PSC-15

FINAL RADIOLOGICAL SURVEY REPORT

FOR

COMPLETION OF REMEDIATION ACTIVITIES

AT

THE NAVAL AIR STATION, JACKSONVILLE, FLORIDA

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Prepared by

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1.0 INTRODUCTION

In response to results of a planned radiological characterization of PSC-15 (Ref. 1) at the Naval Air Station Jacksonville, Florida, Bechtel Environmental, Inc. performed remediation activities to remove materials that contained radioactive contamination at concentrations in excess of regulatory standards (Ref. 2).

PSC-15 is an approximate 1-acre area located south of the Paint Shop in Buildling 868 (Figure 1-1). This area, known as the Solvent and Paint Sludge Disposal Area, is approximately 100 ft wide by 250 ft long and was used by the Navy for disposal of solvents and paint sludges. The principle radiological contaminant had been previously determined to be radium-226, used as a luminous marking for aircraft instrumentation components. The radium-226 contamination resulted from disposal of wastes from the instrumentation repair and maintenance operations on the base.

The radiological characterization survey consisted of a 33 ft (10 m) by 33 ft (10 m) grid line gamma scan to locate elevated activity in excess of twice the background. This grid pattern resulted in approximately 10 percent of the total area being scanned. When a scan reading exceeded twice background along the particular grid line, the scanning continued around the grid line until the location of the highest reading was found. The "hot spot" area was then defined by the four compass points at which the gamma reading fell to 20 percent above background. Hot spot characterization then consisted of gross beta, gamma, and alpha readings; a dose rate measurement; and a surface soil sample.

This characterization identified a total of 11 hot spots (isolated and multi-hit areas) over the 1-acre site that exceeded the twice-background designation criteria. These hot spots were found to vary in size from several feet in diameter to areas as large as a total grid (33 ft by 33 ft). Levels of activity were as high as 40 μR/h. The average background at the grid intersections onsite is approximately 6.8 μR/h. Radioisotope concentrations in the soil samples ranged from approximately 0.6 pCi/g to 21.0 pCi/g, with an average of 7.0 pCi/g. Due to the extent of activity encountered using a survey protocol that involved only 10 percent of the site area, this site was considered contaminated above release criteria. The areas of potential contamination defined from this survey are shown on Figure 1-2.

Based on these results, additional gamma measurements were made to confirm that additional hot spots had not been missed by the grid survey. No additional hot spots were encountered. The elevated area around grid intersection B-1 was determined to result from gravel fill used around the ditch culvert. Samples of this material were sent to a radiochemistry laboratory for isotopic analysis to confirm this. The gamma spectrometry analysis indicated taht this gravel material has a very high natural potassium content:

$$K\text{-}40 = 39.8 \text{ pCi/g}.$$

Using the dose conversion from EPA-FRG12 (Ref. 3) of

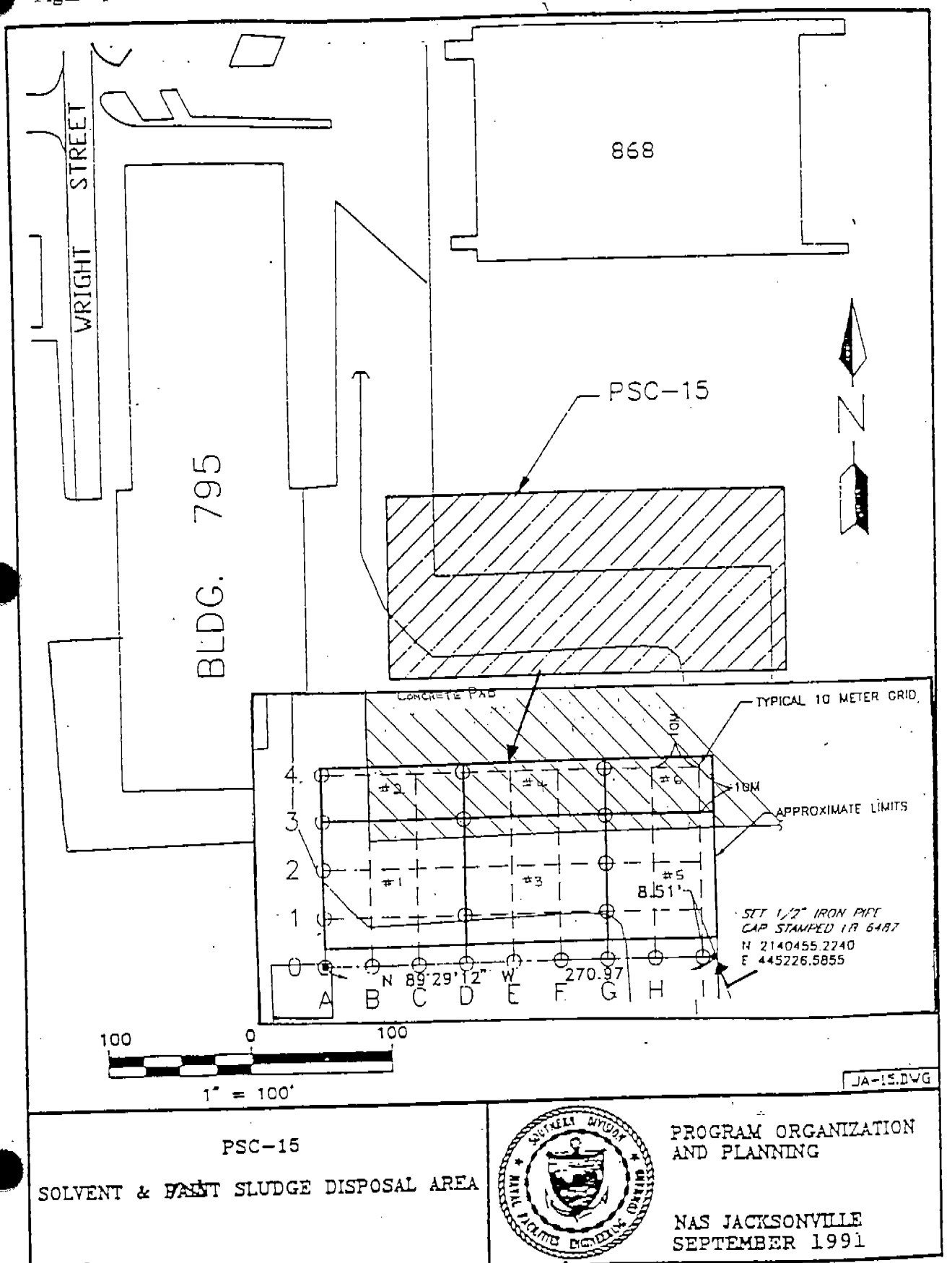
$$C\gamma = 0.119 \text{ μR/h/pCi/g}$$

the incremental dose rate from the K-40 in this material would be

$$\Delta D\gamma \text{ (K-40)} + 4.3 \text{ μR/h}$$

This compares to the average background in this area of approximately 6.5 μR/h which results primarily from the natural uranium and thorium activity in the soil plus a contribution from cosmic radiation of approximately 3.2 μR/h. This additional potassium activity effectively doubles the background soil radiation level.

Figure 1-1 PSC 15 Grid Locations



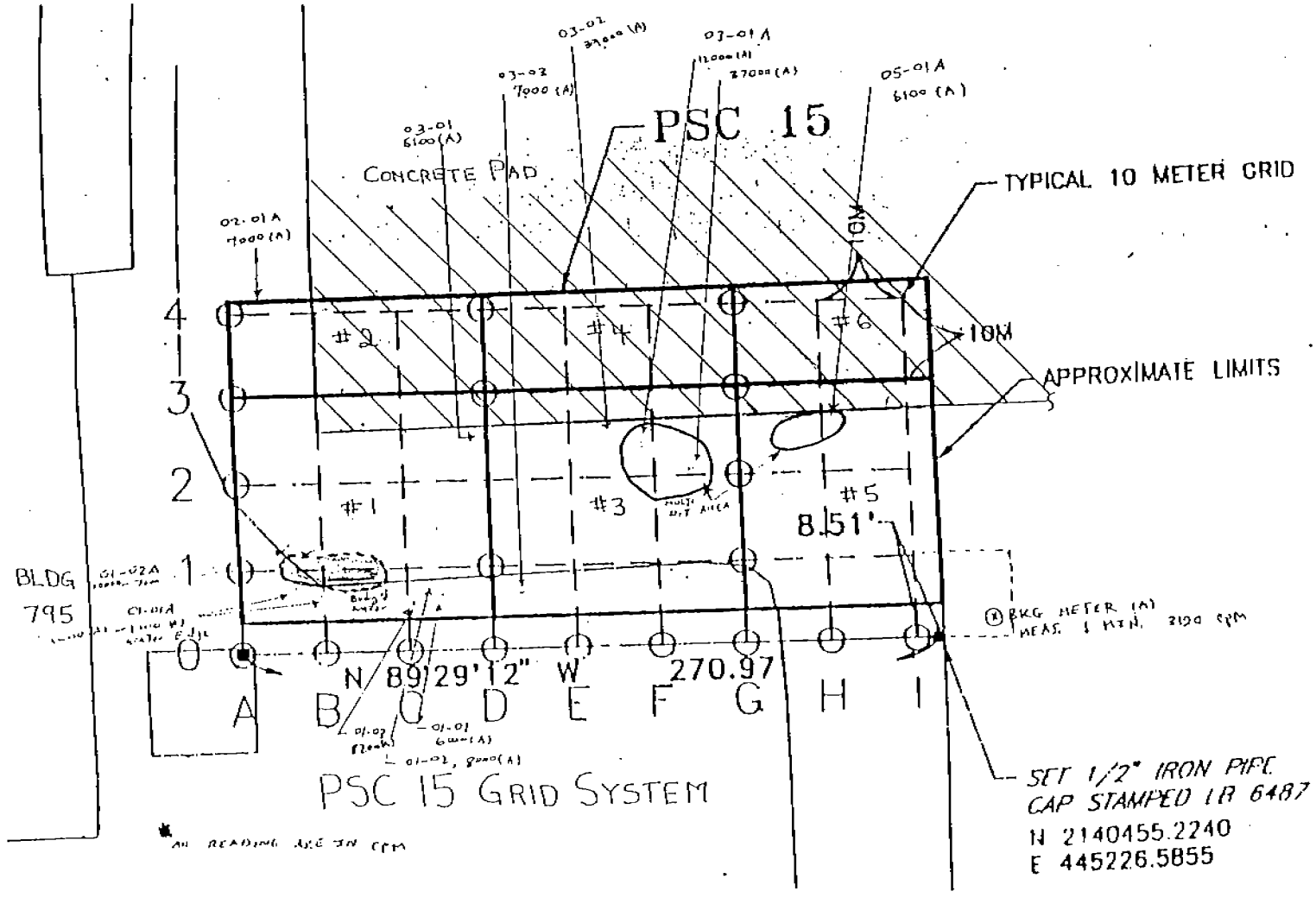


Figure 1-2 PSC 15 Elevated Reading Locations

The remaining two "hot spots" were probed to a depth of approximately 2 ft without reaching background gamma levels. Based on these supplemental measurements, it was estimated that approximately 200 yd^3 of material would require removal to remediate this area. It was noted during this planning that an equipment pad had been placed over a portion of the area that was determined during characterization to be above the release criteria. The plan was based on excavating to the vertical projection of that pad, but not beneath it. The guide wire for the electric pole in grid block E-F/2-3 was also to be undisturbed. These features in relation to the areas of contamination are shown on Figure 1-3.

