00	10.5	11314
80.00	40.00	11.0	10956
80.00	40.00	11.5	11018
80.00	40.00	12.0	10648
80.00	40.00	12.5	10858

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
80.00	40.00	13.0	10264
80.00	40.00	13.5	10854
85.00	155.00	0.0	8312
85.00	155.00	.5	12256
85.00	155.00	1.0	13178
85.00	155.00	1.5	12892
85.00	155.00	2.0	11532
85.00	155.00	2.5	11098
85.00	155.00	3.0	10660
85.00	155.00	3.5	11648
85.00	155.00	4.0	12504
85.00	155.00	4.5	13214
85.00	155.00	5.0	13668
90.00	-90.00	0.0	7066
90.00	-90.00	0.0	9054
90.00	-90.00	.5	9584
90.00	-90.00	.5	9184
90.00	-90.00	1.0	9174
90.00	-90.00	1.0	9068
90.00	-90.00	1.5	7654
90.00	-90.00	1.5	8226
90.00	-90.00	2.0	6954
90.00	-90.00	2.0	7754
90.00	-90.00	2.5	6490
90.00	-90.00	2.5	7996
90.00	-90.00	3.0	6786
90.00	-90.00	3.0	8024
90.00	-90.00	3.5	5950
90.00	-90.00	3.5	7030
90.00	-90.00	4.0	5142
90.00	-90.00	4.0	6718
90.00	-90.00	4.5	4508
90.00	-90.00	5.0	4100
90.00	-90.00	5.0	6814
90.00	-90.00	5.5	4152
90.00	-90.00	6.0	4294
90.00	-90.00	6.0	5674
90.00	-90.00	6.5	4856
90.00	-90.00	7.0	5770
90.00	-90.00	7.0	4298

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
90.00	-90.00	7.5	6826
90.00	-90.00	8.0	8606
90.00	-90.00	8.0	5600
90.00	-90.00	8.5	10984
90.00	-90.00	9.0	10870
90.00	-90.00	9.0	7978
90.00	-90.00	9.5	8522
90.00	-90.00	10.0	9678
90.00	-90.00	10.5	9526
90.00	-90.00	11.0	9770
90.00	-90.00	11.5	9444
90.00	-90.00	12.0	9360
90.00	-90.00	13.0	9652
90.00	-90.00	13.5	10024
100.00	100.00	0.0	18326
100.00	100.00	.5	30710
100.00	100.00	1.0	44032
100.00	100.00	1.5	32362
100.00	100.00	2.0	26496
100.00	100.00	2.5	19826
100.00	100.00	3.0	14046
100.00	100.00	3.5	13642
100.00	100.00	4.0	11466
100.00	100.00	5.0	7634
100.00	100.00	6.0	5712
100.00	100.00	7.0	9058
100.00	100.00	8.0	7172
100.00	100.00	9.0	9558
100.00	100.00	10.0	10858
100.00	100.00	11.0	11322
100.00	100.00	11.5	11596
100.00	240.00	0.0	8804
100.00	240.00	.5	13304
100.00	240.00	1.0	13074
100.00	240.00	1.5	13060
100.00	240.00	2.0	12920
100.00	240.00	2.5	13112
100.00	240.00	3.0	13002
100.00	240.00	3.5	12672

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
106.00	-194.00	0.0	5180
106.00	-194.00	.5	9150
106.00	-194.00	1.0	9628
106.00	-194.00	1.5	8980
106.00	-194.00	2.0	8330
106.00	-194.00	2.5	7310
106.00	-194.00	3.0	7628
106.00	-194.00	3.5	8402
106.00	-194.00	4.0	8398
106.00	-194.00	4.5	7808
106.00	-194.00	5.0	6932
106.00	-194.00	5.5	6826
106.00	-194.00	6.0	7444
106.00	-194.00	7.0	9602
106.00	-194.00	8.0	9886
106.00	-194.00	9.0	10008
106.00	-194.00	10.0	10260
106.00	-194.00	11.0	10768
106.00	-194.00	12.0	11132
106.00	-194.00	13.0	12100
106.00	-194.00	14.0	11834
106.00	-194.00	14.5	11878
110.00	140.00	0.0	32416
110.00	140.00	.5	43374
110.00	140.00	1.0	52546
110.00	140.00	1.5	46168
110.00	140.00	2.0	40110
110.00	140.00	2.5	38712
110.00	140.00	3.0	40462
110.00	140.00	3.5	46838
110.00	140.00	4.0	40206
110.00	140.00	4.5	22236
110.00	140.00	5.0	18272
110.00	140.00	5.5	17104
110.00	140.00	6.0	20530
110.00	140.00	6.5	21860
110.00	140.00	7.0	21454
110.00	140.00	7.5	26846
110.00	140.00	8.0	19042
110.00	140.00	8.5	16162
110.00	140.00	9.0	18036

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4

GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
110.00	140.00	9.5	17746
110.00	140.00	10.0	16298
110.00	140.00	10.5	15500
110.00	140.00	11.0	13260
120.00	-50.00	0.0	10492
120.00	-50.00	.5	9922
120.00	-50.00	1.0	9238
120.00	-50.00	1.5	9164
120.00	-50.00	2.0	7924
120.00	-50.00	2.5	7456
120.00	-50.00	3.0	6970
120.00	-50.00	3.5	6374
120.00	-50.00	4.0	5224
120.00	-50.00	5.0	5272
120.00	-50.00	6.0	3812
120.00	-50.00	7.0	2390
120.00	-50.00	8.0	3588
120.00	-50.00	9.0	5054
120.00	-50.00	10.0	7662
120.00	-50.00	10.5	8322
120.00	-50.00	11.0	9670
120.00	-50.00	11.5	10748
120.00	-50.00	12.0	12068
120.00	-50.00	12.5	11724
120.00	-50.00	13.0	11596
120.00	-50.00	13.5	11246
120.00	-50.00	14.0	11412
132.00	75.00	0.0	6446
132.00	75.00	0.0	7238
132.00	75.00	.5	6614
132.00	75.00	.5	7616
132.00	75.00	1.0	5812
132.00	75.00	1.0	7918
132.00	75.00	1.5	5892
132.00	75.00	1.5	7694
132.00	75.00	2.0	7170
132.00	75.00	2.0	7604
132.00	75.00	2.5	8476
132.00	75.00	2.5	7034
132.00	75.00	3.0	7854

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
132.00	75.00	3.0	7804
132.00	75.00	3.5	6620
132.00	75.00	3.5	9164
132.00	75.00	4.0	5912
132.00	75.00	4.0	9146
132.00	75.00	4.5	5860
132.00	75.00	4.5	8322
132.00	75.00	5.0	4912
132.00	75.00	5.0	7008
132.00	75.00	5.5	5992
132.00	75.00	6.0	2060
132.00	75.00	6.0	4360
132.00	75.00	6.5	3286
132.00	75.00	7.0	1880
132.00	75.00	7.0	1850
132.00	75.00	8.0	2398
132.00	75.00	8.0	1034
132.00	75.00	9.0	1584
132.00	75.00	9.0	578
132.00	75.00	10.0	1176
132.00	75.00	10.0	960
132.00	75.00	11.0	1604
132.00	75.00	11.0	1250
132.00	75.00	12.0	2510
132.00	75.00	12.0	1592
132.00	75.00	12.5	7608
132.00	75.00	13.0	8224
132.00	75.00	13.0	2088
132.00	75.00	13.5	10132
132.00	75.00	14.0	11588
132.00	75.00	14.0	2526
135.00	180.00	0.0	24138
135.00	180.00	.5	20316
135.00	180.00	1.0	22154
135.00	180.00	1.5	20104
135.00	180.00	2.0	22156
135.00	180.00	2.5	14500
135.00	180.00	3.0	10592
135.00	180.00	3.5	8408
135.00	180.00	4.0	7656
135.00	180.00	4.5	8186

