

ATTACHMENT "E"

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**Interim Report
1979-1980**

**Preoperational Radiological Environmental
Monitoring Program**

**Shooting Canyon Uranium Project
Garfield County, Utah
NRC Docket No. 40-8698**

Prepared for
Plateau Resources Limited
November 1980

Woodward-Clyde Consultants

SOIL AND SEDIMENT SAMPLES

5.1 SURFACE SOIL

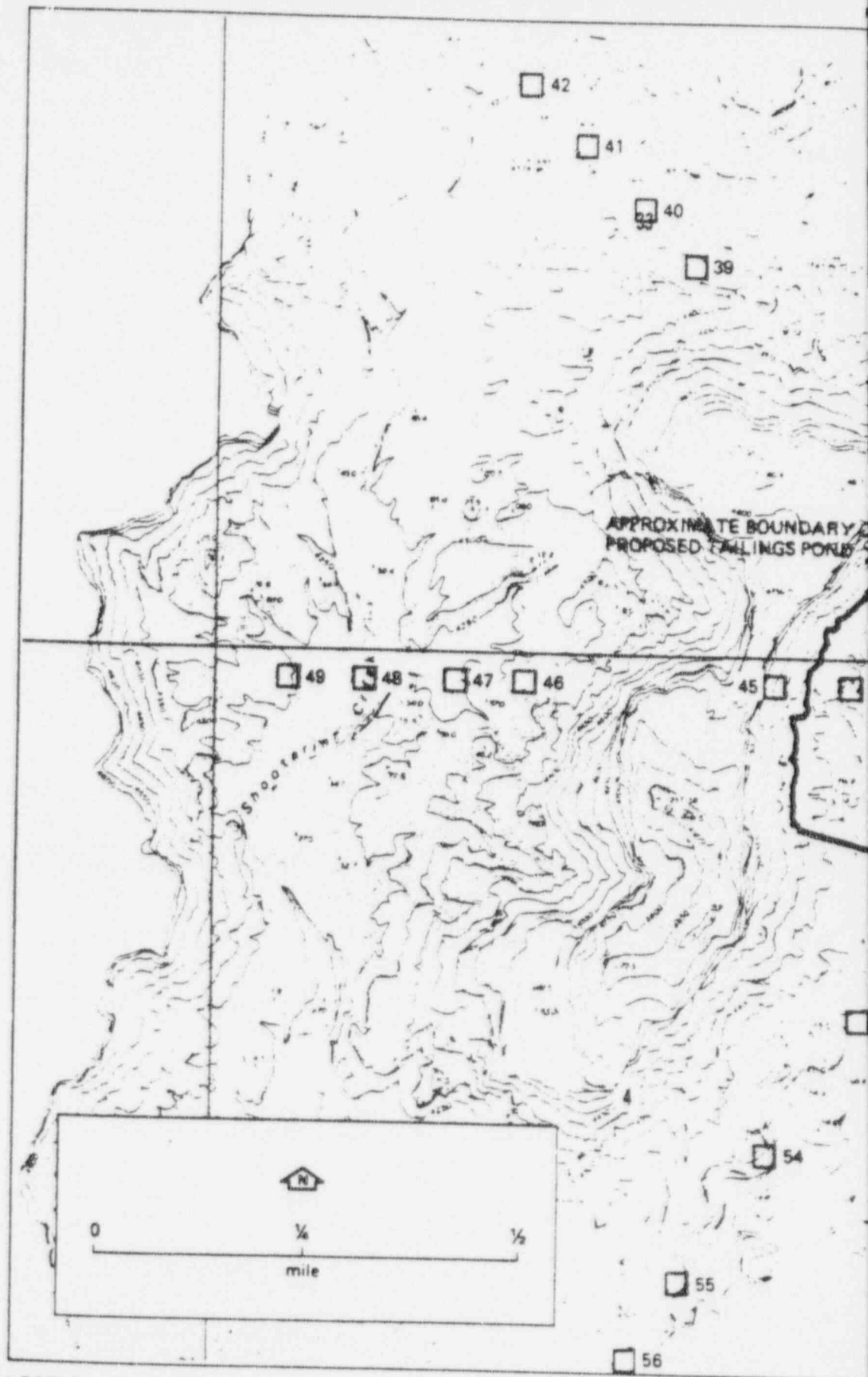
General Description

Surface soil samples were collected from 56 points in the project area (see Figure 5-1) before the start of site preparation activities. Similar samples were collected at the air sampling stations on site and at the planned Ticaboo town site and Bullfrog Basin Marina. Subsequent to initial site preparation activities, 29 surface soil samples were collected in or near disturbed areas. The locations of these "post-excavation" samples are shown in Figure 5-2. Surveyed locations of the post-excavation sampling points are shown in Table 5-1. Results of the sample analyses are shown in Tables 5-2 and 5-3 (baseline samples) and 5-4 and 5-5 (post excavation samples).

Sample Collection

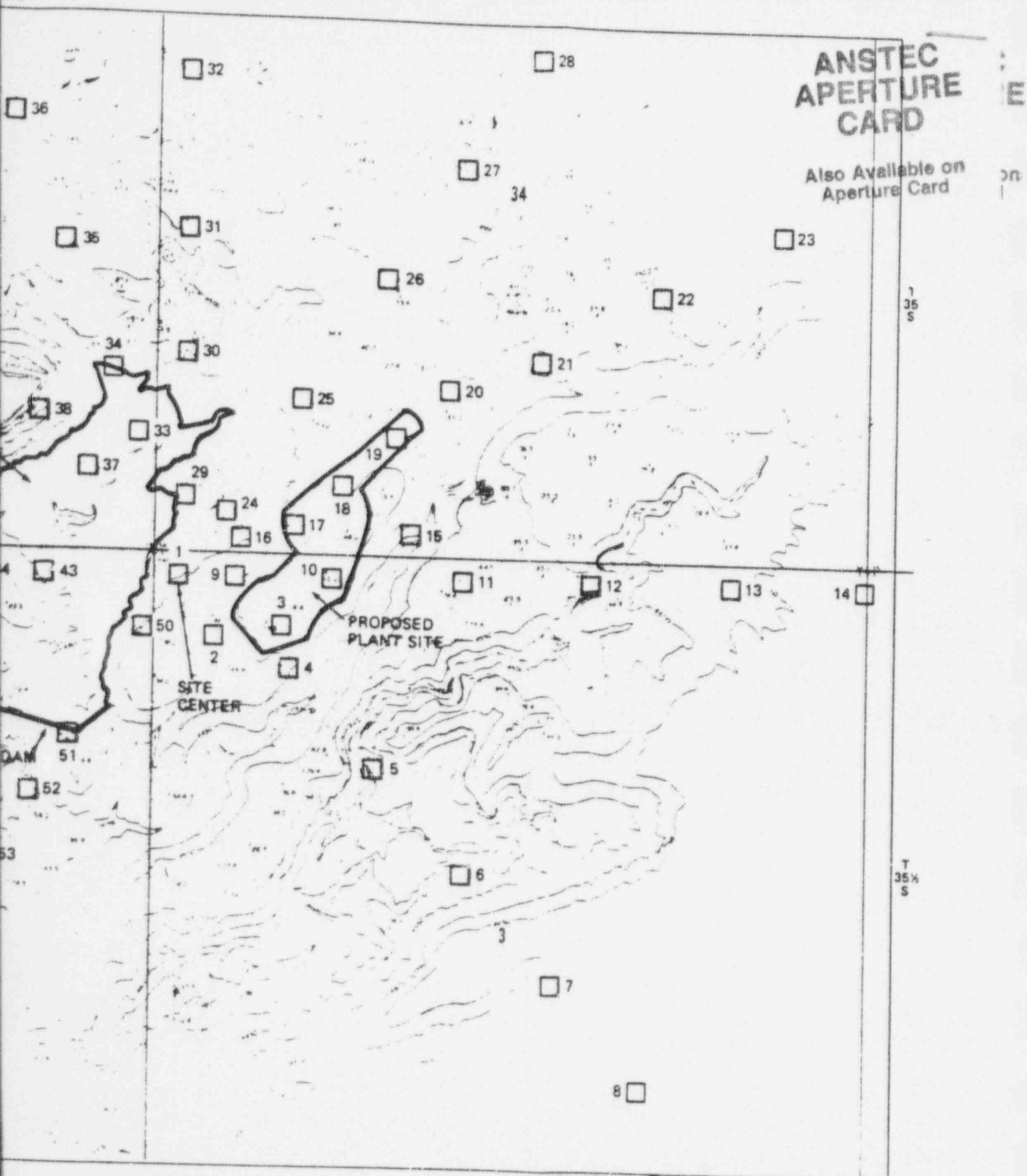
Location. Sample locations were designated by map coordinates on a radial grid laid out from the site center.