2.0 REMEDIATION OF PSC-15

The remediation plan was based on completing the excavation with a minimum of waste volume generated. Excavation was started at the location of the two surface hot spots. The soil was removed in depth increments of 6-12 in. and in the areal directions until gamma measurements with a 2"×2" NaI detector fell below 12,000 cpm (approximately twice local background). The excavation proceeded to depths ranging from 1–3 ft, until, at a depth of approximately 3 ft, a 9-in. diameter sewer line and a 12-in. diameter water line were encountered. The water line is a main supply for the base. It was agreed by parties representing Bechtel, Navy Base Operations (ROICC), and Navy Environmental Compliance that uncovering the water line and the associated excavation activities posed a greater risk than the residual activity around the line. All parties agreed to excavating to the top surface of the pipe and characterizing the remaining residual activity around the pipe. This was also the approach agreed to with respect to elevated activity that was directly beneath the concrete pad. Based on this strategy, a total of 288 yd^3 of soil was removed. The extent of the excavation is shown on Figure 2-1. The final excavation was approximately 26 ft north-south and 105 ft east-west. The excavated area was approximately 2,500 ft^2. The total excavation volume for PSC-15 was 130 percent of the estimated volume. The excavated material was transported to PSC-26 for final stabilization.

3.0 RADIOLOGICAL CHARACTERIZATION

Excavation was continued until the sidewall and bottom of the excavation were less than 12,000 cpm as measured with a 2"×2" NaI detector. The two exceptions to this approach were the vertical excavation faces at the edge of the concrete equipment pad and building curb, and the excavation above the 12-in. water and 9-in. sewer pipes. The residual radioactive contamination within the excavation was characterized as follows:

(1) The area(s) of elevated activity in the bottom of the excavation were defined
(2) Gamma activity along the excavation sidewalls was mapped
(3) The profile of the gamma activity along the top surface of the 12-in. water line was mapped
(4) Biased and composite soil samples were obtained from the excavation area

After confirmation that the only residual activity greater than 12,000 cpm was associated with materials either around the water line or beneath the concrete slabs, the excavation was backfilled with clean soil. The restored area was then characterized as follows:

(1) Gamma readings with the 2"×2" NaI detector
(2) Gamma dose rate measurements taken at the same locations as the measurements taken before backfill

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Calculation Sheet

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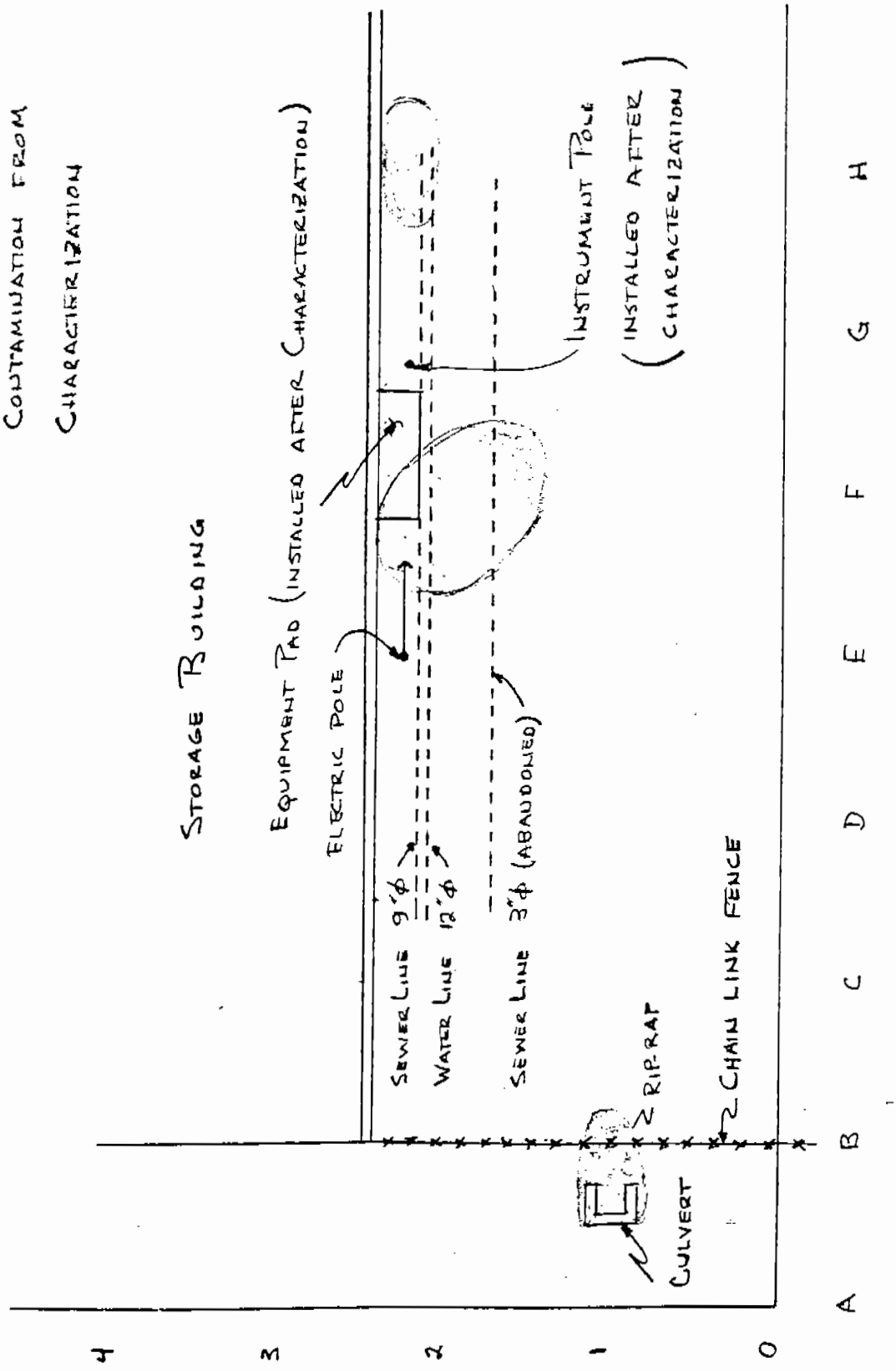
Subject PSC- 15 Sheet No. 1 - 3



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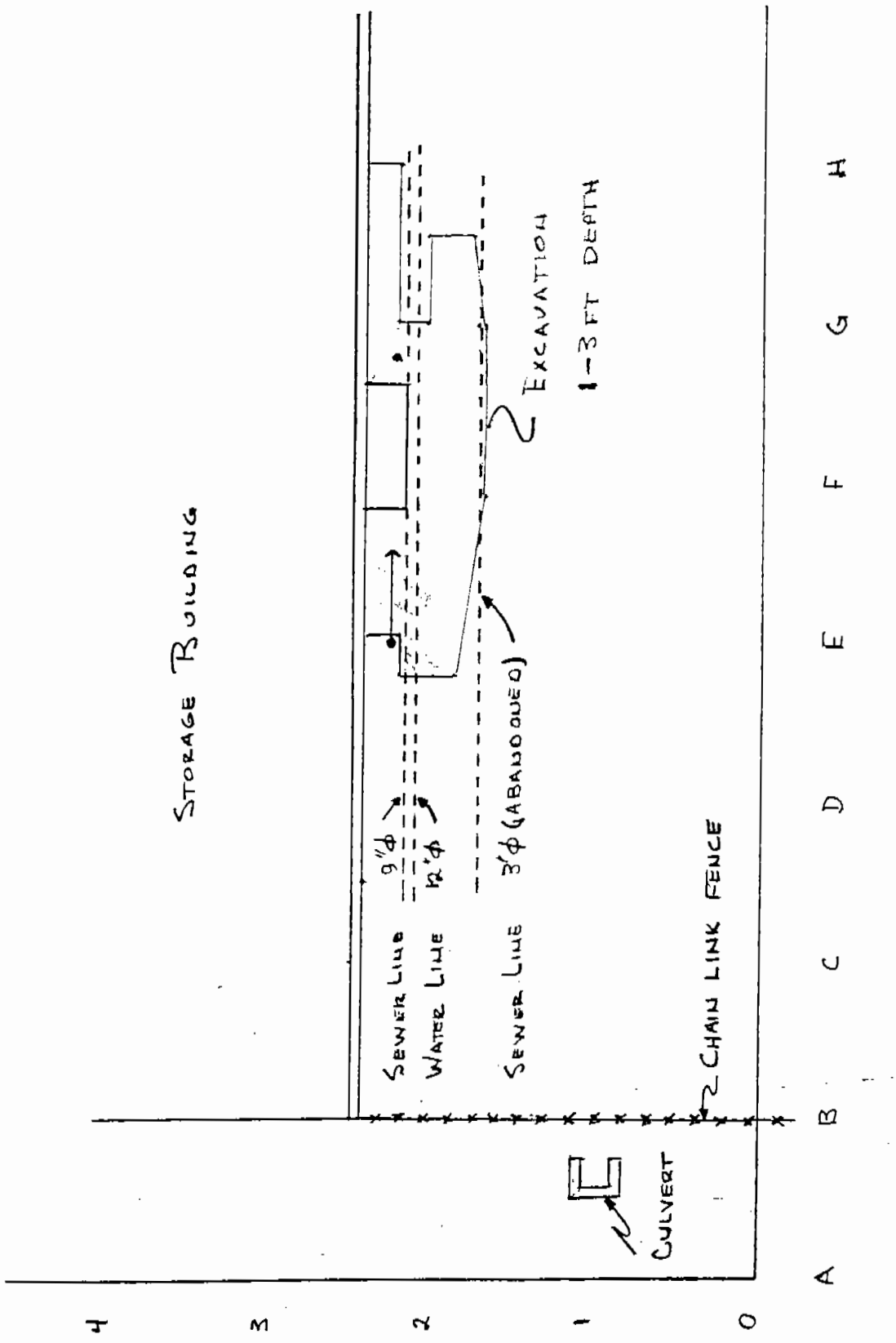


3.1 GAMMA MEASUREMENTS

At the completion of the soil removal activities, the excavation was completely surveyed for gamma activity using the 2"×2" NaI detector. The bottom of the excavation was mapped to show locations of redisual activity above the twice background guideline used for the excavation. The results of this mapping are shown on Figure 3-1. The area around the two pipes contained elevated contamination twice background. One small area between the two pipes measured greater than 20,000 cpm, with a maximum reading of 26,500 cpm. A single isolated hot spot slightly above the guideline was left on the east edge of the excavation.