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
135.00	180.00	5.0	9372
135.00	180.00	5.5	10738
135.00	180.00	6.0	12012
135.00	180.00	6.5	13064
135.00	180.00	7.0	13282
140.00	-100.00	0.0	7516
140.00	-100.00	.5	6764
140.00	-100.00	1.0	6546
140.00	-100.00	1.5	7602
140.00	-100.00	2.0	8912
140.00	-100.00	2.5	9098
140.00	-100.00	3.0	8560
140.00	-100.00	3.5	8426
140.00	-100.00	4.0	8546
140.00	-100.00	4.5	7734
140.00	-100.00	5.0	7462
140.00	-100.00	6.0	5878
140.00	-100.00	7.0	3646
140.00	-100.00	8.0	2644
140.00	-100.00	8.5	2544
145.00	-200.00	0.0	8424
145.00	-200.00	0.0	9078
145.00	-200.00	.5	10684
145.00	-200.00	.5	11258
145.00	-200.00	1.0	11626
145.00	-200.00	1.0	8714
145.00	-200.00	1.5	8216
145.00	-200.00	1.5	7244
145.00	-200.00	2.0	8256
145.00	-200.00	2.0	7176
145.00	-200.00	2.5	8394
145.00	-200.00	2.5	7454
145.00	-200.00	3.0	9592
145.00	-200.00	3.0	7626
145.00	-200.00	3.5	8530
145.00	-200.00	4.0	8994
145.00	-200.00	4.0	8016
145.00	-200.00	4.5	7360
145.00	-200.00	5.0	6050
145.00	-200.00	5.0	6766

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
145.00	-200.00	5.5	6468
145.00	-200.00	6.0	5006
145.00	-200.00	6.0	5958
145.00	-200.00	6.5	4952
145.00	-200.00	7.0	4280
145.00	-200.00	7.0	3998
145.00	-200.00	7.5	3610
145.00	-200.00	8.0	4366
145.00	-200.00	8.0	3840
145.00	-200.00	8.5	4720
145.00	-200.00	9.0	7938
145.00	-200.00	9.0	6280
145.00	-200.00	9.5	8534
145.00	-200.00	10.0	11374
145.00	-200.00	10.0	11216
145.00	-200.00	10.5	11528
145.00	-200.00	11.0	11202
145.00	-200.00	11.0	11994
145.00	-200.00	11.5	13086
145.00	-200.00	12.0	12362
145.00	-200.00	12.0	13146
145.00	-200.00	12.5	12882
145.00	-200.00	12.5	13238
145.00	-200.00	13.0	12510
180.00	-140.00	0.0	6198
180.00	-140.00	.5	6746
180.00	-140.00	1.0	6580
180.00	-140.00	1.5	6432
180.00	-140.00	2.0	6892
180.00	-140.00	2.5	7534
180.00	-140.00	3.0	8366
180.00	-140.00	3.5	9872
180.00	-140.00	4.0	11396
180.00	-140.00	4.5	13238
180.00	-140.00	5.0	14090
180.00	-140.00	5.5	11458
180.00	-140.00	6.0	8948
180.00	-140.00	6.5	5392
180.00	-140.00	7.0	3526
180.00	-140.00	8.0	3368
180.00	-140.00	8.5	9456

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
180.00	-140.00	9.0	14274
180.00	-140.00	9.5	20234
180.00	-140.00	10.0	31152
180.00	250.00	0.0	6246
180.00	250.00	0.0	6862
180.00	250.00	.5	8816
180.00	250.00	.5	9140
180.00	250.00	1.0	10636
180.00	250.00	1.0	11088
180.00	250.00	1.5	11208
180.00	250.00	1.5	12844
180.00	250.00	2.0	12234
180.00	250.00	2.0	13010
180.00	250.00	2.5	12746
180.00	250.00	2.5	13622
180.00	250.00	3.0	13064
180.00	250.00	3.0	13018
180.00	250.00	3.5	13252
180.00	250.00	3.5	13692
180.00	250.00	4.0	12934
180.00	250.00	4.0	13662
180.00	250.00	4.5	13070
180.00	340.00	0.0	11270
180.00	340.00	.5	12948
180.00	340.00	1.0	13656
180.00	340.00	1.5	14678
180.00	340.00	2.0	15480
180.00	340.00	2.5	15706
180.00	340.00	3.0	14920
180.00	340.00	3.5	15060
180.00	340.00	4.0	14688
180.00	340.00	4.5	15202
180.00	340.00	5.0	15064
180.00	340.00	5.5	15016
180.00	340.00	6.0	15058
180.00	340.00	6.5	15276
180.00	340.00	7.0	15050
195.00	0.00	0.0	3970
195.00	0.00	.5	3680

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
195.00	0.00	1.0	3414
195.00	0.00	1.5	3478
195.00	0.00	2.0	3376
195.00	0.00	2.5	3412
195.00	0.00	3.0	3426
195.00	0.00	3.5	2726
195.00	0.00	4.0	1532
195.00	0.00	4.5	1090
195.00	0.00	5.0	1020
195.00	0.00	5.5	1176
195.00	0.00	6.0	1434
195.00	0.00	6.5	1760
195.00	0.00	7.0	1512
195.00	0.00	7.5	1642
195.00	0.00	8.0	1936
195.00	0.00	8.5	2240
195.00	0.00	9.0	2274
200.00	-200.00	0.0	10972
200.00	-200.00	1.0	6658
200.00	-200.00	2.0	5716
200.00	-200.00	3.0	4992
200.00	-200.00	4.0	3368
200.00	-200.00	5.0	3418
200.00	-200.00	6.0	5652
200.00	-200.00	7.0	10102
200.00	-200.00	7.5	11064
200.00	0.00	0.0	4648
200.00	0.00	.5	4504
200.00	0.00	1.0	3134
200.00	0.00	1.5	3302
200.00	0.00	2.0	2930
200.00	0.00	2.5	3242
200.00	0.00	3.0	3478
200.00	0.00	3.5	3066
200.00	0.00	4.0	2908
200.00	0.00	4.5	1952
200.00	0.00	5.0	1106
200.00	0.00	6.0	872
200.00	0.00	7.0	1364
200.00	0.00	8.0	1320

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
200.00	0.00	9.0	1760
200.00	0.00	9.5	2480
200.00	200.00	0.0	9466
200.00	200.00	.5	9792
200.00	200.00	1.0	9478
200.00	200.00	1.5	9080
200.00	200.00	2.0	7760
200.00	200.00	2.5	6096
200.00	200.00	3.0	4782
200.00	200.00	3.5	4350
200.00	200.00	4.0	4420
200.00	200.00	5.0	4392
200.00	200.00	6.0	3898
200.00	200.00	7.0	3976
200.00	200.00	8.0	4776
200.00	200.00	9.0	5448
200.00	200.00	10.0	9256
200.00	200.00	11.0	9956
200.00	200.00	11.5	9622
200.00	300.00	0.0	9798
200.00	300.00	.5	11770
200.00	300.00	1.0	11036
200.00	300.00	1.5	11534
200.00	300.00	2.0	13124
200.00	300.00	2.5	13532
200.00	300.00	3.0	13648
200.00	300.00	3.5	13872
200.00	300.00	4.0	13938
200.00	300.00	4.5	14206
200.00	300.00	5.0	14734
200.00	300.00	5.5	14578
200.00	300.00	6.0	14692
200.00	300.00	6.5	14438
200.00	300.00	7.0	14066
200.00	300.00	7.5	14326
225.00	220.00	0.0	105234
225.00	220.00	0.0	8882
225.00	220.00	.5	66354
225.00	220.00	.5	9874