Procedure. Samples were collected at each location by compositing approximately 0.5 kilogram increments from 10 points in an area of about 100 square meters. Samples were taken to a depth of 5 centimeters using a 1.5-inch wide scoop. Each resulting 5 kilogram sample was then blended, coned, halved, and placed in identified plastic bags. One sample split was delivered to the laboratory for analysis, and the other was stored for possible future reference.



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- Surface Soil Sample Locations, 1-56



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Figure 5-1. PREOPERATIONAL MONITORING
LOCATIONS FOR SURFACE SOILS

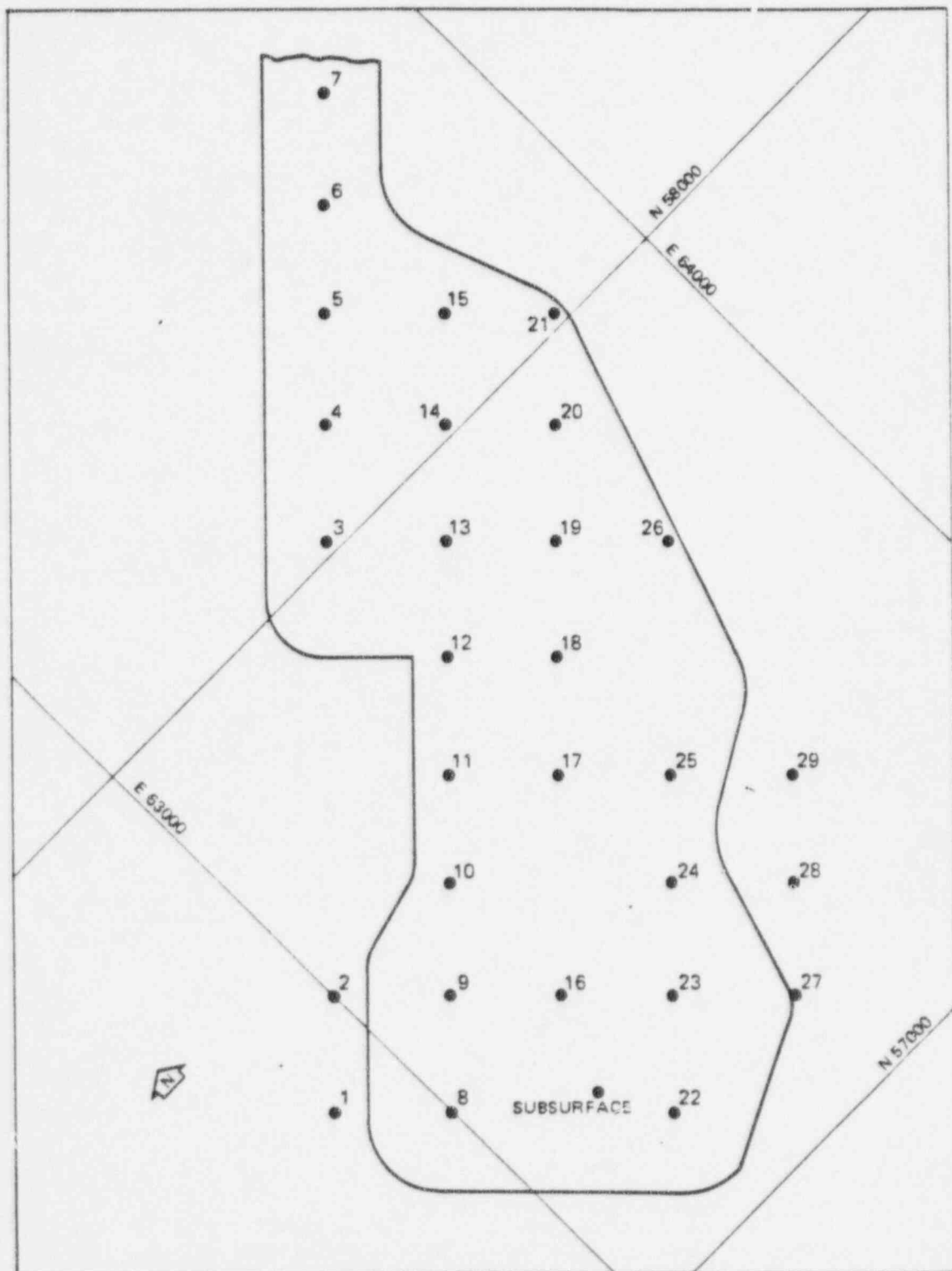


Figure 5-2. POST EXCAVATION SAMPLING LOCATIONS FOR SURFACE SOILS

Table 5-1. POST EXCAVATION GAMMA SURVEY AND SOIL SAMPLE LOCATIONS

Station Number	Northing	Easting
1	57486.0	62882.4
2	57587.9	62984.3
3	58009.2	63408.5
4	58114.4	63514.3
5	58222.1	63620.1
6	58326.8	63726.8
7	58432.9	63832.8
8	57376.2	62991.9
9	57477.1	63092.0
10	57583.6	63198.6
11	57692.2	63307.3
12	57799.9	63415.9
13	57899.9	63516.3
14	58005.2	63621.9
15	58111.4	63729.0
16	57375.9	63196.5
17	57587.7	63410.3
18	57694.3	63521.8
19	57794.7	63622.2
20	57898.7	63726.3
21	58004.0	63831.7
22	57175.4	63201.3
23	57273.2	63302.1
24	57375.7	63408.5
25	57478.2	63515.6
26	57689.7	63728.9
27	57161.3	63405.4
28	57274.0	63501.6
29	57380.9	63613.5

Table 5-2. PREOPERATIONAL SURFACE SOIL SAMPLES (Isotopic Analyses) Page 1 of 7

Date 5-17-79

Location 1

Type Surface Soil

<u>Radionuclide</u>	<u>Concentration</u> <u>($\mu\text{Ci/g}$)</u>	<u>Error Estimate</u> <u>($\mu\text{Ci/g}$)</u>	<u>LLD</u> <u>($\mu\text{Ci/g}$)</u>
U-nat	0.32E-6	0.12E-6	
Th-230	0.45E-6	0.21E-6	
Ra-226	0.18E-6	0.05E-6	
Pb-210	0.00	0.20E-6	
Po-210	-	-	