The exposed top surface of the 12-in. water line was measured with the 2"×2" NaI detector. The range of readings was noted for each section of exposed pipe surface between connecting joints. This profile is shown on Figure 3-2. Note that along the exposed surface of the pipe itself, the maximum reading is barely above the twice background criteria.

Next, each of the excavation sidewalls was measured, using the 2"×2" NaI detector. The east, south, and west faces were surveyed in sections with the minimum and maximum readings noted. This is shown on Figure 3-3. This figure also shows the minimum and maximum readings along the north excavation face beneath the concrete slabs. The actual measurements were taken as 1-minute stationary counts along 1 m intervals. These results are included in Appendix A. Elevated activity remains beneath the equipment pad and the building curb to the west of the pad. This is consistent with the characterization (Ref. 1) results that showed the equipment pad placed over part of the suspected area of contamination. Composite and biased sample results along this excavation face are discussed in Section 3.2.

3.2 SAMPLE ANALYSIS

Before excavation on the site, a sample of the gravel fill around the ditch culvert was taken for isotopic analysis to determine if the elevated gamma activity noted in this area during characterization is the result of natural radioisotopic content or residue from the base instrumentation maintenance operations.

During the excavation, two additional biased soil samples were obtained for analysis. These samples were taken to verify the radiological content of media that appeared different from the basic soil composition and indicated higher radiological content based on gross gamma readings obtained with the 2"×2" NaI detector. The two media were analyzed using gamma spectroscopy. The laboratory analysis results of these media samples are included in Appendix C. The results of these analyses area as follows:

Medium	Location	Sample ID	Ra-226 (pCi/g)	Th-232 (pCi/g)	K-40 (pCi/g)	Cs-137 (pCi/g)
Gravel	15-1A	JX00747	1.2 ± 0.19	1.9 ± 0.24	39.8 ± 4.3	ND
Red clay	15-2A	JX00763	96.2 ± 11.4	0.87 ± 0.24	1.9 ± 1.4	ND
Gray sand	15-3	JX00766	0.50 ± 0.11	0.72 ± 0.10	2.4 ± 0.54	ND

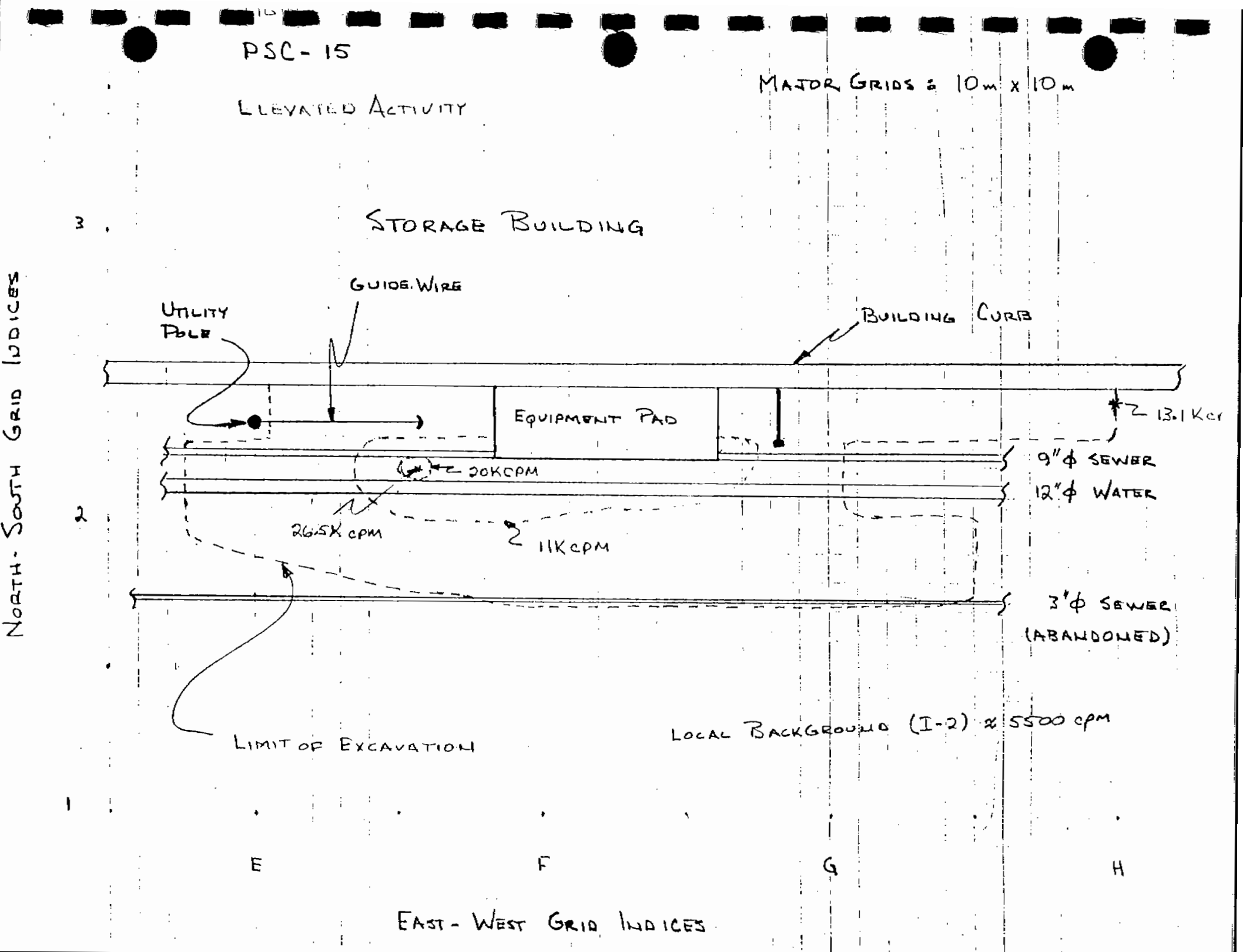
ND = Not detected

At the completion of the excavation, several areas were left with elevated activity above the twice background guideline used to direct the excavation. These included a hot spot at the east excavation face, activity directly beneath the concrete equipment pad, and activity between the 9-in. sewer line the the 12-in. water line. These three areas were sampled to confirm the isotopic levels that would be left and covered with backfill. The gamma spectroscopy are included in Appendix C. The locations of the biased samples are shown on Figure 3-4. The results of these sample analyses are summarized in Table 3-1.

PSC-15

MAJOR GRIDS = 10m x 10m

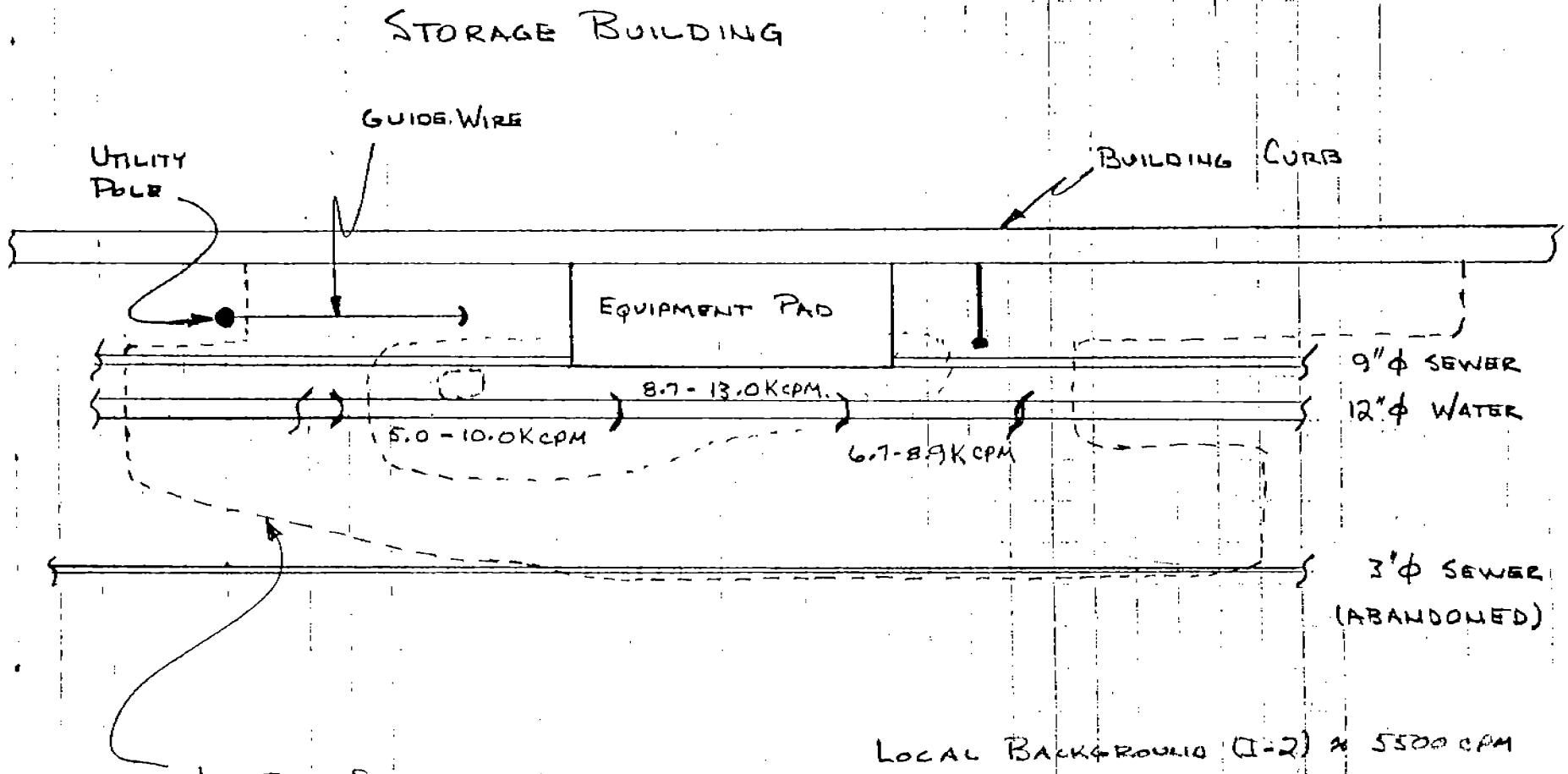
ELEVATED ACTIVITY



PSC-15

MAJOR GRIDS = 10m x 10m

GAMMA PROFILE ALONG
EXPOSED 12"ϕ WATER LINE (TOP OF PIPE)