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
225.00	220.00	1.0	59250
225.00	220.00	1.0	9810
225.00	220.00	1.5	47754
225.00	220.00	1.5	12278
225.00	220.00	2.0	22682
225.00	220.00	2.0	10922
225.00	220.00	2.5	16786
225.00	220.00	2.5	10336
225.00	220.00	3.0	19940
225.00	220.00	3.0	6720
225.00	220.00	3.5	21404
225.00	220.00	3.5	5238
225.00	220.00	4.0	28414
225.00	220.00	4.0 OPP	4042
225.00	220.00	4.5	18010
225.00	220.00	4.5	2034
225.00	220.00	5.0	22914
225.00	220.00	5.0	1848
225.00	220.00	5.5	12276
225.00	220.00	6.0	13924
225.00	220.00	6.0	1262
225.00	220.00	6.5	14124
225.00	220.00	7.0	13410
225.00	220.00	7.0	1264
225.00	220.00	7.5	24310
225.00	220.00	8.0	76768
225.00	220.00	8.0	2184
225.00	220.00	8.5	57444
225.00	220.00	9.0	19356
225.00	220.00	9.0	3274
225.00	220.00	9.5	12560
225.00	220.00	10.0	11444
225.00	220.00	10.0	3732
225.00	220.00	10.5	11590
225.00	220.00	10.5	3804
225.00	220.00	11.0	12320
225.00	220.00	11.5	12876
240.00	120.00	0.0	5074
240.00	120.00	.5	6158
240.00	120.00	1.0	7448
240.00	120.00	1.5	7694

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SWPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
240.00	120.00	2.0	7752
240.00	120.00	2.5	8044
240.00	120.00	3.0	8494
240.00	120.00	3.5	12444
240.00	120.00	4.0	15116
240.00	120.00	4.5	10508
240.00	120.00	5.0	7826
240.00	120.00	5.5	6690
240.00	120.00	6.0	6484
240.00	120.00	7.0	5538
240.00	120.00	8.0	4474
240.00	120.00	9.0	3028
240.00	120.00	10.0	3290
250.00	320.00	0.0	56730
250.00	320.00	.5	49880
250.00	320.00	1.0	42672
250.00	320.00	1.5	34956
250.00	320.00	2.0	32954
250.00	320.00	2.5	35924
250.00	320.00	3.0	40912
250.00	320.00	3.5	53310
250.00	320.00	4.0	52718
250.00	320.00	4.5	57350
250.00	320.00	5.0	30984
250.00	320.00	5.5	13660
250.00	320.00	6.0	13708
250.00	320.00	6.5	12872
250.00	320.00	7.0	14786
250.00	320.00	7.5	14800
250.00	320.00	8.0	14752
250.00	320.00	8.5	14782
250.00	320.00	9.0	14978
250.00	320.00	9.5	14336
250.00	320.00	10.0	14486
250.00	320.00	10.5	14882
250.00	320.00	11.0	14846
280.00	280.00	0.0	40366
280.00	280.00	.5	102878
280.00	280.00	1.0	46506
280.00	280.00	1.5	26182

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4

GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
280.00	280.00	2.0	24414
280.00	280.00	2.5	50070
280.00	280.00	3.0	34486
280.00	280.00	3.5	25864
280.00	280.00	4.0	10296
280.00	280.00	4.5	3498
280.00	280.00	5.0	1540
280.00	280.00	5.5	1050
280.00	280.00	6.0	914
280.00	280.00	6.5	932
280.00	280.00	7.0	1838
280.00	280.00	7.5	2230
280.00	280.00	8.0	2378
280.00	280.00	8.5	2882
280.00	280.00	9.0	3538
280.00	280.00	9.5	4156
280.00	280.00	10.0	4262
280.00	280.00	10.5	4890
280.00	280.00	11.0	6702
280.00	280.00	11.5	8126
280.00	280.00	12.0	9498
280.00	280.00	12.5	11102
280.00	280.00	13.0	12018
280.00	280.00	13.5	13494
280.00	280.00	14.0	19704
285.00	-75.00	0.0	7068
285.00	-75.00	.5	6750
285.00	-75.00	1.0	5768
285.00	-75.00	1.5	5276
285.00	-75.00	2.5	5068
285.00	-75.00	3.0	7104
285.00	-75.00	3.5	7852
285.00	-75.00	4.0	7136
285.00	-75.00	4.5	5858
285.00	-75.00	5.0	4424
285.00	-75.00	5.5	2080
285.00	-75.00	6.5	620
285.00	-75.00	7.5	466
285.00	-75.00	8.0	542
285.00	200.00	0.0	14132

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
285.00	200.00	0.0	5866
285.00	200.00	.5	13962
285.00	200.00	.5	7760
285.00	200.00	1.0	10236
285.00	200.00	1.0	7874
285.00	200.00	1.5	9160
285.00	200.00	1.5	8198
285.00	200.00	2.0	10806
285.00	200.00	2.0	8752
285.00	200.00	2.5	10908
285.00	200.00	2.5	8824
285.00	200.00	3.0	16684
285.00	200.00	3.0	8716
285.00	200.00	3.5	12708
285.00	200.00	3.5	6242
285.00	200.00	4.0	8234
285.00	200.00	4.0	4768
285.00	200.00	4.5	4858
285.00	200.00	5.0	6244
285.00	200.00	5.0	5210
285.00	200.00	5.5	4808
285.00	200.00	6.0	4946
285.00	200.00	6.0	4986
285.00	200.00	7.0	1592
285.00	200.00	7.0	1912
285.00	200.00	8.0	728
285.00	200.00	8.0	2126
285.00	200.00	9.0	778
285.00	200.00	9.0	3060
285.00	200.00	10.0	904
285.00	200.00	10.0	3030
285.00	200.00	11.0	3438
285.00	200.00	11.0	3612
285.00	200.00	12.0	2998
285.00	200.00	12.0	4530
285.00	200.00	13.0	3162
285.00	200.00	13.0	2302
285.00	200.00	14.0	1936
285.00	200.00	14.0	2174
285.00	200.00	14.5	2118
285.00	200.00	14.5	2132

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
285.00	430.00	0.0	10604
285.00	430.00	0.0	7744
285.00	430.00	.5	12852
285.00	430.00	.5	10464
285.00	430.00	1.0	17038
285.00	430.00	1.0	13032
285.00	430.00	1.5	19834
285.00	430.00	1.5	18976
285.00	430.00	2.0	20242
285.00	430.00	2.0	23434
285.00	430.00	2.5	19594
285.00	430.00	2.5	20286
285.00	430.00	3.0	19230
285.00	430.00	3.0	18434
285.00	430.00	3.5	18840
285.00	430.00	3.5	15402
285.00	430.00	4.0	16714
285.00	430.00	4.0	13610
285.00	430.00	4.5	13670
285.00	430.00	4.5	9974
285.00	430.00	5.0	11804
285.00	430.00	5.0	6512
285.00	430.00	5.5	6318
285.00	430.00	6.0	9356
285.00	430.00	6.0	5908
285.00	430.00	7.0	5146
285.00	430.00	7.0	2176
285.00	430.00	8.0	7004
285.00	430.00	8.0	3844
285.00	430.00	9.0	7074
285.00	430.00	9.0	6492
285.00	430.00	9.5	9842
285.00	430.00	10.0	10016
285.00	430.00	10.0	10790
285.00	430.00	10.5	11382
285.00	430.00	11.0	12442
285.00	430.00	11.0	12484
285.00	430.00	11.5	12910
285.00	430.00	11.5	12714
285.00	430.00	12.0	12564
285.00	430.00	12.0	12426
285.00	430.00	12.5	12328