Date 5-18-79

Location 4

Type Surface Soil

<u>Radionuclide</u>	<u>Concentration</u> <u>($\mu\text{Ci/g}$)</u>	<u>Error Estimate</u> <u>($\mu\text{Ci/g}$)</u>	<u>LLD</u> <u>($\mu\text{Ci/g}$)</u>
U-nat	0.36E-6	0.10E-6	
Th-230	0.66E-6	0.41E-6	
Ra-226	0.23E-6	0.07E-6	
Pb-210	0.78E-6	0.47E-6	
Po-210	-	-	

Table 5-2. PREOPERATIONAL SURFACE SOIL SAMPLES (Isotopic Analyses) Page 2 of 7

Date 5-18-79

Location 10

Type Surface Soil

<u>Radionuclide</u>	<u>Concentration ($\mu\text{Ci/g}$)</u>	<u>Error Estimate ($\mu\text{Ci/g}$)</u>	<u>LLD ($\mu\text{Ci/g}$)</u>
U-nat	0.37E-6	0.15E-6	
Th-230	0.47E-6	0.21E-6	
Ra-226	0.18E-6	0.05E-6	
Pb-210	0.93E-6	0.48E-6	
Po-210	-	-	

Date 5-17-79

Location 25

Type Surface Soil

<u>Radionuclide</u>	<u>Concentration ($\mu\text{Ci/g}$)</u>	<u>Error Estimate ($\mu\text{Ci/g}$)</u>	<u>LLD ($\mu\text{Ci/g}$)</u>
U-nat	0.74E-6	0.54E-6	
Th-230	0.94E-6	0.79E-6	
Ra-226	0.00	0.20E-6	
Pb-210	0.55E-6	0.40E-6	
Po-210	-	-	

Table 5-2. PREOPERATIONAL SURFACE SOIL SAMPLES (Isotopic Analyses) Page 3 of 7

Date 5-17-79

Location 26

Type Surface Soil

<u>Radionuclide</u>	<u>Concentration</u> <u>($\mu\text{Ci/g}$)</u>	<u>Error Estimate</u> <u>($\mu\text{Ci/g}$)</u>	<u>LLD</u> <u>($\mu\text{Ci/g}$)</u>
U-nat	0.24E-6	0.15E-6	
Th-230	0.15E-6	0.08E-6	
Ra-226	0.07E-6	0.02E-6	
Pb-210	0.00	0.20E-6	
Po-210	-	-	

Date 5-16-79

Location 30

Type Surface Soil

<u>Radionuclide</u>	<u>Concentration</u> <u>($\mu\text{Ci/g}$)</u>	<u>Error Estimate</u> <u>($\mu\text{Ci/g}$)</u>	<u>LLD</u> <u>($\mu\text{Ci/g}$)</u>
U-nat	0.48E-6	0.34E-6	
Th-230	0.29E-6	0.17E-6	
Ra-226	0.33E-6	0.10E-6	
Pb-210	0.00	0.20E-6	
Po-210	-	-	

Table 5-2. PREOPERATIONAL SURFACE SOIL SAMPLES (Isotopic Analyses) Page 4 of 7

Date 5-16-79

Location 44

Type Surface Soil

<u>Radionuclide</u>	<u>Concentration ($\mu\text{Ci/g}$)</u>	<u>Error Estimate ($\mu\text{Ci/g}$)</u>	<u>LLD ($\mu\text{Ci/g}$)</u>
U-nat	0.59E-6	0.11E-6	
Th-230	0.48E-6	0.20E-6	
Ra-226	0.31E-6	0.09E-6	
Pb-210	0.00	0.20E-6	
Po-210	-	-	

Date 5-19-79

Location 52

Type Surface Soil

<u>Radionuclide</u>	<u>Concentration ($\mu\text{Ci/g}$)</u>	<u>Error Estimate ($\mu\text{Ci/g}$)</u>	<u>LLD ($\mu\text{Ci/g}$)</u>
U-nat	0.56E-6	0.19E-6	
Th-230	1.3E-6	0.8E-6	
Ra-226	0.27E-6	0.08E-6	
Pb-210	1.9E-6	0.5E-6	
Po-210	-	-	

Table 5-2. PREOPERATIONAL SURFACE SOIL SAMPLES (Isotopic Analyses) Page 5 of 7

Date 8-6-79

Location AP-1

Type Surface Soil

<u>Radionuclide</u>	<u>Concentration ($\mu\text{Ci/g}$)</u>	<u>Error Estimate ($\mu\text{Ci/g}$)</u>	<u>LLD ($\mu\text{Ci/g}$)</u>
U-nat	1.56E-6	0.20E-6	
Th-230	1.2E-6	0.4E-6	
Ra-226	0.62E-6	0.19E-6	
Pb-210	1.4E-6	0.4E-6	
Po-210	-	-	

Date 8-6-79

Location AP-2

Type Surface Soil

<u>Radionuclide</u>	<u>Concentration ($\mu\text{Ci/g}$)</u>	<u>Error Estimate ($\mu\text{Ci/g}$)</u>	<u>LLD ($\mu\text{Ci/g}$)</u>
U-nat	0.41E-6	0.14E-6	
Th-230	0.28E-6	0.14E-6	
Ra-226	0.22E-6	0.07E-6	
Pb-210	0.91E-6	0.40E-6	
Po-210	-	-	

Table 5-2. PREOPERATIONAL SURFACE SOIL SAMPLES (Isotopic Analyses) Page 6 of 7

Date 8-6-79

Location AP-3

Type Surface Soil

<u>Radionuclide</u>	<u>Concentration ($\mu\text{Ci/g}$)</u>	<u>Error Estimate ($\mu\text{Ci/g}$)</u>	<u>LLD ($\mu\text{Ci/g}$)</u>
U-nat	0.37E-6	0.13E-6	
Th-230	0.46E-6	0.20E-6	
Ra-226	0.19E-6	0.06E-6	
Pb-210	1.0E-6	0.4E-6	
Po-210	-	-	

Date 8-6-79

Location AP-4

Type Surface Soil

<u>Radionuclide</u>	<u>Concentration ($\mu\text{Ci/g}$)</u>	<u>Error Estimate ($\mu\text{Ci/g}$)</u>	<u>LLD ($\mu\text{Ci/g}$)</u>
U-nat	0.35E-6	0.09E-6	
Th-230	0.37E-6	0.18E-6	
Ra-226	0.19E-6	0.06E-6	
Pb-210	0.69E-6	0.50E-6	
Po-210	-	-	

Table 5-2. PREOPERATIONAL SURFACE SOIL SAMPLES (Isotopic Analyses) Page 7 of 7

Date 8-6-79
Location C-1
Type Surface Soil

<u>Radionuclide</u>	<u>Concentration</u> <u>($\mu\text{Ci/g}$)</u>	<u>Error Estimate</u> <u>($\mu\text{Ci/g}$)</u>	<u>LLD</u> <u>($\mu\text{Ci/g}$)</u>
U-nat	0.31E-6	0.09E-6	
Th-230	0.30E-6	0.15E-6	
Ra-226	0.19E-6	0.06E-6	
Pb-210	0.00	0.20E-6	
Po-210	-	-	