NORTH-SOUTH GRID INDICES

3
2
1

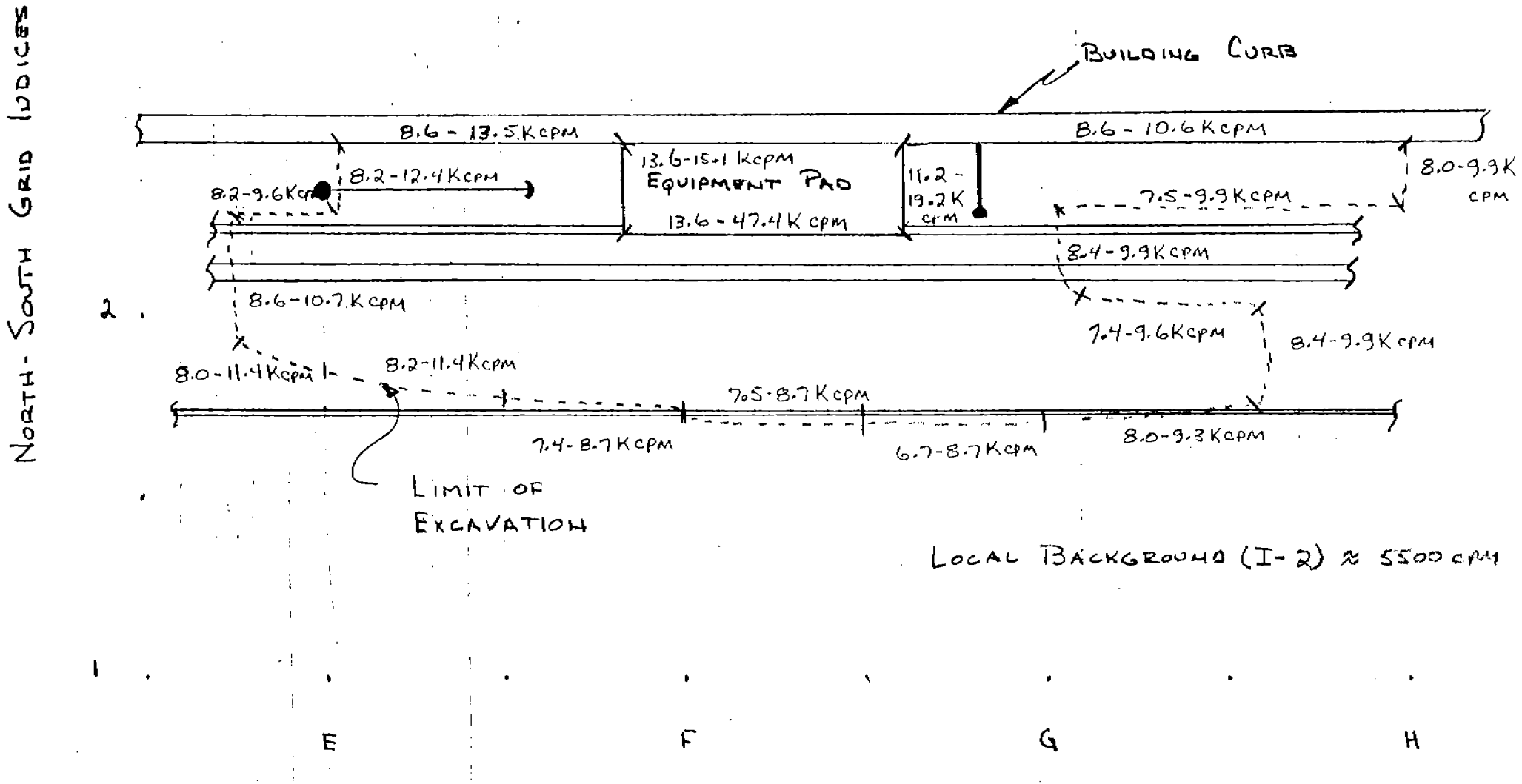
E F G H

EAST-WEST GRID INDICES

PSC-15

MAJOR GRIDS = 10m x 10m

EXCAVATION SIDEWALL MEASUREMENTS

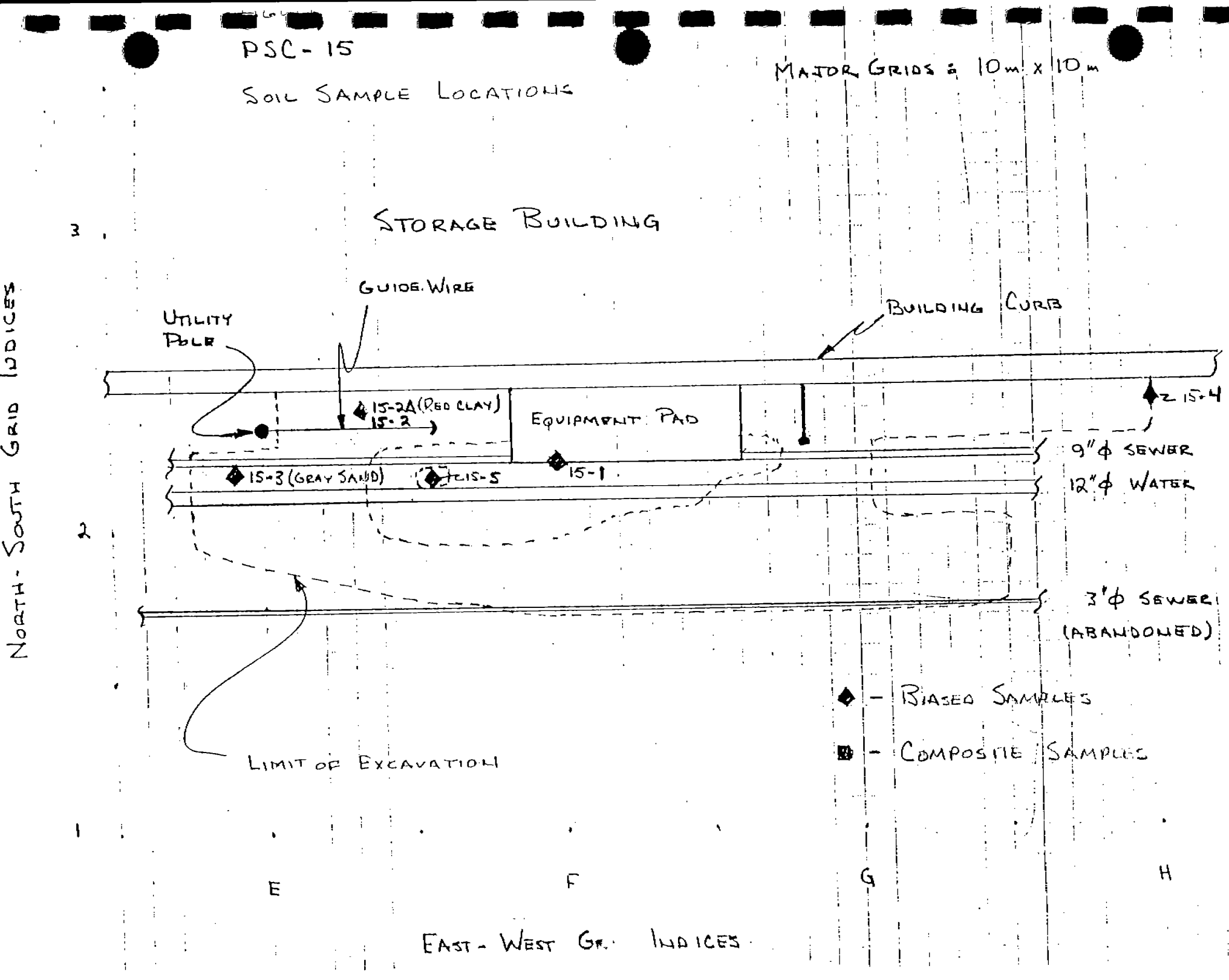


LOCAL BACKGROUND (I-2) ≈ 5500 CPM

PSC-15

SOIL SAMPLE LOCATIONS

MAJOR GRIDS = 10m x 10m



Composite samples were taken of the excavation sidewalls and bottom. Sub-areas were defined as shown on Figure 3-5 and a composite sample obtained for each. This composite consisted of taking five "plugs" randomly within each sub-area and blending them to make up the sample. If differing media appeared to be present in a specific sub-area, attempts to obtain a "plug" from each media type were made. The soil sample radiological analysis results from the laboratory are included in Appendix C. A summary of the primary isotopes of interest is provided in Table 3-1.

3.3 DOSE RATE MEASUREMENTS

At the completion of the excavation, a series of gamma dose rate measurements were made using the Reuter-Stokes pressurized ion chamber (PIC). This is an accurate detector for measuring background level gamma dose rates. Measurements are taken with the detector chamber 1 m above the surface. This provides an average dose rate over an effective area of approximately 10 m^2 (34 ft^2). This type of measurement provides a more reasonable estimate of a potential radiological risk, as it averages the effects of isolated hot spots. The results of this measurement is presented on Figure 3-6. The highest readings occur along the 12-in. water line. The highest reading is $D\gamma \approx 9.9$ μR/h. This is an increase over local background of

$\Delta D\gamma \approx 3.0$ μR/h

$\Delta D\gamma \approx 26$ mrem/yr above background

3.4 HOT SPOT ANALYSIS

At the completion of the excavation, several localized areas of elevated activity remained. These areas were above the excavation criteria of 12,000 cpm, using a 2"×2" NaI detector. Due to location and/or size in relationship to surrounding base structures, it was agreed that further excavation attempts would introduce potential risks of damage to those structures. A total of six elevated activity locations will be left, as shown on Figure 3-7. Additional characterization was performed to quantify the activity levels to be left.

Area 1

This is the gravel material that was used as rip-rap around the ditch culvert on the west side of the PSC.

	Background	Hot Spot	Increase
Original Characterization (Ref. 1)			
2"×2" NaI detector	3,500 cpm	11,800 cpm	8,300 cpm
Dose rate (PIC)	6.7 μR/h	15 μR/h	8.3 μR/h
December 1997			
2"×2" NaI detector*	6,300 cpm	14,500 cpm	8,200 cpm
Sample Analysis (Gravel)			
Ra-226	0.64 pCi/g	1.2 pCi/g	0.56 pCi/g
Th-232	0.72 pCi/g	1.9 pCi/g	1.2 pCi/g
K-40	3.34 pCi/g	39.8 pCi/g	36.5 pCi/g
Cs-137	0.15 pCi/g	ND	--

ND = Not detected

* Different detector from one used during characterization.