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
285.00	430.00	12.5	12472
285.00	430.00	13.0	12642
285.00	430.00	13.0	12844
285.00	430.00	13.5	13014
285.00	430.00	13.5	13442
285.00	430.00	14.0	12800
300.00	200.00	0.0	12646
300.00	200.00	.5	12212
300.00	200.00	1.0	8332
300.00	200.00	1.5	8464
300.00	200.00	2.0	10152
300.00	200.00	2.5	9886
300.00	200.00	3.0	12432
300.00	200.00	3.5	7316
300.00	200.00	4.0	5976
300.00	200.00	4.5	5486
300.00	200.00	5.0	4976
300.00	200.00	6.0	1688
300.00	200.00	7.0	1534
300.00	200.00	8.0	2098
300.00	200.00	9.0	2306
300.00	200.00	10.0	3584
300.00	200.00	10.5	4086
300.00	200.00	11.0	3964
300.00	200.00	11.5	3584
300.00	200.00	12.0	3660
300.00	200.00	13.0	2948
300.00	200.00	14.0	2022
300.00	200.00	14.5	2066
300.00	300.00	0.0	10382
300.00	300.00	.5	7800
300.00	300.00	1.0	8204
300.00	300.00	1.5	12040
300.00	300.00	2.0	9618
300.00	300.00	2.5	6094
300.00	300.00	3.0	4994
300.00	300.00	4.0	3998
300.00	300.00	5.0	2992
300.00	300.00	6.0	2530
300.00	300.00	7.0	2684

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
300.00	300.00	8.0	3212
300.00	300.00	9.0	3948
300.00	300.00	10.0	5782
300.00	300.00	10.5	10448
300.00	300.00	11.0	12152
300.00	300.00	11.5	13274
300.00	300.00	12.0	14818
300.00	300.00	12.5	13954
300.00	300.00	13.0	13454
300.00	400.00	0.0	3624
300.00	400.00	.5	5286
300.00	400.00	1.0	5358
300.00	400.00	1.5	5226
300.00	400.00	2.0	5650
300.00	400.00	2.5	5520
300.00	400.00	3.0	4768
300.00	400.00	3.5	4198
300.00	400.00	4.0	3220
300.00	400.00	5.0	2074
300.00	400.00	6.0	2242
300.00	400.00	7.0	2846
300.00	400.00	8.0	3922
300.00	400.00	9.0	6874
300.00	400.00	9.5	7532
300.00	400.00	10.0	8290
300.00	400.00	10.5	10166
300.00	400.00	11.0	12620
300.00	400.00	11.5	12456
300.00	400.00	12.0	12956
300.00	400.00	12.5	12486
300.00	400.00	13.0	12276
320.00	380.00	0.0	13786
320.00	380.00	.5	10488
320.00	380.00	1.0	8812
320.00	380.00	1.5	6804
320.00	380.00	2.0	5400
320.00	380.00	2.5	3956
320.00	380.00	3.0	2786
320.00	380.00	3.5	2806
320.00	380.00	4.0	3236

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
320.00	380.00	4.5	4476
320.00	380.00	5.0	6782
320.00	380.00	5.5	8972
320.00	380.00	6.0	11076
320.00	380.00	6.5	11922
320.00	380.00	7.0	13546
320.00	380.00	7.5	13964
320.00	380.00	8.0	14236
320.00	380.00	8.5	14128
320.00	380.00	9.0	14246
320.00	380.00	9.5	15626
340.00	160.00	0.0	3462
340.00	160.00	.5	4136
340.00	160.00	1.0	4590
340.00	160.00	1.5	4222
340.00	160.00	2.0	3800
340.00	160.00	2.5	3930
340.00	160.00	3.0	4144
340.00	160.00	4.0	1668
340.00	160.00	5.0	1296
340.00	160.00	6.0	1668
340.00	160.00	7.0	1368
340.00	160.00	8.0	508
340.00	160.00	9.0	488
340.00	160.00	9.5	596
340.00	380.00	0.0	51420
340.00	380.00	.5	41858
340.00	380.00	1.0	28444
340.00	380.00	1.5	18084
340.00	380.00	2.0	16442
340.00	380.00	2.5	17486
340.00	380.00	3.0	14332
340.00	380.00	3.5	12982
340.00	380.00	4.0	11830
340.00	380.00	4.5	13996
340.00	380.00	5.0	16062
340.00	380.00	5.5	16232
340.00	380.00	6.0	17040
340.00	380.00	6.5	17274
340.00	380.00	7.0	17024

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
340.00	380.00	7.5	15496
340.00	380.00	8.0	14432
340.00	380.00	8.5	13602
340.00	380.00	9.0	12630
340.00	380.00	9.5	12242
340.00	380.00	10.0	12344
340.00	380.00	10.5	11532
340.00	380.00	11.0	10816
340.00	380.00	11.5	11346
340.00	380.00	12.0	11580
360.00	300.00	0.0	4972
360.00	300.00	.5	5846
360.00	300.00	1.0	5524
360.00	300.00	1.5	5536
360.00	300.00	2.0	5526
360.00	300.00	2.5	3934
360.00	300.00	3.0	3456
360.00	300.00	4.0	2920
360.00	300.00	5.0	3852
360.00	300.00	5.5	4832
360.00	300.00	6.0	6376
360.00	300.00	6.5	9276
360.00	300.00	7.0	10536
360.00	300.00	7.5	10184
360.00	300.00	8.0	10358
360.00	300.00	8.5	10444
360.00	300.00	9.0	10602
360.00	300.00	9.5	10320
360.00	300.00	10.0	9926
360.00	300.00	10.5	10152
360.00	300.00	11.0	10386
360.00	300.00	11.5	10364
360.00	300.00	12.0	10602
360.00	300.00	12.5	10192
360.00	300.00	13.0	10042
360.00	300.00	13.5	10152
400.00	300.00	0.0	6778
400.00	300.00	.5	8216
400.00	300.00	1.0	10046
400.00	300.00	1.5	9386
400.00	300.00	2.0	8416

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4

GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
400.00	300.00	2.5	8142
400.00	300.00	3.0	6628
400.00	300.00	3.5	8226
400.00	300.00	4.0	10032
400.00	300.00	5.0	11906
400.00	300.00	6.0	12136
400.00	300.00	7.0	11522
400.00	300.00	8.0	10726
400.00	300.00	9.0	11162
400.00	300.00	10.0	11210
400.00	300.00	11.0	11110
400.00	300.00	11.5	11232
435.00	348.00	0.0	388872
435.00	348.00	0.0	47012
435.00	348.00	.5	460652
435.00	348.00	.5	66402
435.00	348.00	1.0	512314
435.00	348.00	1.0	74206
435.00	348.00	1.5	481758
435.00	348.00	1.5	54994
435.00	348.00	2.0	415908
435.00	348.00	2.0	32910
435.00	348.00	2.5	253818
435.00	348.00	2.5	18684
435.00	348.00	3.0	205910
435.00	348.00	3.0	14468
435.00	348.00	3.5	186094
435.00	348.00	3.5	13860
435.00	348.00	4.0	179904
435.00	348.00	4.0	13236
435.00	348.00	4.5	202284
435.00	348.00	4.5	11692
435.00	348.00	5.0	165824
435.00	348.00	5.0	11386
435.00	348.00	5.5	163384
435.00	348.00	5.5	11112
435.00	348.00	6.0	106350
435.00	348.00	6.0	10284
435.00	348.00	6.5	113518
435.00	348.00	6.5	10474
435.00	348.00	7.0	131260