Date 8-6-79
Location C-2
Type Surface Soil

<u>Radionuclide</u>	<u>Concentration</u> <u>($\mu\text{Ci/g}$)</u>	<u>Error Estimate</u> <u>($\mu\text{Ci/g}$)</u>	<u>LLD</u> <u>($\mu\text{Ci/g}$)</u>
U-nat	0.42E-6	0.15E-6	
Th-230	0.25E-6	0.15E-6	
Ra-226	0.20E-6	0.06E-6	
Pb-210	1.8E-6	0.5E-6	
Po-210	-	-	

Table 5-3. PREOPERATIONAL SURFACE SOIL SAMPLES (Ra-226 Analysis) Page 1 of 4

Date 5-16-79 thru 5-19-79

Location No.	Ra-226 Concentration $\mu\text{Ci/g}$	Error Estimate $\mu\text{Ci/g}$	LLD $\mu\text{Ci/g}$
1*	0.18E-6	0.05E-6	
2	0.31E-6	0.03E-6	
3	0.18E-6	0.03E-6	
4*	0.23E-6	0.07E-6	
5	0.26E-6	0.03E-6	
6	0.21E-6	0.02E-6	
7	0.60E-6	0.04E-6	
8	0.35E-6	0.03E-6	
9	0.16E-6	0.02E-6	
10*	0.18E-6	0.05E-6	
11	0.23E-6	0.03E-6	
12	0.10E-6	0.02E-6	
13	0.15E-6	0.04E-6	
14	0.23E-6	0.04E-6	
15	0.18E-6	0.03E-6	
16	0.15E-6	0.02E-6	
17	0.16E-6	0.02E-6	
18	0.23E-6	0.03E-6	
19	0.25E-6	0.03E-6	
20	0.69E-6	0.04E-6	

*Retabulated from Table 5-2.

Table 5-3. PREOPERATIONAL SURFACE SOIL SAMPLES (Ra-226 Analysis) Page 2 of 4

Date 5-16-79 thru 5-19-79

Location No.	Ra-226 Concentration $\mu\text{Ci/g}$	Error Estimate $\mu\text{Ci/g}$	LLD $\mu\text{Ci/g}$
21	0.40E-6	0.04E-6	
22	0.43E-6	0.04E-6	
23	0.30E-6	0.03E-6	
24	0.18E-6	0.03E-6	
25*	0.00	0.20E-6	
26*	0.07E-6	0.02E-6	
27	0.48E-6	0.04E-6	
28	0.19E-6	0.02E-6	
29	0.18E-6	0.02E-6	
30*	0.33E-6	0.10E-6	
31	0.10E-6	0.03E-6	
32	1.23E-6	0.05E-6	
33	0.16E-6	0.03E-6	
34	0.17E-6	0.03E-6	
35	0.57E-6	0.04E-6	
36	0.99E-6	0.06E-6	
37	0.36E-6	0.04E-6	
38	1.37E-6	0.72E-6	
39	0.51E-6	0.04E-6	
40	0.40E-6	0.04E-6	

*Retabulated from Table 5-2.

Table 5-3. PREOPERATIONAL SURFACE SOIL SAMPLES (Ra-226 Analysis) Page 3 of 4

Date 5-16-79 thru 5-19-79

Location No.	Ra-226 Concentration $\mu\text{Ci/g}$	Error Estimate $\mu\text{Ci/g}$	LLD $\mu\text{Ci/g}$
41	0.22E-6	0.03E-6	
42	0.20E-6	0.03E-6	
43	0.16E-6	0.02E-6	
44*	0.31E-6	0.09E-6	
45	0.48E-6	0.04E-6	
46	0.36E-6	0.04E-6	
47	0.21E-6	0.03E-6	
48	0.54E-6	0.04E-6	
49	0.46E-6	0.04E-6	
50	0.38E-6	0.03E-6	
51	0.26E-6	0.03E-6	
52*	0.27E-6	0.08E-6	
53	0.27E-6	0.04E-6	
54	1.46E-6	0.39E-6	
55	0.21E-6	0.02E-6	
56	0.13E-6	0.02E-6	

*Retabulated from Table 5-2.

Table 5-3. PREOPERATIONAL SURFACE SOIL SAMPLES (Ra-226 Analysis) Page 4 of 4

Date 8-6-79

Location No.	Ra-226 Concentration $\mu\text{Ci/g}$	Error Estimate $\mu\text{Ci/g}$	LLD $\mu\text{Ci/g}$
AP-1*	0.62E-6	0.19E-6	
AP-2*	0.22E-6	0.07E-6	
AP-3*	0.19E-6	0.06E-6	
AP-4*	0.19E-6	0.06E-6	
C-1*	0.19E-6	0.06E-6	
C-2*	0.20E-6	0.06E-6	

*Retabulated from Table 5-2.