PSC-15

Soil Sample Locations

Major Grids = 10m x 10m

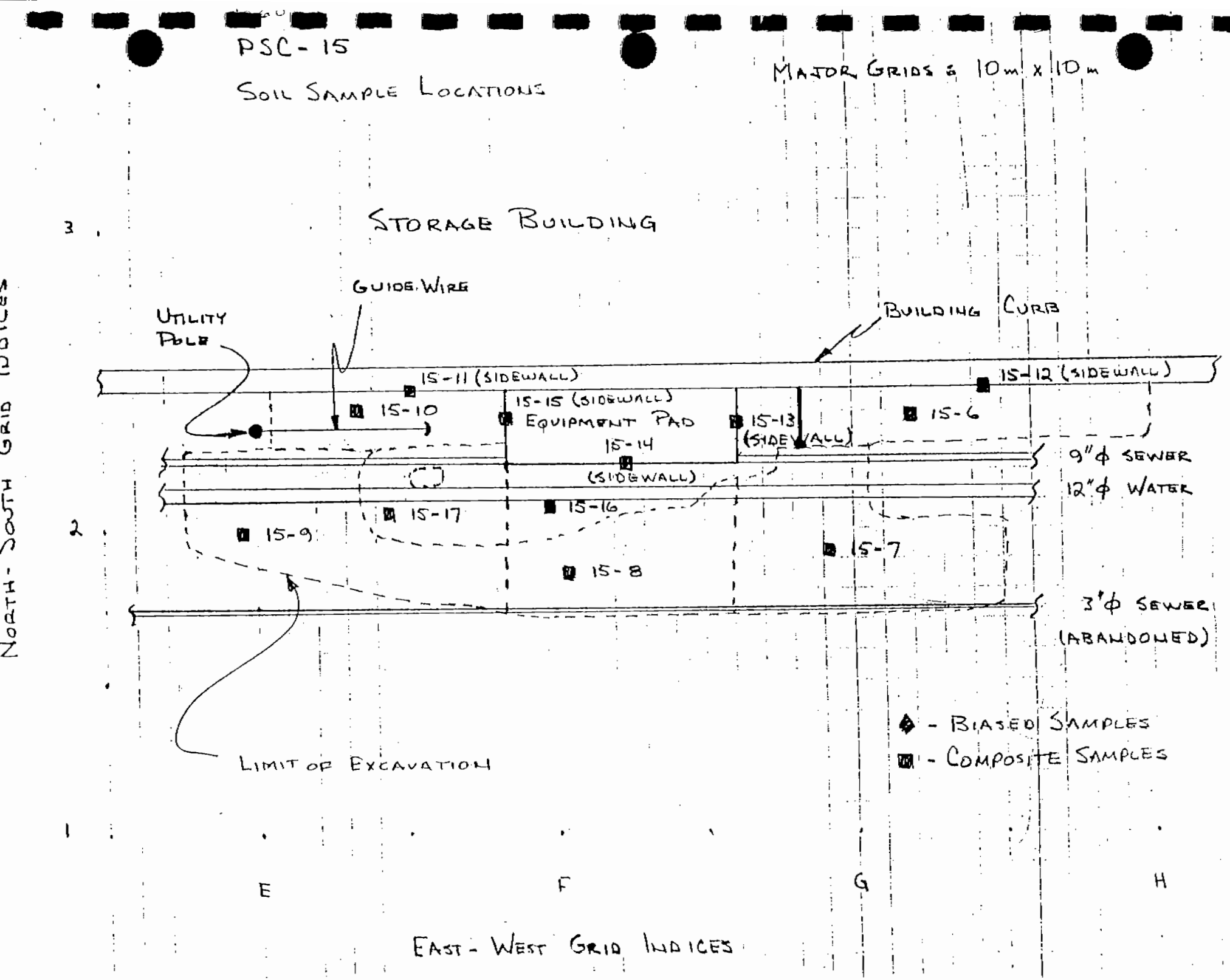


Table 3-1
Soil Sample Isotopic Content

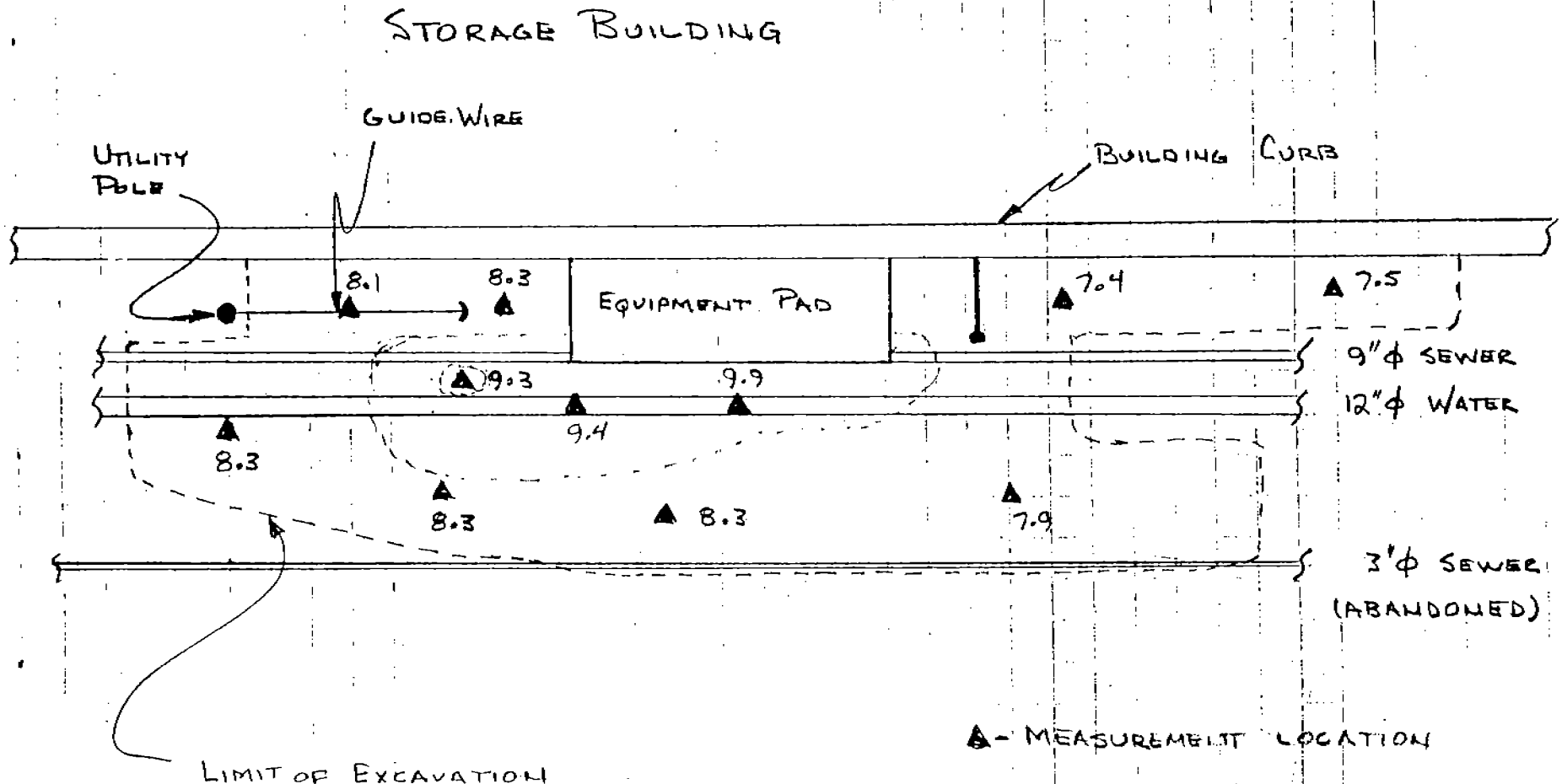
Sample ID	Sample Type	Ra-226 (pCi/g)	Th-232 (pCi/g)	K-40 (pCi/g)	Cs-137 (pCi/g)
JX00764 15-1	Hot spot	20.2 ± 2.53	0.83 ± 0.12	2.8 + 0.77	0.04 ± 0.03
JX00767 15-4	Hot spot	6.4 ± 0.80	0.71 ± 0.13	2.9 ± 0.78	0.04 ± 0.06
JX00768 15-5	Hot spot	67.9 ± 7.70	0.98 ± 0.20	3.3 ± 1.49	ND
JX00769 15-6	Composite (bottom)	1.3 ± 0.18	0.72 ± 0.09	2.9 ± 0.48	ND
JX00770 15.7	Composite (bottom)	1.0 ± 0.17	0.87 ± 0.12	3.0 ± 0.59	ND
JX00771 15-8	Composite (bottom)	1.9 ± 0.25	0.87 ± 0.13	2.9 ± 0.52	0.04 ± 0.03
JX00772 15-9	Composite (bottom)	2.0 ± 0.26	0.79 ± 0.11	2.6 ± 0.62	0.03 ± 0.02
JX00773 15-10	Composite (bottom)	2.3 ± 0.30	0.89 ± 0.14	2.5 ± 0.68	0.02 ± 0.02
JX00774 15-11	Composite (sidewall)	2.4 ± 0.33	0.73 ± 0.11	3.1 ± 0.60	0.04 ± 0.03
JX00775 15-12	Composite (sidewall)	1.9 ± 0.25	0.54 ± 0.07	2.2 ± 0.37	0.84 ± 0.02
JX00776 15-13	Composite (sidewall)	13.0 ± 1.51	0.82 ± 0.12	2.7 ± 0.72	ND
JX00777 15-14	Composite (sidewall)	12.3 ± 1.43	0.94 ± 0.14	2.8 ± 0.63	0.04 ± 0.04
JX00778 15-15	Composite (sidewall)	4.2 ± 0.54	0.70 ± 0.09	2.6 ± 0.45	0.05 ± 0.02
JX00779 15-16	Composite (bottom)	4.8 ± 0.56	0.82 ± 0.11	2.2 ± 0.61	0.03 ± 0.02
JX00780 15-17	Composite (bottom)	4.6 ± 0.58	0.90 ± 0.11	3.0 ± 0.52	0.03 ± 0.02
JX00781 15-18	Duplicate of 15-8	1.9 ± 0.24	0.87 ± 0.10	3.1 ± 0.48	0.03 ± 0.01