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
435.00	348.00	7.0	10070
435.00	348.00	7.5	26498
435.00	348.00	7.5	10202
435.00	348.00	8.0	21020
435.00	348.00	8.0	10154
435.00	348.00	8.5	21204
435.00	348.00	8.5	10378
435.00	348.00	9.0	15938
435.00	348.00	9.0	10842
435.00	348.00	9.5	14094
435.00	348.00	9.5	10992
435.00	348.00	10.0	13216
435.00	348.00	10.0	10914
435.00	348.00	10.5	13792
435.00	348.00	10.5	10606
435.00	348.00	11.0	13908
435.00	348.00	11.0	10384
435.00	348.00	11.5	10760
435.00	348.00	12.0	13696
435.00	348.00	12.0	11308
435.00	348.00	12.5	15454
435.00	348.00	12.5	11636
496.00	296.00	0.0	61580
496.00	296.00	0.0	59878
496.00	296.00	.5	103070
496.00	296.00	.5	66216
496.00	296.00	1.0	107602
496.00	296.00	1.0	55482
496.00	296.00	1.5	65844
496.00	296.00	1.5	38662
496.00	296.00	2.0	43330
496.00	296.00	2.0	27300
496.00	296.00	2.5	19072
496.00	296.00	2.5	21088
496.00	296.00	3.0	12282
496.00	296.00	3.0	18328
496.00	296.00	3.5	12298
496.00	296.00	3.5	17140
496.00	296.00	4.0	12450
496.00	296.00	4.0	17514
496.00	296.00	4.5	15968

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
496.00	296.00	5.0	13022
496.00	296.00	5.0	17660
496.00	296.00	5.5	18176
496.00	296.00	6.0	12854
496.00	296.00	6.0	16086
496.00	296.00	6.5	14094
496.00	296.00	7.0	13620
496.00	296.00	7.0	13014
496.00	296.00	7.5	13428
496.00	296.00	8.0	13386
496.00	296.00	9.0	12716
496.00	296.00	10.0	12490
496.00	296.00	11.0	12384
496.00	296.00	12.0	12204
496.00	296.00	13.0	12056
496.00	296.00	13.5	13316
500.00	400.00	0.0	6182
500.00	400.00	.5	7226
500.00	400.00	1.0	7650
500.00	400.00	1.5	7710
500.00	400.00	2.0	8402
500.00	400.00	2.5	8862
500.00	400.00	3.0	8680
500.00	400.00	3.5	8154
500.00	400.00	4.0	8482
500.00	400.00	4.5	9506
500.00	400.00	5.0	9968
500.00	400.00	5.5	10028
500.00	400.00	6.0	10446
500.00	400.00	6.5	10432
500.00	400.00	7.0	10886
500.00	400.00	7.5	10764
500.00	400.00	8.0	10628
500.00	400.00	8.5	10502
500.00	400.00	9.0	10252
500.00	400.00	9.5	9806
500.00	400.00	10.0	9434
500.00	400.00	10.5	9242
500.00	400.00	11.0	9190
500.00	400.00	11.5	9002
500.00	400.00	12.0	8852

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4

GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
500.00	400.00	12.5	9046
500.00	400.00	13.0	9302
500.00	400.00	13.5	9862
520.00	80.00	0.0	5432
520.00	80.00	.5	5456
520.00	80.00	1.0	6912
520.00	80.00	1.5	9062
520.00	80.00	2.0	10796
520.00	80.00	2.5	7484
520.00	80.00	3.0	5406
520.00	80.00	3.5	4786
520.00	80.00	4.0	6222
520.00	80.00	4.5	5934
520.00	320.00	0.0	23644
520.00	320.00	.5	25354
520.00	320.00	1.0	29964
520.00	320.00	1.5	33920
520.00	320.00	2.0	35750
520.00	320.00	2.5	21324
520.00	320.00	3.0	18506
520.00	320.00	3.5	14862
520.00	320.00	4.0	13696
520.00	320.00	4.5	13822
520.00	320.00	5.0	13858
520.00	320.00	5.5	13686
520.00	320.00	6.0	13652
520.00	320.00	6.5	13240
520.00	320.00	7.0	13038
520.00	320.00	7.5	12850
540.00	160.00	0.0	21866
540.00	160.00	.5	86874
540.00	160.00	1.0	53570
540.00	160.00	1.5	26948
540.00	160.00	2.0	12500
540.00	160.00	2.5	7222
540.00	160.00	3.0	7610
540.00	160.00	3.5	9284
540.00	160.00	4.0	8576
540.00	160.00	4.5	7106

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOCATION

TABLE 4
GAMMA-RAY PROFILE OF SUBSURFACE RADIOACTIVITY IN BOREHOLES *

SHPACK CHARACTERIZATION

COORDINATES		DEPTH	BOREHOLE
SITE-X(N,S)	SITE-Y(E,W)	(FT)	PROBE CPM
600.00	400.00	0.0	8758
600.00	400.00	.5	10594
600.00	400.00	1.0	12608
600.00	400.00	1.5	13022
600.00	400.00	2.0	12496
600.00	400.00	2.5	11472
600.00	400.00	3.0	10748
600.00	400.00	3.5	10952
600.00	400.00	4.0	11264
600.00	400.00	5.0	11744
600.00	400.00	6.0	11054
600.00	400.00	7.0	10436
600.00	400.00	8.0	9976
600.00	400.00	9.0	10430
600.00	400.00	10.0	11586
600.00	400.00	11.0	11410
600.00	400.00	12.0	12404

* DUPLICATE ENTRIES INDICATE MORE THAN ONE HOLE DRILLED AT A LOACTION

TABLE 5

EXTENT OF SUBSURFACE CONTAMINATION AS INDICATED BY SCINTILLATION PROBE (SPA-3) LOGGING

SHPACK CHARACTERIZATION

COORDINATES		DEPTH
SITE-X(N,S)	SITE-Y(E,W)	(FT)
-60.00	-40.00	0.0
30.00	-100.00	0.0
35.00	60.00	7.5
45.00	-25.00	0.0
60.00	-180.00	0.0
70.00	190.00	0.0
80.00	40.00	5.5
85.00	155.00	0.0
90.00	-90.00	0.0
100.00	100.00	3.0
100.00	240.00	0.0
106.00	-194.00	0.0
110.00	140.00	11.0
120.00	-50.00	0.0
132.00	75.00	0.0
135.00	180.00	3.0
140.00	-100.00	0.0
145.00	-200.00	0.0
180.00	-140.00	0.0
180.00	250.00	0.0
180.00	340.00	0.0
195.00	00.00	0.0
200.00	-200.00	0.0
200.00	00.00	0.0
200.00	200.00	0.0
200.00	300.00	0.0
225.00	220.00	9.0
240.00	120.00	0.0
250.00	320.00	11.0
280.00	280.00	4.0
285.00	-75.00	0.0
285.00	200.00	0.0
285.00	430.00	4.5
300.00	200.00	0.0
300.00	300.00	0.0
300.00	400.00	0.0
320.00	380.00	0.0
340.00	160.00	0.0
340.00	380.00	8.0
360.00	300.00	0.0
435.00	348.00	10.0
496.00	296.00	7.0
500.00	400.00	0.0
520.00	80.00	0.0
520.00	320.00	6.0
540.00	160.00	5.0
600.00	400.00	0.0