6.1 GAMMA DOSE RATE MEASUREMENTS

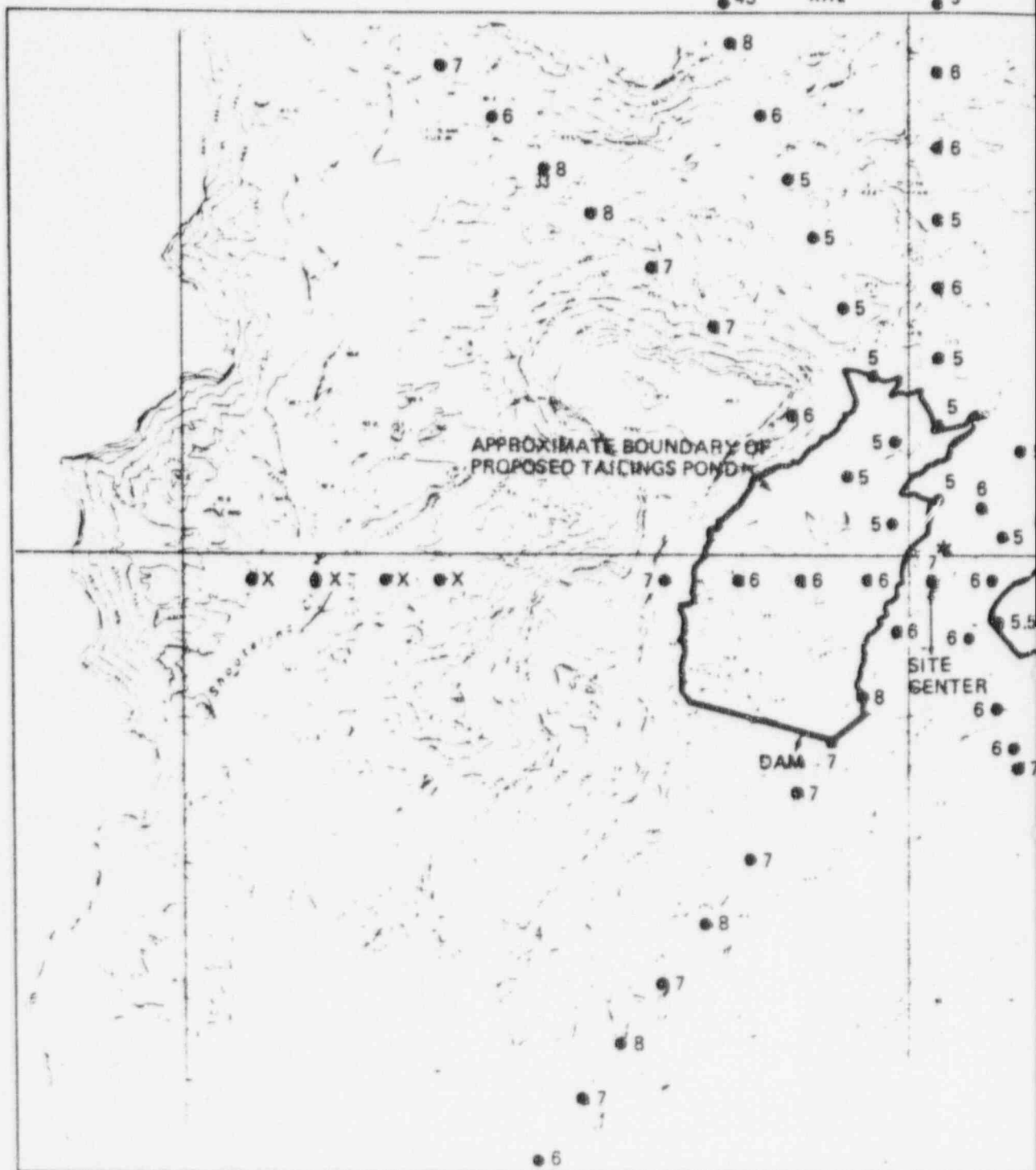
General Description

Gamma dose rate measurements were made by Eberline Instrument Corporation at approximately 90 points on a radial grid centered on the project site as shown in Figure 6-1. On each radial arm, the measurement points were spaced at approximately 150 meter intervals, to a distance of about 1500 meters, except where the terrain prevented access. In addition, measurements were made at the airborne particulate monitoring sites. A post excavation survey was completed, covering 29 disturbed surface points on the project site as shown in Figure 6-2. The dates and results of these surveys are shown in Table 6-1.

Sample Collection

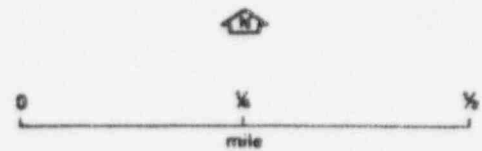
Location. Measurement points in the project area were selected to conform to the recommendation of NRC R.G.4.14. Direct radiation was also measured at the six air particulate monitoring locations.

Equipment. The equipment used for the pre-excavation survey was Eberline Instrument Corporation's (EIC) sodium iodide scintillation probe (SPA-3) connected by a CA-5-36 cable to a scaler. Both PS-2 and PRS-2 scalers were used. SPA-3/scaler combination was cross referenced to EIC's pressurized ion chamber (traceable to NBS standard) based on comparative exposure to a known Ra-226 source and background gamma levels at the mine camp.



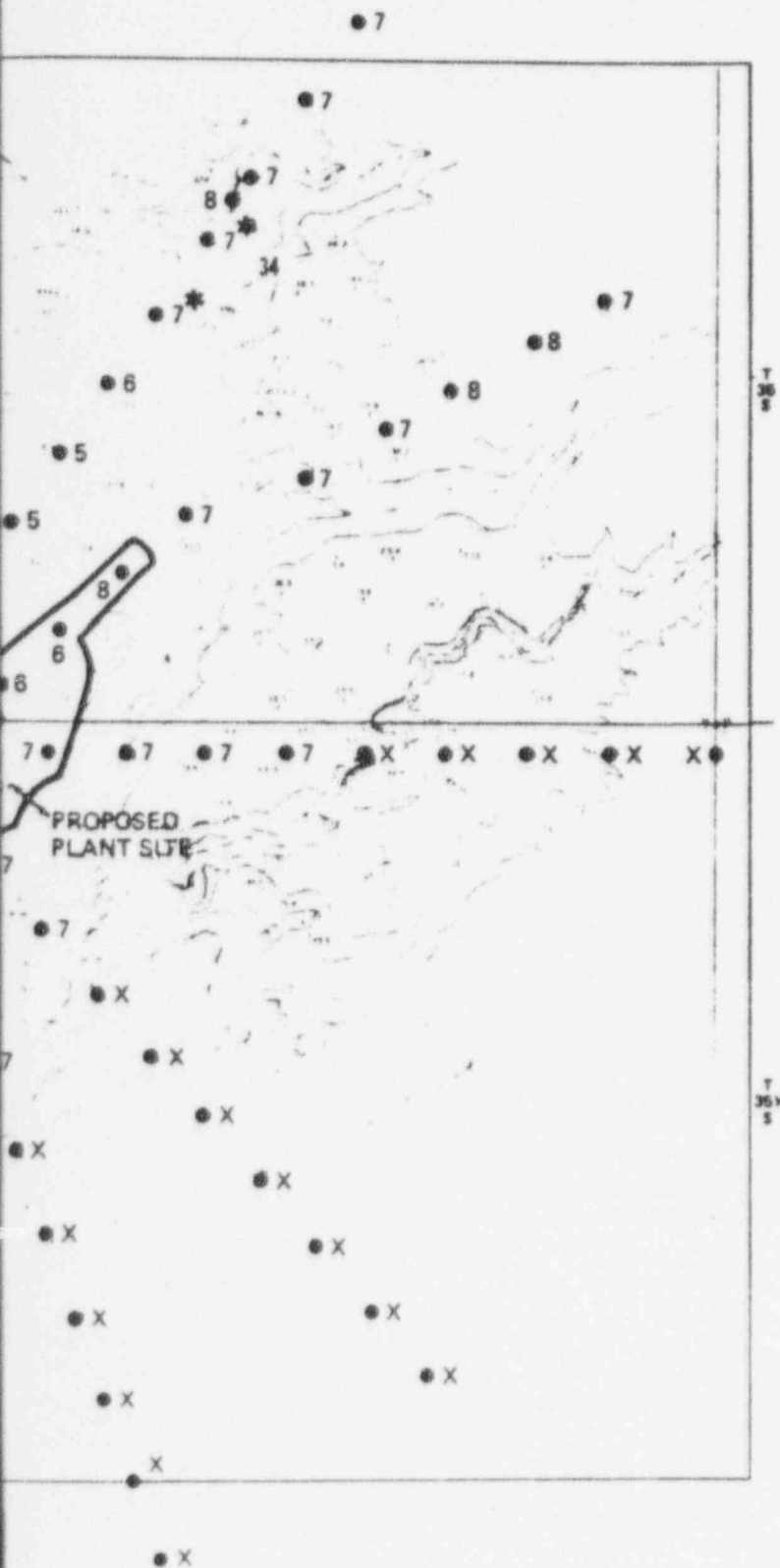
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LEGEND

- Gamma Survey Locations
- X No Reading Taken, Due to Terrain
- * Averaged Reading



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Figure 6-1. PREOPERATIONAL MONITORING
LOCATIONS FOR GAMMA SURVEY