ND = Not detected

PSC-15

MAJOR GRIDS = 10m x 10m

GAMMA DOSE RATE - μR/HR



LOCAL BACKGROUND = 6.5 - 7.0 μR/HR

NORTH - SOUTH GRID INDICES

3

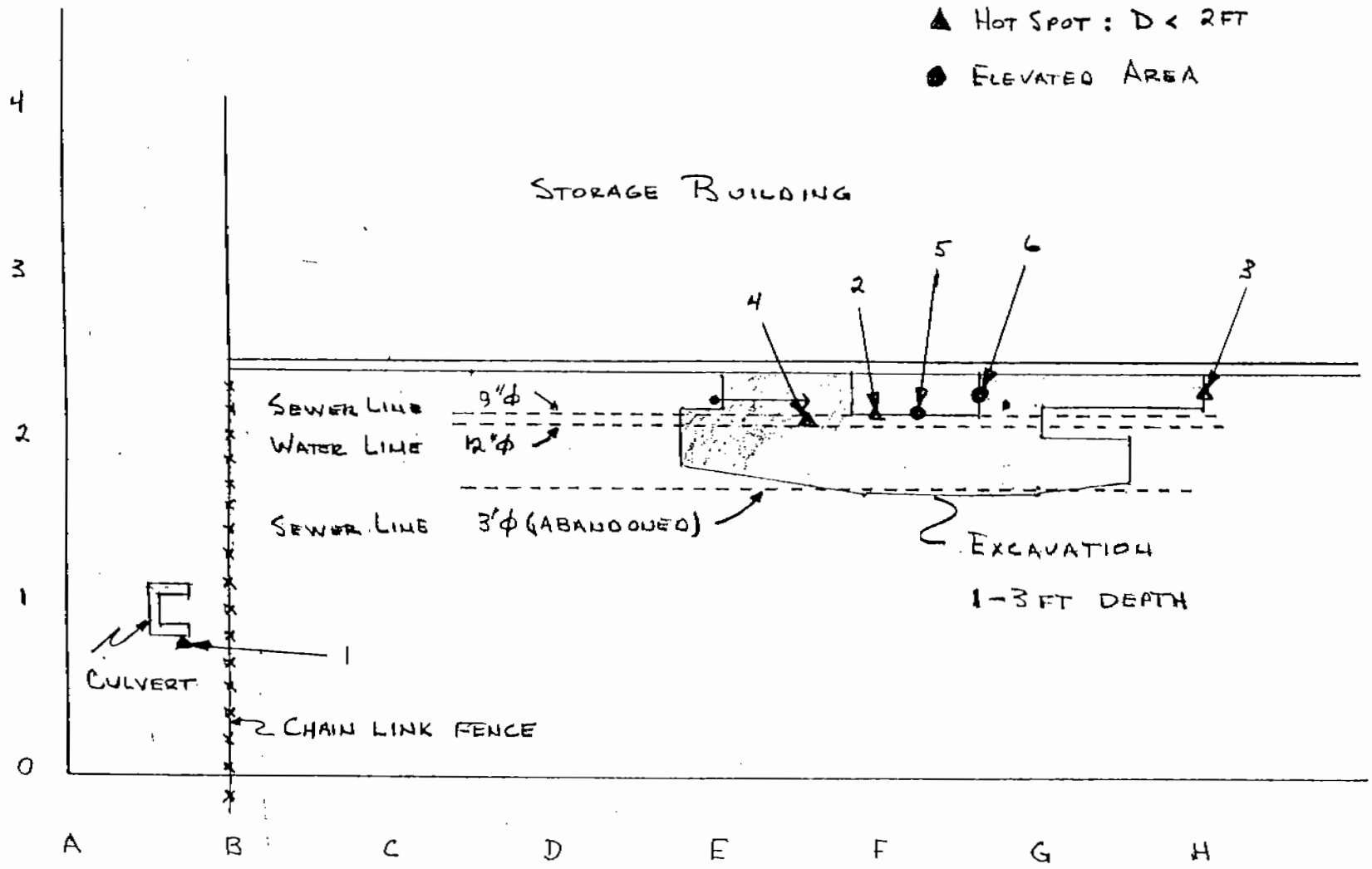
2

1

E F G H

EAST - WEST GRID INDICES

FIGURE 3-7 POST EXCAVATION ELEVATED ACTIVITY, PSC-15



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Subject PSC-15 Sheet No. 3-7

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The detector response to the change in isotopic concentration may be determined from the following conversion factors:

Isotope	$\bar{E}\gamma$ (MeV)	$K\gamma$ (μR/h/pCi/g) (Ref 3)	$\Delta D\gamma$ (μR/h)
Ra-226	0.876	1.186	0.66
Th-232	0.914	2.839	3.41
K-40	1.46	0.119	4.34
Cs-137	0.662	0.412	--

Increase - Theoretical $D\gamma = 8.41$ μR/h

Increase - Measured $D\gamma = 8.3$ μR/h

It can be concluded that the "hot spot" activity in this area results from the elevated natural K-40 and thorium content of the gravel and is not a result of the NAS Jacksonville activities that involved radium paint.

Area 2

This is the location of the highest activity measured with a 2"×2" NaI detector along the excavation sidewall beneath the concrete equipment pad. The elevated activity along this sidewall is located within a 1/2–1 in. black layer of material approximately 18-in. below the slab. The radiation levels from this "hot spot" were as follows:

	Background	Hot Spot	Increase
2"×2" NaI Detector	6,300 cpm	33,300 cpm	27,000 cpm
Sample Analysis			
Ra-226	0.64 pCi/g	20.2 pCi/g	19.6 pCi/g
Th-232	0.72 pCi/g	0.83 pCi/g	0.11 pCi/g
K-40	3.34 pCi/g	2.8 pCi/g	-0.5 pCi/g
Cs 137	0.15 pCi/g	0.04 pCi/g	-0.1 pCi/g

No direct dose rate was measured adjacent to this hot spot; however, dose rates measured in the general area (Figure 3-6) indicate elevated readings of 2.0–2.5 μR/h (17.5–22 mrem/yr) above background. Most of this increase is likely from elevated activity along the bottom of the excavation between the two water lines (illustrated on Figure 3-2).

Area 3

This is a small (< 2-in. diameter) hot spot on the east excavation face, approximately 1 ft below the surface, adjacent to the Storage Building concrete curb. A biased soil sample was obtained to determine isotopic

composition. The hot spot was defined using the 2"×2" NaI detector, with the results shown on Figure 3-1. The analysis of this hot spot results in

	Background	Hot Spot	Increase
2"×2" NaI Detector	6,300 cpm	13,100 cpm	6,800 cpm
Sample Analysis			
Ra-226	0.64 pCi/g	6.4 pCi/g	5.56 pCi/g
Th-232	0.72 pCi/g	0.72 pCi/g	--
K-40	3.34 pCi/g	2.90 pCi/g	-0.44 pCi/g
Cs 137	0.15 pCi/g	0.04 pCi/g	-0.10 pCi/g

The radium concentration is marginally above the cleanup criteria of 5 pCi/g used for this program. However, this elevated activity has essentially no impact on the general area dose rate shown on Figure 3-6. Based on the small size, relative activity, dose rate impact, and subsurface location, it was determined that further excavation was not cost effective.

Area 4

This hot spot is located between the two water lines along the bottom of the excavation (3 ft below ground level). The hot spot area was approximately 3 ft in the north-south direction and approximately 2-1/2 ft in the east-west direction. The maximum gamma reading was taken using a 2"×2" NaI detector. A dose rate measurement using the PIC was made directly above this hot spot. The results of the measurements is as follows:

	Background	Hot Spot	Increase
2"×2" NaI detector	6,300 cpm	26,500 cpm	20,200 cpm
Dose rate (PIC)	6.7 μR/h	9.3 μR/h	2.6 μR/h
Sample Analysis			
Ra-226	0.64 pCi/g	67.9 pCi/g	67.3 pCi/g
Th-232	0.72 pCi/g	0.98 pCi/g	0.26 pCi/g
K-40	3.34 pCi/g	3.3 pCi/g	--
Cs-137	0.15 pCi/g	ND	--

ND = Not detected

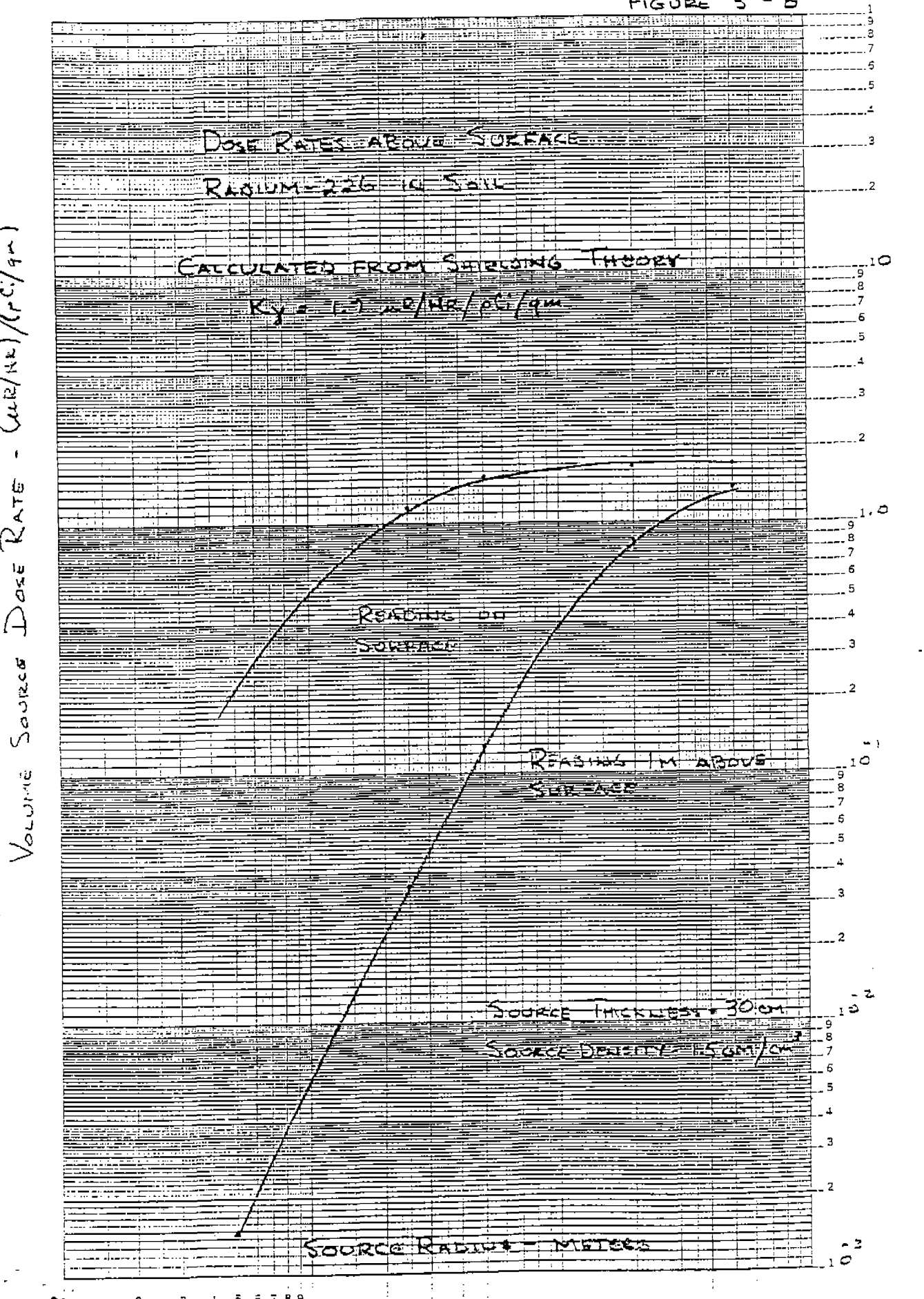
For a hot spot with radius of approximately 0.3 m, the dose rate conversion factor 1 m above the surface will be

$K\gamma = 5\times10^{-2}$ μR/h/pCi/g (Figure 3-8)

$$\Delta D\gamma = (67.3)\text{pCi/g}\ (5\times10^{-2})\ \frac{\mu R/h}{pCi/g} = 3.4\ \mu\text{R/h}$$

This is in excellent agreement with the measured change of 2.6 μR/h given that the hot spot depth is not likely equal to the 30 cm thickness used for the figure.