TABLE 6
RADIONUCLIDE CONCENTRATION IN SURFACE WATER SAMPLES
SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	----CONCENTRATION (pCi/l +/- 2 Sigma)---- URANIUM-234	URANIUM-235	URANIUM-238
250.00	460.00	12.0 +/- 1.0	.5 +/- .2	6.3 +/- .6
250.00	520.00	1.7 +/- .3	< .1	.8 +/- .2
350.00	450.00	16.0 +/- 1.0	.6 +/- .2	2.4 +/- .3
350.00	520.00	2.4 +/- .4	.2 +/- .1	.8 +/- .3
450.00	440.00	13.0 +/- 1.0	.5 +/- .2	1.7 +/- .3
470.00	510.00	3.7 +/- .4	.1 +/- .1	1.5 +/- .3
520.00	450.00	2.5 +/- .3	.1 +/- .1	.5 +/- .2
640.00	600.00	1.0 +/- .2	< .1	.3 +/- .1
700.00	300.00	.6 +/- .2	< .1	1.1 +/- .3
760.00	400.00	.3 +/- .1	< .1	.2 +/- .1
790.00	500.00	.3 +/- .1	< .1	.2 +/- .1
798.00	200.00	.4 +/- .2	< .1	.3 +/- .2
820.00	60.00	4.6 +/- .5	.3 +/- .2	21.0 +/- 1.0
820.00	100.00	.7 +/- .1	< .1	.7 +/- .1
896.00	50.00	5.2 +/- .3	.3 +/- .1	14.0 +/- 1.0

PRINT DATE: 07/07/83

TABLE 7

RADIONUCLIDE CONCENTRATION IN SEDIMENT SAMPLE
SHPACK CHARACTERIZATION

CONCENTRATION pCi/g +/- 2 Sigma

SITE-X(N,S)	SITE-Y(E,W)	RADIUM-226	URANIUM-235	URANIUM-238
200.00	460.00	.4 +/- .0	.039	.3 +/- .1
220.00	460.00	.4 +/- .0	.032	.2 +/- .1
225.00	494.00	.4 +/- .0	.058	.2 +/- .1
260.00	460.00	*	.364	*
260.00	500.00	.3 +/- .0	.026	.2 +/- .1
300.00	460.00	*	.062	*
300.00	500.00	.4 +/- .0	.036	.3 +/- .1
320.00	500.00	*	.060	*
360.00	500.00	.3 +/- .0	.049	.3 +/- .1
400.00	460.00	*	.257	*
400.00	500.00	.2 +/- .0	.036	.2 +/- .1
440.00	460.00	.4 +/- .0	.146	.2 +/- .1
440.00	500.00	.3 +/- .0	.058	.7 +/- .1
480.00	460.00	.4 +/- .0	.126	.7 +/- .1
480.00	500.00	.4 +/- .0	.041	.2 +/- .1
500.00	500.00	.6 +/- .0	.060	.1 +/- .1
520.00	420.00	.4 +/- .0	.161	.4 +/- .2
520.00	460.00	.5 +/- .0	.163	.3 +/- .1
520.00	500.00	.6 +/- .0	.260	.7 +/- .1
560.00	420.00	.6 +/- .0	.056	.4 +/- .1
560.00	460.00	*	.066	*
560.00	500.00	.4 +/- .0	.169	.3 +/- .2
640.00	600.00	.4 +/- .0	.034	.1 +/- .1
700.00	300.00	.6 +/- .0	.049	.2 +/- .2
760.00	400.00	.5 +/- .0	.036	.1 +/- .1
790.00	500.00	.4 +/- .0	.024	.7 +/- .1
798.00	200.00	1.2 +/- .1	.026	.7 +/- .1
820.00	60.00	.5 +/- .0	.024	.1 +/- .1
820.00	100.00	1.2 +/- .1	.060	.1 +/- .1
896.00	50.00	.5 +/- .0	.032	.1 +/- .1

* - NO DETECTABLE ACTIVITY

U-235 CONCENTRATIONS, WITH NO INDICATED UNCERTAINTY, WERE ANALYZED AT ORNL WITH 95% CONFIDENCE, RANGING FROM 2.5% TO 4.0%. (REF.5)

TABLE 8

RADIONUCLIDE CONCENTRATION IN GROUND WATER SAMPLES
SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	CONCENTRATIONS (pCi/l +/- 2 Sigma) RADIUM-226	URANIUM-234	URANIUM-235	URANIUM-238
-60.00	-40.00		25.0 +/- 3.0	< 1.4	19.0 +/- 2.0
14.10	594.00		.1 +/- .1	< .1	.2 +/- .1
30.00	-100.00	.8 +/- .2	.3 +/- .2	< .1	.3 +/- .2
35.00	60.00	270.0 +/-80.0	12.0 +/- 2.0	< .4	12.0 +/- 2.0
40.00	300.00	< .1	.4 +/- .2	< .1	.7 +/- .2
42.50	164.80		5.3 +/- .6	< .2	.8 +/- .2
42.80	-67.20	.6 +/- .2	1.1 +/- .2	< .1	1.1 +/- .2
45.00	-25.00	.8 +/- .2	3.0 +/- .4	.2 +/- .1	.4 +/- .2
54.67	-155.50	.7 +/- .2	.6 +/- .2	< .1	.5 +/- .1
70.00	190.00		.7 +/- .3	< .2	.2 +/- .2
80.00	40.00	2.8 +/- .8	1.1 +/- .3	< .1	< .1
83.60	-242.50		1.4 +/- .3	.1 +/- .1	1.6 +/- .3
85.00	155.00	8.0 +/- 2.0	17.0 +/- 2.0	.5 +/- .3	10.0 +/- 1.0
90.00	-90.00	.6 +/- .2	2.3 +/- .5	< .2	1.5 +/- .4
100.00	-100.00	1.3 +/- .4	.8 +/- .3	.3 +/- .2	.3 +/- .2
106.00	194.00	1.4 +/- .4	.3 +/- .2	< .1	1.6 +/- .3
110.00	140.00	.5 +/- .1	14.0 +/- 1.0	.6 +/- .3	10.0 +/- 1.0
120.00	-50.00	.4 +/- .1	8.0 +/- 1.0	.3 +/- .2	20.0 +/- 1.0
132.00	75.00		6.0 +/- .6	.2 +/- .1	1.0 +/- .3
135.00	180.00	< 2.0	530.0 +/- 10.0	70.0 +/- 3.0	940.0 +/- 10.0
145.00	-200.00	.9 +/- .3	2.3 +/- .6	< .2	1.1 +/- .4
145.00	200.00		.8 +/- .2	< .1	.6 +/- .2
173.90	482.00		.1 +/- .1	< .1	.2 +/- .1
180.00	-140.00	.5 +/- .2	4.0 +/- .6	.2 +/- .1	3.5 +/- .6
180.00	-100.00	.2 +/- .1	< .3	< .2	.7 +/- .3
180.00	250.00	9.0 +/- 3.0	6.0 +/- 1.0	.6 +/- .2	13.0 +/- 1.0
180.00	340.00	34.0 +/-10.0	4.0 +/- 1.0	< .3	6.0 +/- 1.0
200.00	-200.00	.9 +/- .3	< .1	< .1	< .2
200.00	0.00		2.6 +/- 1.1	< .6	3.9 +/- 1.4
200.00	200.00	.4 +/- .1	4.3 +/- .6	.2 +/- .1	1.2 +/- .3
200.00	300.00	.1 +/- .1	< .1	< .1	< .1
225.00	220.00	6.0 +/- 2.0	38.0 +/- 3.0	1.4 +/- .6	4.7 +/- 1.1
240.00	120.00	1.6 +/- .5	19.0 +/- 1.0	.7 +/- .2	21.0 +/- 1.0
250.00	320.00	1.3 +/- .4	900.0 +/- 20.0	380.0 +/-20.0	6300.0 +/-100.0
280.00	280.00	76.0 +/-23.0	3900.0 +/-100.0	130.0 +/-10.0	59.0 +/- 2.0
285.00	200.00		170.0 +/- 10.0	6.0 +/- 1.0	7.0 +/- 1.0
285.00	430.00	2.5 +/- .8	17.5 +/- 1.0	1.2 +/- .3	14.0 +/- 1.0
300.00	200.00	.3 +/- .1	.5 +/- .2	< .1	< .2
300.00	300.00	1.9 +/- .6	< .2	< .2	< .2
300.00	400.00	.8 +/- .2	< .2	< .2	< .1
320.00	380.00	9.0 +/- 3.0	120.0 +/- 10.0	4.0 +/- 1.0	46.0 +/- 2.0
321.50	580.00		1.1 +/- .3	< .1	.6 +/- .3
340.00	160.00	.6 +/- .2	34.0 +/- 1.0	1.3 +/- .3	6.0 +/- 1.0