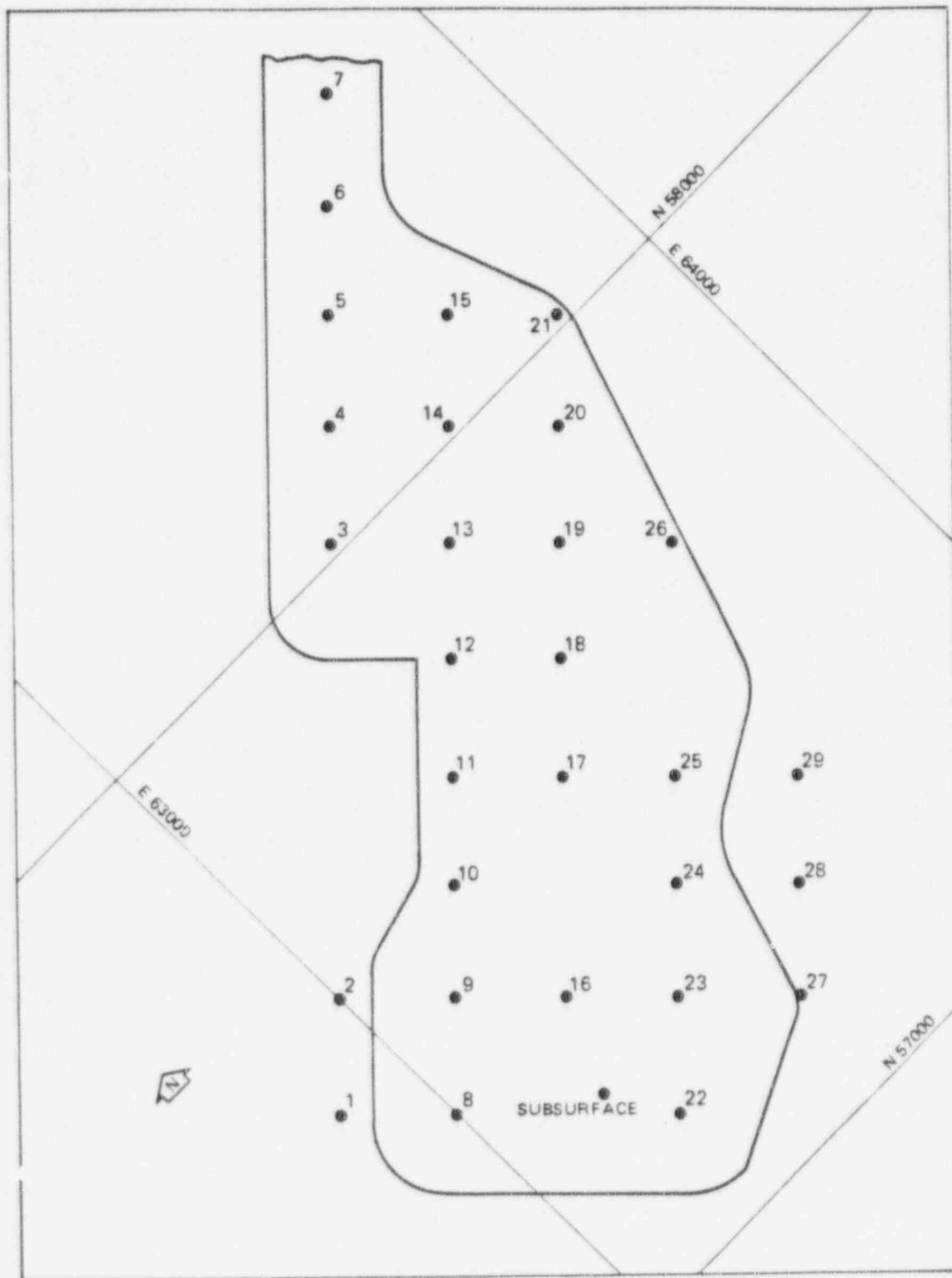


Figure 6-2. POST EXCAVATION SAMPLING LOCATIONS FOR GAMMA SURVEY

Table 6-1. POST EXCAVATION GAMMA DOSE RATE
MEASUREMENTS

Page 1 of 2

Date 2-13-80

Location	Exposure Rate (mR/qr)	Error Estimate (mR/qr)
1	12.40	0.07
2	14.28	0.18
3	10.45	0.11
4	12.68	0.07
5	12.33	0.09
6	11.69	0.15
7	10.60	0.07
8	14.04	0.26
9	16.21	0.39
10	14.39	0.39
11	15.57	0.26
12	13.62	0.26
13	12.40	0.09
14	13.93	0.24
15	13.29	0.09
16	14.67	0.20

Table 6-1. POST EXCAVATION GAMMA DOSE RATE
MEASUREMENTS

Page 2 of 2

Date 2-13-80

<u>Location</u>	<u>Exposure Rate (mR/qr)</u>	<u>Error Estimate (mR/qr)</u>
17	15.81	0.13
18	14.63	0.13
19	15.13	0.11
20	15.20	0.26
21	12.40	0.09
22	10.56	0.20
23	13.84	0.02
24	15.68	0.18
25	14.74	0.15
26	15.86	0.22
27	14.39	0.09
28	15.26	0.13
29	15.75	0.13

A SPA-3 probe with a PRS-1 probe was used for the post excavation survey. A calibration factor was again calculated from cross calibration with a pressurized ion chamber. This calibration was determined from background gamma levels alone and then with an added radium-226 source.

Procedure. At each field sampling location during both surveys, the SPA-3/scaler combination was mounted on a standard photographic tripod at a height of one meter above ground level. The measurement duration for counting with the PS-2 scaler was that needed to accumulate 1000 counts. The calibration factor was set into the internal circuitry and an outpost in $\mu\text{k}/\text{hour}$ was directly produced. A preset time was used for the PRS-2 scaler and direct readout was in cpm. These readings were later divided by the calibration factor.

Three timed counts of one minute duration each were obtained at each sampling locality with the PRS-1/SPA-3 system during the post excavation survey. A direct readout in $\mu\text{k}/\text{hour}$ was obtained since the calibration factor was set into the internal circuitry of the PRS-1/scaler. An average exposure rate at each location was calculated from the three readings.

Exposure Rate Calculations. The counting rates in cpm were divided by the calibration factor in cpm per $\mu\text{k}/\text{hour}$ to yield the $\mu\text{k}/\text{hour}$ counting rates. This was done internally by the PS-2 and PR-1 scalers. Calibration factors for the SPA-3/PS-2, SPA/PRS-2, and SPA/PRS-1 units of 1,040, 1,000, and 952 cpm per $\mu\text{k}/\text{hour}$, respectively were used. These were obtained by cross calibration with the pressurized ion chamber. The exposure rates in $\mu\text{k}/\text{hour}$ were multiplied by 2,184 hours per quarter to obtain exposure rates in $\mu\text{k}/\text{quarter}$.

Error Estimates. Counting error estimates for the pre excavation survey were calculated by the following relation:

$$E = \frac{2(2184) \sqrt{C}}{(T)(K)}$$

where: E = two sigma counting error in μ k/quarter,
 C = number of counts,
 T = counting time in minutes,
 K = calibration factor in cpm per μ k/hr,
 2184 = hours/quarter.

Counting error estimates for the post excavational survey were obtained in the following relation:

$$E = \frac{(2)(2184)}{(K)} \sqrt{\frac{\sum (c - \bar{c})^2}{2}}$$

where: E = two sigma counting error in mk/quarter,
 C = number of counts in each of 3 one minute counting intervals at a location
 \bar{c} = calculated mean number of counts for the 3 one minute counting intervals,
 K = calibration factor in cpm per mk/hr,
 2184 = hours/quarter

Systematic errors exist in the calibration factor for the SPA-3 probes due to the differing gamma energy response characteristics of the pressurized ion chamber and portable survey instruments. This error in the calibration factors is estimated to be on the order of 50 percent. The estimated field systematic error for the pressurized ion chamber is ± 8 percent with ± 5 percent associated with the instrument and 3 percent error to correct for radium-226 spectral response relative to cobalt-60.