FIGURE 3 - B


DOSE RATES ABOVE SURFACE
RADIUM-226 IN SOIL
CALCULATED FROM SHIELDING THEORY
Ky = 1.3 mR/HR/pCi/gm
READING ON SURFACE
READING 1M ABOVE SURFACE
SOURCE THICKNESS = 30 cm
SOURCE DENSITY = 1.5 gm/cm³
SOURCE RADIUS - METERS
VOLUME SOURCE DOSE RATE - (UR/HR)/(pCi/gm)

Area 5

This area is the elevated region along the north excavation face beneath the concrete equipment pad. The elevated region consisted of a blackened material approximately 18 in. below the bottom of the pad—a layer ranging from approximately 1/2 in. to no more than 2 in. thick. Gamma measurements were made using the 2"×2" NaI detector to obtain an activity profile along this layer. This is shown on Figure 3-3. The 1-minute scalar counts, taken at 1 m intervals along this face, are included in Appendix A as survey points 12 through 20. A composite sample of this layer was obtained for isotopic analysis. The results of this analysis are as follows:

	Background (pCi/g)	Hot Spot (pCi/g)	Increase (pCi/g)
Sample Analysis			
Ra-226	0.64	12.3	11.7
Th-232	0.72	0.94	0.22
K-40	3.34	2.8	-0.5
Cs 137	0.15	0.04	-0.10

Although this material is higher in radium-226 concentration than the guideline of 5 pCi/g used for the project, it was agreed that no excavation to remove this material beneath the concrete structure would be performed. If this layer is exposed at some later date, the maximum dose rate that would result would be for an infinite slab:

$$K\gamma = (1.7)\ \frac{mR/h}{pCi/g}\ (11.7)\ \ \frac{pCi}{g}\ \text{(Fig. 3-8)}$$

= 20 μR/h (0.02 mR/h)

= 175 mrem/yr above surrounding background

This is a factor of 100 below the radiation level of 2.0 mR/h that is the lower limit requiring radiological controls.

Area 6

This area is the elevated region along the east excavation face of the concrete equipment pad. This elevated region is an extension of the layer described as Area 5. The gamma profile along this face is shown on Figure 3-3. The 1-minute scalar counts taken along 1 m intervals are included in Appendix A as survey points 20 through 23. A composite sample of the layer along this face was obtained for isotopic analysis. The results of this analysis are as follows:

	Background (pCi/g)	Hot Spot (pCi/g)	Increase (pCi/g)
Sample Analysis			
Ra-226	0.64	13.0	12.4
Th-232	0.72	0.82	0.10
K-40	3.34	2.7	-0.6
Cs 137	0.15	ND	--

ND = Not detected

This activity is consistent with results for Area 5, as would be expected. The dose consequence for exposing this material at a future date is the same as the discussion for Area 5.

3.5 POST-EXCAVATION RADIOLOGICAL MEASUREMENTS

After backfilling, the excavation area was resurveyed to determine the levels of gamma radiation from the residual activity remaining. Figure 3-9 shows the range of response of the 2"×2" NaI detector. This shows that radiation levels over the backfilling are well below twice background. Dose rate measurements were made with the PIC located at the same points above the backfill as similar measurements that were taken within the excavation before the backfilling (Figure 3-6). The post-backfill dose rates are shown on Figure 3-10. The highest dose rate (7.6 μR/h) is just slightly higher then local background. Using the background average of 6.7 μR/h, the greatest incremental increase is

$$\Delta D\gamma \approx 0.9\ \mu R/h$$

$$\Delta D\gamma \approx 8\ mrem/yr$$

The effects of the backfill as shielding are shown on Table 3-2, which is a pre- and post- excavation comparison of the dose rates. As one would expect, the greatest reduction occurs for shielding the localized hot spots are Locations 3, 4, and 5.

Table 3-2
Shielding Effects of Backfill

Location	Pre-Backfill (μR/h) (Fig. 3-6)	Post-Backfill (μR/H) (Fig. 3-10)	Backfill Depth (ft)	Reduction (μR/h)
1	8.1 (near wall)	7.2	~3	0.9
2	8.3 (near wall)	7.2	~3	1.1
3	9.3 (hot spot)	7.5	~3	1.8
4	9.4 (pipe)	7.6	~3	1.8
5	9.9 (pipe)	7.6	~3	2.3
6	8.3	7.4	2	0.9
7	8.3	7.4	2	0.9
8	8.3	7.5	2	0.8
9	7.9	7.6	1	0.3
10	7.4	7.4	1	0.0
11	7.5	7.4	1	0.1

Hot spots at Locations 3, 4, and 5.