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TABLE 8

RADIONUCLIDE CONCENTRATION IN GROUND WATER SAMPLES
SHPACK CHARACTERIZATION

SITE-X(N,S)	SITE-Y(E,W)	CONCENTRATIONS (pCi/l +/- 2 Sigma) RADIUM-226	URANIUM-234	URANIUM-235	URANIUM-238
340.00	380.00	35.0 +/-11.0	1300.0 +/-100.0	130.0 +/-10.0	3500.0 +/-100.0
360.00	300.00	49.0 +/-15.0	16.0 +/- 2.0	< .4	10.0 +/- 1.0
400.00	300.00	5.0 +/- 2.0	2.5 +/- .4	.2 +/- .1	1.4 +/- .3
435.00	348.00	27.0 +/- 8.0	11.0 +/- 2.0	.8 +/- .5	4.0 +/- 1.0
496.00	296.00	2.7 +/- .8	16.0 +/- 1.0	.6 +/- .2	8.6 +/- .8
500.00	400.00	.3 +/- .1	.6 +/- .3	< .2	2.2 +/- .5
520.00	80.00	1.3 +/- .4	2.5 +/- .4	.1 +/- .1	1.3 +/- .3
520.00	320.00	1.7 +/- .5	32.0 +/- 1.0	1.4 +/- .3	18.0 +/- 1.0
540.00	160.00	.9 +/- .3	300.0 +/- 10.0	40.0 +/- 3.0	1500.0 +/-100.0
582.50	514.80		25.0 +/- 1.0	.2 +/- .1	3.0 +/- .3
595.50	509.90		.7 +/- .4	< .3	.9 +/- .3
600.00	400.00	32.0 +/-10.0	8.2 +/- .6	.4 +/- .1	5.7 +/- .5
936.80	45.80		.9 +/- .2	< .1	.7 +/- .2

PRINT DATE:07/07/83

TABLE 9

IN-SITU GAMMA-RAY MEASUREMENT USING A PRESSURIZED ION CHAMBER AT 1 METER ABOVE THE GROUND

SHPACK CHARACTERIZATION

COORDINATES		EXPOSURE RATE
SITEX(S)	SITEY(E)	micro R/hr
0.00	100.00	8.6
0.00	200.00	10.4
100.00	-200.00	12.2
100.00	-100.00	11.6
100.00	0.00	10.6
100.00	100.00	10.4
100.00	200.00	11.4
200.00	-200.00	12.7
200.00	-100.00	9.7
200.00	0.00	8.1
200.00	100.00	26.7
200.00	200.00	14.3
200.00	300.00	10.3
200.00	400.00	6.7
200.00	500.00	10.6
300.00	-100.00	10.2
300.00	0.00	9.5
300.00	100.00	10.4
300.00	200.00	9.6
300.00	300.00	12.1
300.00	400.00	11.9
400.00	-100.00	10.3
400.00	0.00	8.7
400.00	100.00	11.7
400.00	200.00	11.3
400.00	300.00	10.1
400.00	400.00	10.7
500.00	0.00	8.6
500.00	100.00	10.8
500.00	200.00	10.9
500.00	300.00	29.5
500.00	400.00	6.0
600.00	100.00	11.8
600.00	200.00	11.9
600.00	400.00	12.5
600.00	500.00	10.5

Table 10
Radionuclide Concentration in Air Samples

Shpack Characterization

Coordinates		Volume of Air	Concentration (pCi/M 3 +/- 2Sigma)			
SiteX(S)	SiteY(E)	Cubic M	Radium-226	Uranium-234	Uranium-235	Uranium-238
100.00	345.00	2821.4	7.1E-04+/-2.1E-04	<7.1E-05	<3.5E-05	1.4E-04+/-1.1E-04*
40.00	60.00	1782.5	1.2E-03+/-3.4E-04	3.9E-04+/-2.2E-04	<1.1E-04	1.7E-04+/-1.1E-04**

* COMMENT: McGinn Residence
** COMMENT: Access Trailer

APPENDIX B

U. S. DEPARTMENT OF ENERGY

PROPOSED RADIOLOGICAL CRITERIA FOR

FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM

AND

REMOTE SURPLUS FACILITIES MANAGEMENT PROGRAM SITES

U.S. DEPARTMENT OF ENERGY
Proposed Residual Contamination Criteria
for
Formerly Utilized Sites Remedial Action Program
and
Remote Surplus Facilities Management Program Sites

Presented here are the residual contamination cleanup and waste control criteria of general applicability to the FUSRAP project and remote SFMP sites*.

With the exception of limits for radium-226, the soil residual contamination criteria were developed on the basis of limiting maximum individual radiation exposure to DOE limits specified in DOE Order 5480.1A exclusive of exposure from natural background radiation or medical procedures. The aggregate of the contribution from all major pathways, based on scenarios for permanent intrusion, e.g., establishing residences on the site, has been assumed. In most circumstances, the probability is low that such an intrusion will occur. Also, conservative assumptions were used in deriving these criteria to ensure that a particular dose limit would not be exceeded. Use of these criteria is additionally conservative because the pathways considered in the derivation of the criteria assume all water intake and most food intake is from the site. Also, the sites often have limited agricultural capability and the contamination is generally not homogeneous. The combined effect of these factors is such that the probable radiation exposure to the average population on, or in the vicinity of, FUSRAP sites decontaminated to these criteria limits will not be appreciably different from that normally received from natural background radiation.

*A remote SFMP site is one that is excess to DOE programmatic needs and is located outside a major operating DOE R&D or production area. Remote sites are more likely to be released to the public or excessed to other government agencies after decontamination than are sites located with major R&D or production areas.

The residual contamination criteria for surface contamination of structures were developed from a proposed ANSI standard* modified as appropriate to be consistent with DOE Order 5480.1A and the specific needs of FUSRAP for cost-effective, workable guidelines which provide an adequate safety margin. The waste control criteria are consistent with applicable DOE Orders and EPA's regulations for inactive uranium milling sites, 40 CFR 192.

A. RESIDUAL CONTAMINATION CRITERIA FOR FORMERLY UTILIZED SITES AND REMOTE SURPLUS FACILITIES MANAGEMENT PROGRAM SITES

The following criteria represent the maximum residual contamination limits for unrestricted use of land contaminated with radionuclides related to the nuclear fuel cycle at FUSRAP and remote SFMP sites. It is the policy of DOE to decontaminate sites to contamination levels at or below the limits and in a manner consistent with DOE's as-low-as-is-reasonably-achievable (ALARA) policy. Residual contamination limits for other nuclides will be developed when required using the same methodology** as was used for those represented here.