Quality Assurance. The SPA-3/scaler unit calibrations, by cross reference to a pressurized ion chamber translate to an NBS standard, must be certified within the 90 day period immediately preceding the field measurements.

6.2 THERMOLUMINESCENT DOSIMETER SURVEY

General Description

In addition to the one-time scintillometer measurements, thermoluminescent dosimeters (TLD's) were installed in pairs at nine locations on the project site (see Figure 6-3) and at the Ticaboo town site and Bullfrog Basin Marina. One of each TLD pair was replaced at three month intervals. The TLD results are shown in Table 6-2. The TLD pairs were employed for back up and comparison with the direct gamma dose rate measurements.

Sample Analysis

The TLDs returned from the field were read by Eberline on an Eberline TLR-6 reader. Each of the five chips in a dosimeter were preheated to 150°C for ten seconds and then read at 250°C for ten seconds. A background correction was made by subtracting an additional ten second reading on each chip from the first reading value. The average of the five chip readings in net mrem was then converted to mk/quarter by consideration of the response time. Two sigma uncertainties were calculated from the following relation

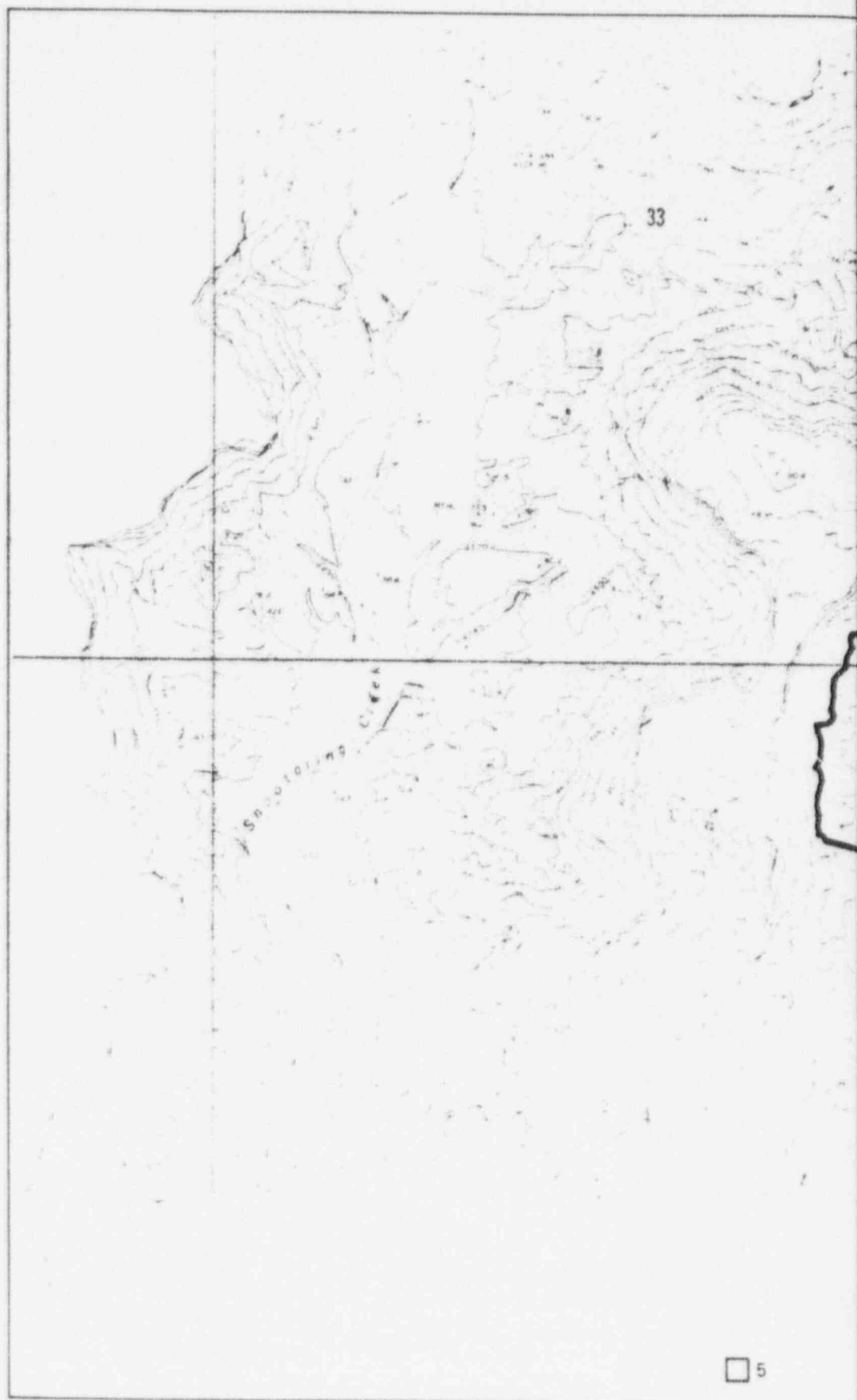
$$E = \left(\sqrt{\frac{\sum(R - \bar{R})^2}{N-1}} \right) \left(\frac{S}{\bar{R}} \right)$$

where \bar{R} = net reading for each chip in a dosimeter in mrem,

\bar{R} = average net reading for the chips in a dosimeter in mrem,

N = number of chips per dosimeter = 5 (unless some are damaged),

S = estimated dosimeter mk/quarter.