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*ANSI N13.12 (proposed)--an adaptation to be applied, as appropriate.
**Described in ORO-831 and ORO-832.

1. Residual Contamination Limits for Land[1]

Radionuclide	Soil Remedial Action Criteria[2] Soil Criteria (pCi/g above background) Avg. over 100m^2
Ra-226	5 pCi/g, averaged over the first 15 cm of soil below the surface; 15 pCi/g when averaged over 15 cm thick soil layers more than 15 cm and less than 1.5 m below the surface.
U-Natural[3]	75
U-238[4]	75
U-234[5]	150.
U-235[5]	150.
Am-241	20
Pu-241[6]	800
Pu-239, -240	100
Pu-238	100
Th-230[7]	15
Cs-137	80
Sr-90	100
H-3 (pCi/ml soil moisture)	5,200
Th-232[7]	15

Notes:
1. Maximum limits for unrestricted use
2. These criteria represent unrestricted-use residual concentrations above background averaged across any 15 cm thickness layer to any depth and over any contiguous 100 m^2 surface area.
3. A curie of natural uranium means the sum of 3.7×10^{10} disintegrations per second from U-238 plus 3.7×10^{10} disc/sec from U-234 plus 1.7×10^{9} disc/sec from U-235. One curie of natural uranium is equivalent to 3,000 kilograms or 6,615 pounds of natural uranium.
4. This criteria is for the activity concentration of U-238 alone, but has been derived on the basis of the assumption that U-234 is also present in the soil at the same activity concentration and that the contribution from U-235 is small.
5. Assumes no other uranium isotopes are present.
6. The Pu-241 criterion was derived from the Am-241 concentration.
7. Assumes all decay chain products are in equilibrium concentrations (e.g., Ra-228 criteria would be the same as that for Th-232).

2. Residual Contamination Limits for Buildings

a. Indoor Radon Decay Products

A structure located on private property and intended for unrestricted use shall be subject to remedial action as necessary to ensure the annual average radon daughter concentration (RDC) is less than 0.03 WL within the structure.

b. Indoor Gamma Radiation

The indoor gamma radiation after cleanup shall not exceed 20 microroentgen per hour (20 microR/hr) above background.

c. Indoor/Outdoor Building Surface Contamination[1]

Building Surface Contamination Remedial Action Criteria:

Radionuclides	Allowable Surface Contamination (dpm/100 cm^2)[2] Total	Removable
Group 1: Radionuclides for which the area concentration guide in air above background[3] is 2×10^{-13} Ci/m^3 or less or for which the uncontrolled area concentration guide in water above background[3] is 2×10^{-7} Ci/m^3 or less; includes Pa-231, Th-228, Th-230, Ac-227, Ra-226, Ra-228, and Pb-210.	100	20
Group 2: Radionuclides not in Group 1 for which the uncontrolled area concentration guide in air above background[3] is 1×10^{-12} Ci/m^3 or less or for which an uncontrolled area concentration guide in water above background[3] is 1×10^{-6} Ci/m^3 or less; includes U-232, U-238, Th-232, Ra-223, and Po-210.	1,000	200
Group 3: Those radionuclides not in Group 1 or Group 2; includes U-234, U-235, and Ra-224.	5,000	1,000

Notes:
1. These criteria represent unrestricted-use residual concentrations above background averaged across any 15 cm thickness layer to any depth and over any contiguous 100 m^2 surface area.
2. The levels may be averaged over 1 m^2 provided the maximum activity in any area of 100 cm^2 is less than three times the limit value; dpm = disintegrations per minute.
3. Given in Attachment I to Chapter XI, Table II, DOE Order 5480.1A.

B. CONTROL OF RADIOACTIVE WASTES AND RESIDUES

The following criteria represent the controlling limits for interim storage and long-term radioactive waste management of residual contamination removed from FUSRAP and remote SFMP sites and apply to storage or disposal sites located outside of DOE major operating facilities. These criteria are not intended to apply to disposal operations under the jurisdiction of DOE Order 5820. It is the policy of DOE to store radioactive wastes in a manner representing sound engineering practices consistent with DOE's ALARA philosophy.

1. Interim Storage for Waste from FUSRAP and Remote SFMP Sites

All operational and control requirements specified in the following DOE Orders shall apply:

a. 5480.1A, Environmental Protection, Safety, and Health Protection Program for DOE Operations.

b. 5480.2, Hazardous and Radioactive Mixed Waste Management.

c. 5481.1, Safety Analysis and Review System.

d. 5483.1, Occupational Safety and Health Program for Government-Owned Contractor-Operator Facilities.

e. 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements.

f. 5484.2, Unusual Occurrence Reporting System.

g. 5820, Radioactive Waste Management

h. Control and stabilization features will be designed to ensure, to the extent reasonably achievable, an effective life of 50 years, and in any case, at least 25 years.

i. Radon concentrations in the atmosphere above facility surfaces or openings shall not (1) exceed 100 pCi/l at any given point, or any average concentration of 30 pCi/l for the facility site, or (2) exceed an average radon concentration at or above any location outside the facility site of 3.0 pCi/l (above background).

j. For water protection, use existing State and Federal Standards; apply site-specific measures where needed.

2. Long Term Management for Waste from FUSRAP and Remote SFMP Sites for Disposal Operations Not Covered in DOE Order 5820

a. All operational requirements specified for Interim Storage Facilities (B-1.a-g) will apply.

b. Control and stabilization features will be designed to ensure, to the extent reasonably achievable, an effective life of 1,000 years and, in any case, at least 200 years. Other disposal site design features shall be consistent with 40 CFR 192 performance guidelines/requirements.

c. Radon emanation to the atmosphere from facility surfaces or openings shall not (1) exceed an average release rate of 20 pCi/m^2 sec, or (2) increase the annual average radon concentration at or above any location outside the facility site by more than 0.5 pCi/l.

d. For water protection, use existing State and Federal Standards; apply site-specific measures where needed.

e. Prior to placement of any potentially biodegradable contaminated wastes in a Long-Term Management facility, such wastes will be properly conditioned to (1) insure the generation and escape of biogenic gases will not cause the criteria in paragraph 2.c. to be exceeded, and (2) insure biodegradation within the facility will not result in premature structural failure not in accordance with the criteria in paragraph 2.b. If biodegradable wastes are conditioned by incineration, incineration operations will be carried out in compliance with all applicable federal, state, and local air emission standards and requirements, including any standards for radionuclides established pursuant to 40 CFR 61, National Emission Standards for Hazardous Air Pollutants (NESHAPS).

C. EXCEPTIONS

1. Procedure -- Analysis of site-specific conditions.

2. Applicability -- Where health and safety would be endangered, or where cost clearly outweighs benefits.

D. CRITERIA SOURCES

Criteria	Source
1. Residual Contamination	
a. Residual Contamination of Land[1]	DOE Order 5480.1A, 40 CFR 192[2]
b. Residual Contamination of Buildings	40 CFR 192, proposed ANSI N13.12
2. Control of Radioactive Wastes and Residues	
a. Interim Storage	DOE Order 5480.1A
b. Disposal	40 CFR 192
3. Exceptions	
a. Procedure	40 CFR 192
b. Applicability	40 CFR 192

Notes: 1. The bases of the residual contamination criteria are developed in ORO-831 and ORO-832.
2. Based on limiting the radon daughter concentration to 0.03 WL within structures.