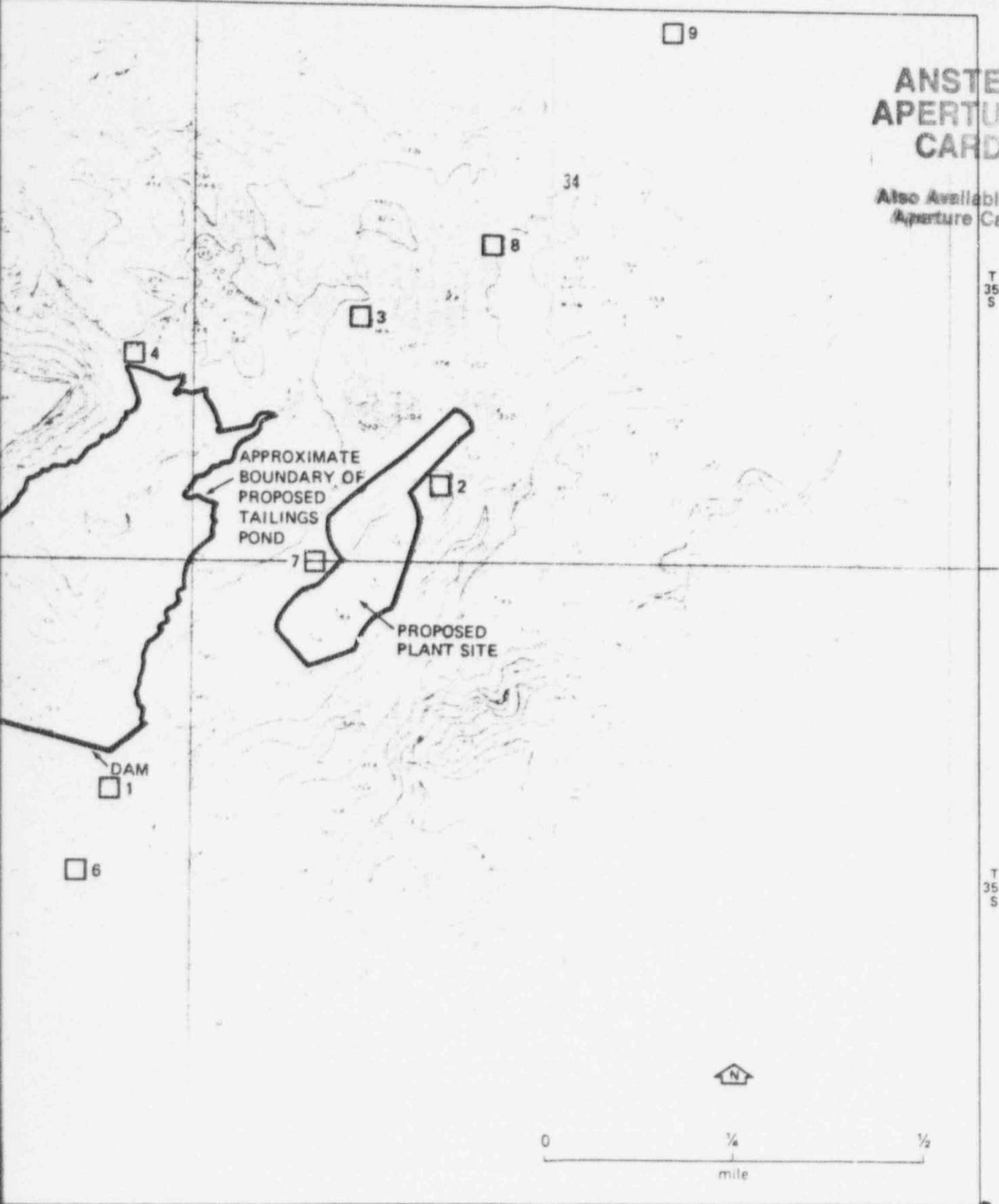


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T
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S



9702100473-03

Figure 6-3. PREOPERATIONAL TLD
SURVEY LOCATIONS

Table 6-2. THERMOLUMINESCENT DOSIMETER
MEASUREMENTS

Page 1 of 3

Dates 7-3-79 to 10-3-79

<u>Location</u>	<u>Exposure Rate</u> <u>(mR/gr)</u>	<u>Error Estimate</u> <u>(mR/gr)</u>
1	25.4	5.0
2	23.3	4.0
3	21.3	3.7
4	21.3	9.4
5	21.5	2.3
6	26.0	2.9
7	21.2	4.9
8	21.2	3.9
9	23.1	6.5
C-1	20.7	5.2
C-2	21.3	5.9

Table 6-2. THERMOLUMINESCENT DOSIMETER
MEASUREMENTS

Page 2 of 3

Dates 7-3-79 to 1-3-80

<u>Location</u>	<u>Exposure Rate</u> <u>(mR/qr)</u>	<u>Error Estimate</u> <u>(mR/qr)</u>
1	45.0 (20.7)*	108 (2.7)*
2	19.9	7.2
3	19.0	3.7
4	18.9	5.1
5	19.2	3.2
6	20.0	5.2
7	19.6	5.3
8	20.3	2.3
9	21.2	4.0
C-1	19.1	8.8
C-2	17.6	3.3

*Recalculated value, see text.

Table 6-2. THERMOLUMINESCENT DOSIMETER
MEASUREMENTS

Page 3 of 3

Dates 1-3/4-79 to 4-1-80

<u>Location</u>	<u>Exposure Rate</u> <u>(mR/qr)</u>	<u>Error Estimate</u> <u>(mR/qr)</u>
1	-	
2	25.4	3.9
3	23.9	4.8
4	26.7	8.6
5	25.4	3.6
6	25.1	2.9
7	25.2	8.0
8	25.7	7.3
9	26.5	4.6
C-1	22.4	4.1
C-2	24.7	2.5

All dosimeters were annealed prior to placement in the field at 400°C for one hour. The TLR-6 reader was calibrated twice daily by reading TLD chips exposed to known quantities of gamma radiation. The dosimeters can detect total gamma exposure as low as 10 mk.

E.3 CLAY AND SOIL ANALYSIS



LABORATORY ANALYSIS REPORT - US ENERGY

Page 5 of 6

Sample I.D.:

Laboratory I.D.:

Sample Matrix:

Sample Date / Time:

Date Received:

Report Date:

<i>SE</i> CLAY	<i>middle</i> CLAY
G-4	G-5
96-63982	96-63983
Soil	
11-05-96	
11-12-96	
November 27, 1996	

Radiometric	Method	Detection Limit	Units	Results		Date Analyzed
Radium 226 (Ra ₂₂₆)	903.0	0.02	pCi/g	<0.02	0.5	11-25-96
Radium Precision				-	0.1	



LABORATORY ANALYSIS REPORT - US ENERGY

Page 4 of 6

Sample I.D.:
Laboratory I.D.:
Sample Matrix:
Sample Date / Time:
Date Received:
Report Date:

NE CLAY	NW CLAY
G-2	G-3
96-63980	96-63981
Soil	
11-05-96	
11-12-96	
November 27, 1996	

Radlometric	Method	Detection Limit	Units	Results	Date Analyzed
Radium 226 (Ra226)	903.0	0.02	pCi/g	<0.02	11-25-96
Radium Precision					



LABORATORY ANALYSIS REPORT - US ENERGY

Page 3 of 6

Sample I.D.:

Laboratory I.D.:

Sample Matrix:

Sample Date / Time:

Date Received:

Report Date:

NE
SOILSW
CLAY

C-5

G-1

96-63978

96-63979

Soil

11-05-96

11-12-96

November 27, 1996

Radiometric	Method	Detection Limit	Units	Results	Date Analyzed
Radium 226 (Ra226)	903.0	0.02	pCi/g	0.2	11-25-96
Radium Precision				0.1	



LABORATORY ANALYSIS REPORT - US ENERGY

Sample I.D.:
Laboratory I.D.:
Sample Matrix:
Sample Date / Time:
Date Received:
Report Date:

middle
SOIL

SW
SOIL

Page 2 of 6

C-3	C-4
96-63976	96-63977
Soil	
11-05-96	
11-12-96	
November 27, 1996	

Radiometric	Method	Detection Limit	Units	Results		Date Analyzed
Radium 226 (Ra226)	903.0	0.02	pCi/g	0.2	0.2	11-25-96
Radium Precision				0.1	0.1	

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LABORATORY ANALYSIS REPORT - US ENERGY

Page 1 of 6

Sample I.D.:
Laboratory I.D.:
Sample Matrix:
Sample Date / Time:
Date Received:
Report Date:

NW SOIL	SE SOIL
C-1	C-2
96-63974	96-63975
Soil	
11-05-96	
11-12-96	
November 27, 1996	

Radiometric	Method	Detection Limit	Units	Results		Date Analyzed
Radium 226 (Ra226)	903.0	0.02	pCi/g	0.1	0.2	11-25-96
Radium Precision				0.1	0.1	