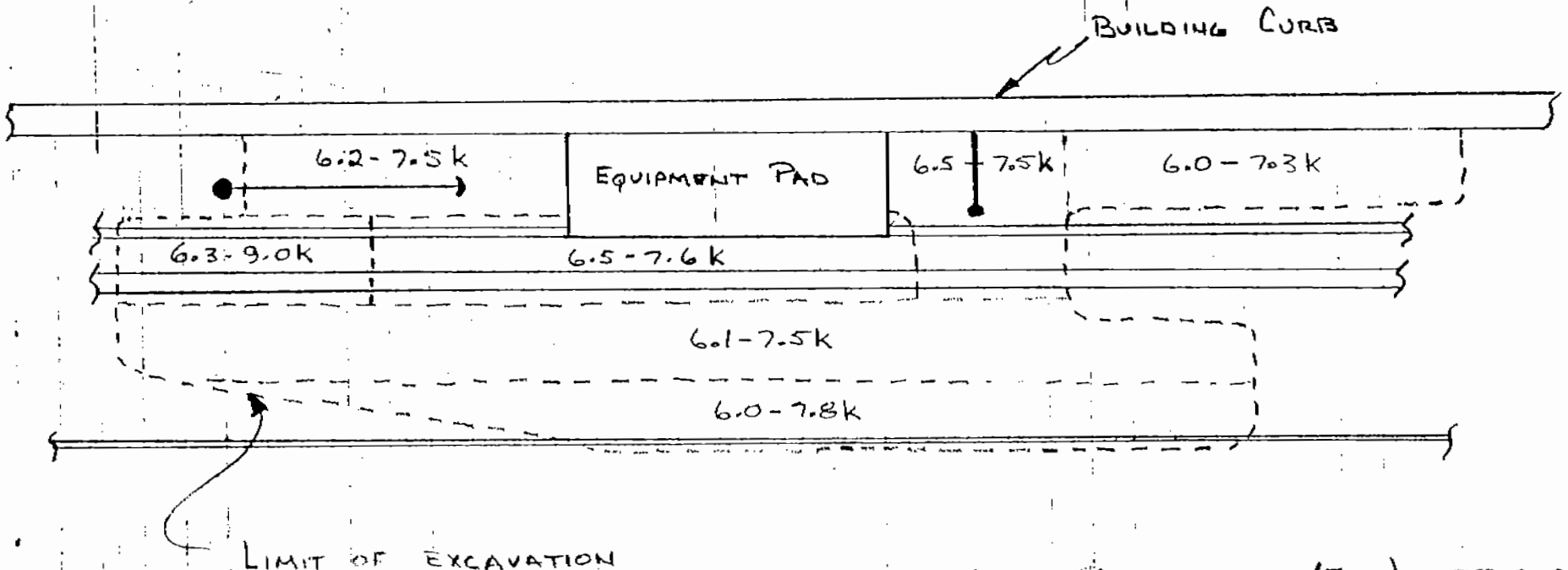
PSC-15

MAJOR GRIDS = 10m x 10m

POST BACKFILL GAMMA MEASUREMENTS

2" x 2" NaI DETECTOR - kCPM

STORAGE BUILDING



LIMIT OF EXCAVATION

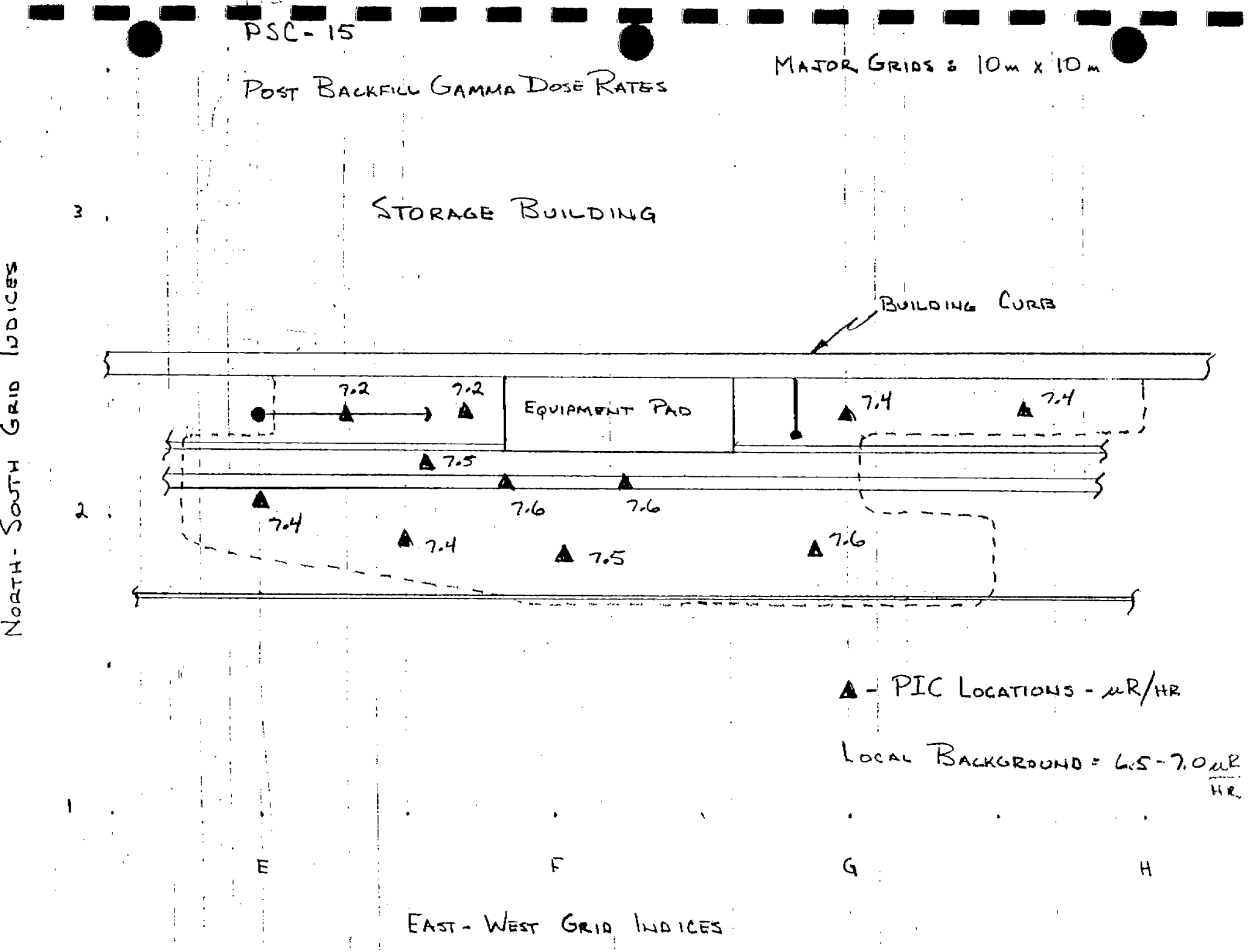
LOCAL BACKGROUND (I-2) ≈ 5500 cpm

EAST - WEST GRID INDICES

PSC-15

Post Backfill Gamma Dose Rates

Major Grids = 10m x 10m



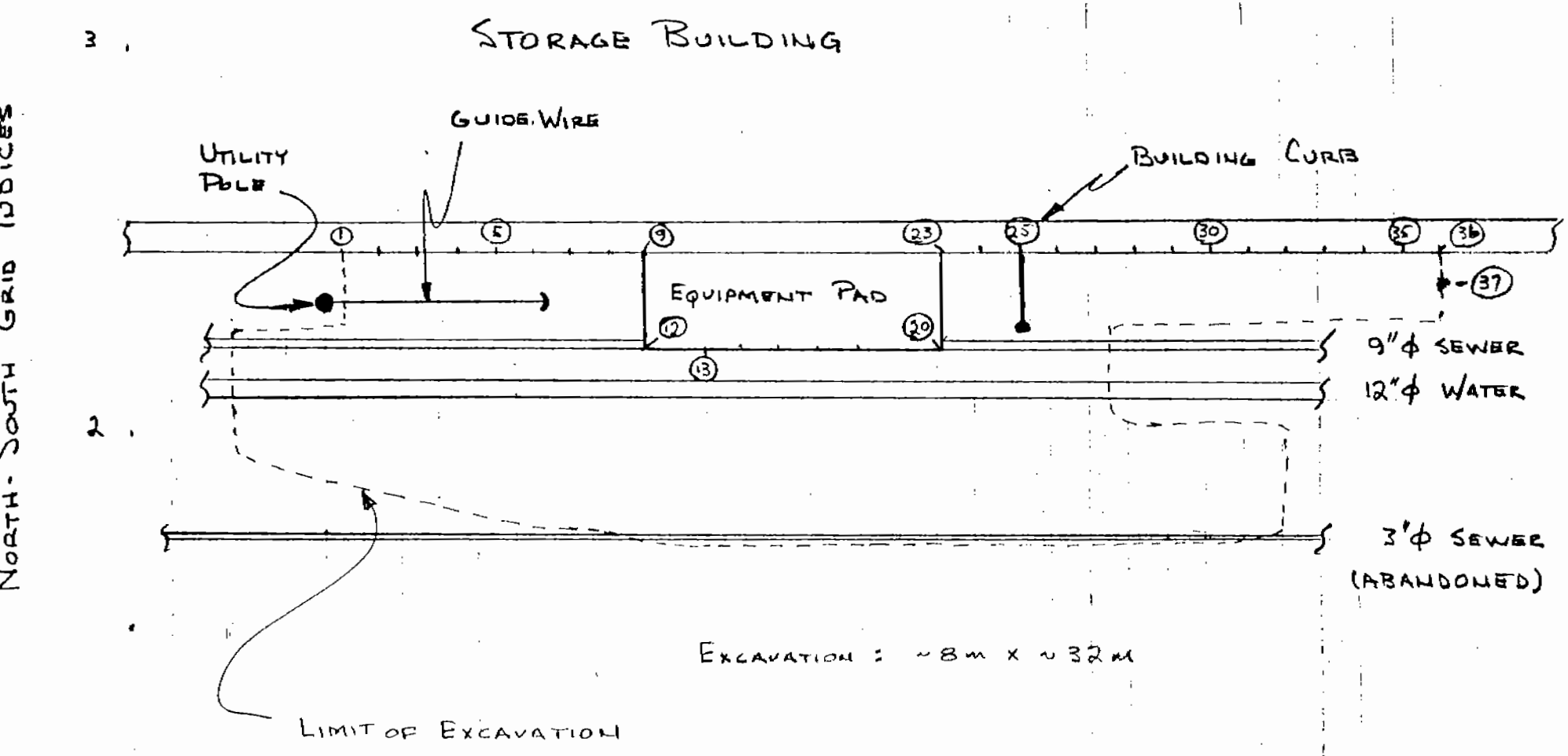
▲ - PIC Locations - μR/HR

Local Background = 6.5 - 7.0 μR/HR

PSC-15

MAJOR GRIDS = 10m x 10m

GAMMA SURVEY BELOW EDGE OF CONCRETE



PSC-15 | CONCRETE PADS | DEC 1, 1997

LOCATION	2"x2" NaI	SERIAL No. 386	
1	13517	E-W CURB	BKGD = 5356 cpm
2	8664		(I-2)
3	8883		
4	8373		
5	9658		
6	10831		
7	10431		
8	10275		
9	14202	CORNER	
10	15173	N-S CURB	
11	13832		ADDITIONAL EXCAVATION 12-2-97
12	13571	CORNER	13846
13	47370	F-205	37342
14	31273	E-W CURB	22196
15	24384		14915
16	16499		18211
17	21737		13432
18	17909		11278
19	22132	18" FROM CORNER	13093
20	22322	CORNER	15585
21	12869	N-S CURB	
22	19702		
23			

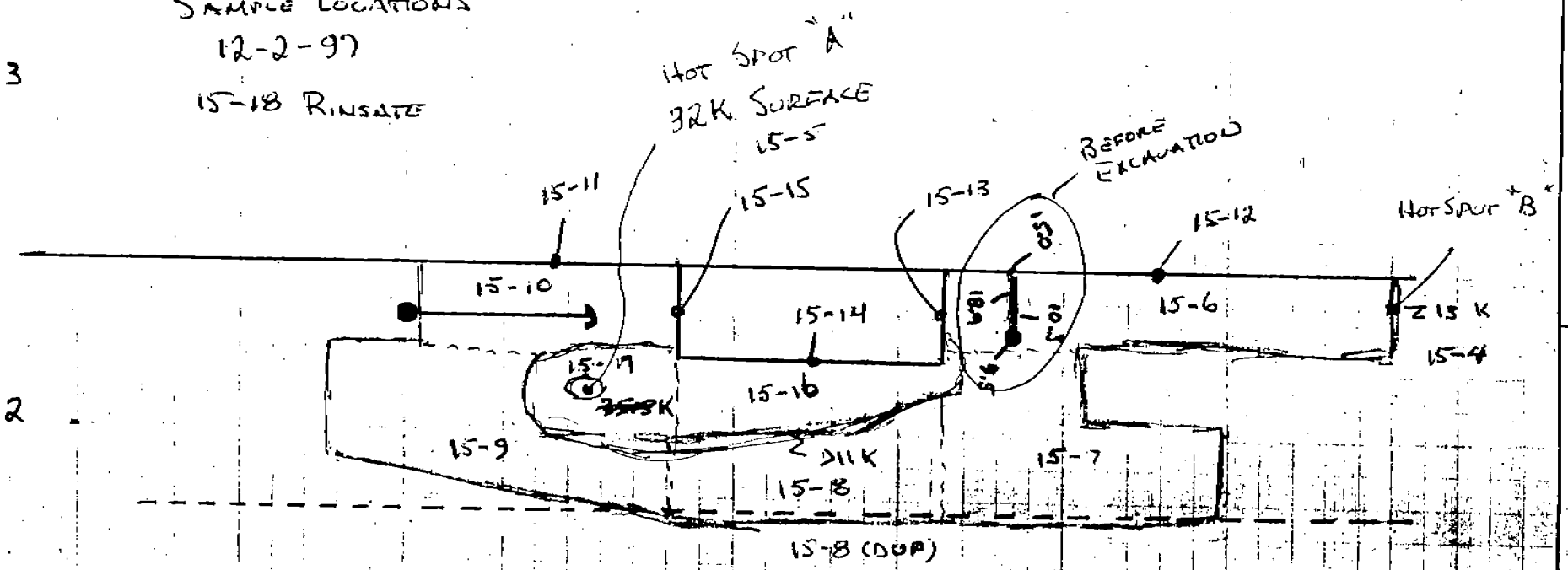
PSC-15 | | Dec 2, 1997

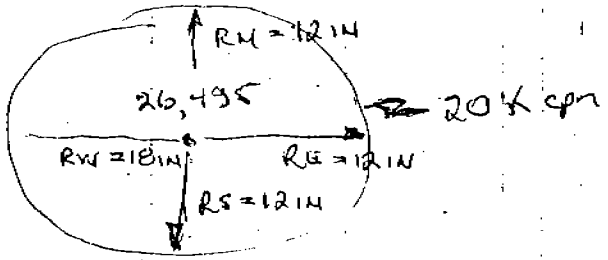
Location	2"x2" NaI	Serial No 386	
			BKGD (I-2) 5467 cpm
20	19012	N-S Curb Corner	
21	11230		
22	19198		
23	14356	Corner	
24	10582	E-W Curb	
25	15027 (Before Excavation)	Conduit	10354 After Excavation
26	10489	E-W Curb	
27	9365		
28	9643		
29	9298		
30	9011		
31	9300		
32	8613		
33	9036		
34	9565		
35	9634		
36	10403	End of Excavation	
37	13118	Hot Spot on Excavation 18 in from wall, ~12 in deep	

Sample Locations

12-2-97

15-18 Rinsate





Hot Spot "A"

D E F G H

Pressurized Ionization Chamber Readings

Location	Start Time	END Time	INtegen	AVerage	mAximum	minimum	STND DeVo
I 2 (BKg)	08:22	08:40	2.2 μr	7.1 μr/hr	8.6 μr/hr	6.1 μr/hr	0.4
1	08:43	09:01	2.4 μr	8.2 μr/hr	10.0 μr/hr	7.0 μr/hr	0.4
2	09:03	09:21	2.6 μr	8.8 μr/hr	10.0 μr/hr	7.7 μr/hr	0.4
3	09:23	09:41	3.0 μr	9.3 μr/hr	11.2 μr/hr	8.2 μr/hr	0.5
4	10:05	10:23	3.1 μr	10.3 μr/hr	11.5 μr/hr	9.3 μr/hr	0.4
5	09:46	10:04	2.5 μr	8.4 μr/hr	10.0 μr/hr	7.2 μr/hr	0.4

SAMPLE		
15 - 2	10401 cpm	RED CLAY
15 - 3	10065 cpm	GRAY SAND
15 - 1	33302 CPM	R - 2.5
15 - 4	13893	Hot Spot "B"
15 - 5	26495	Hot Spot "A"

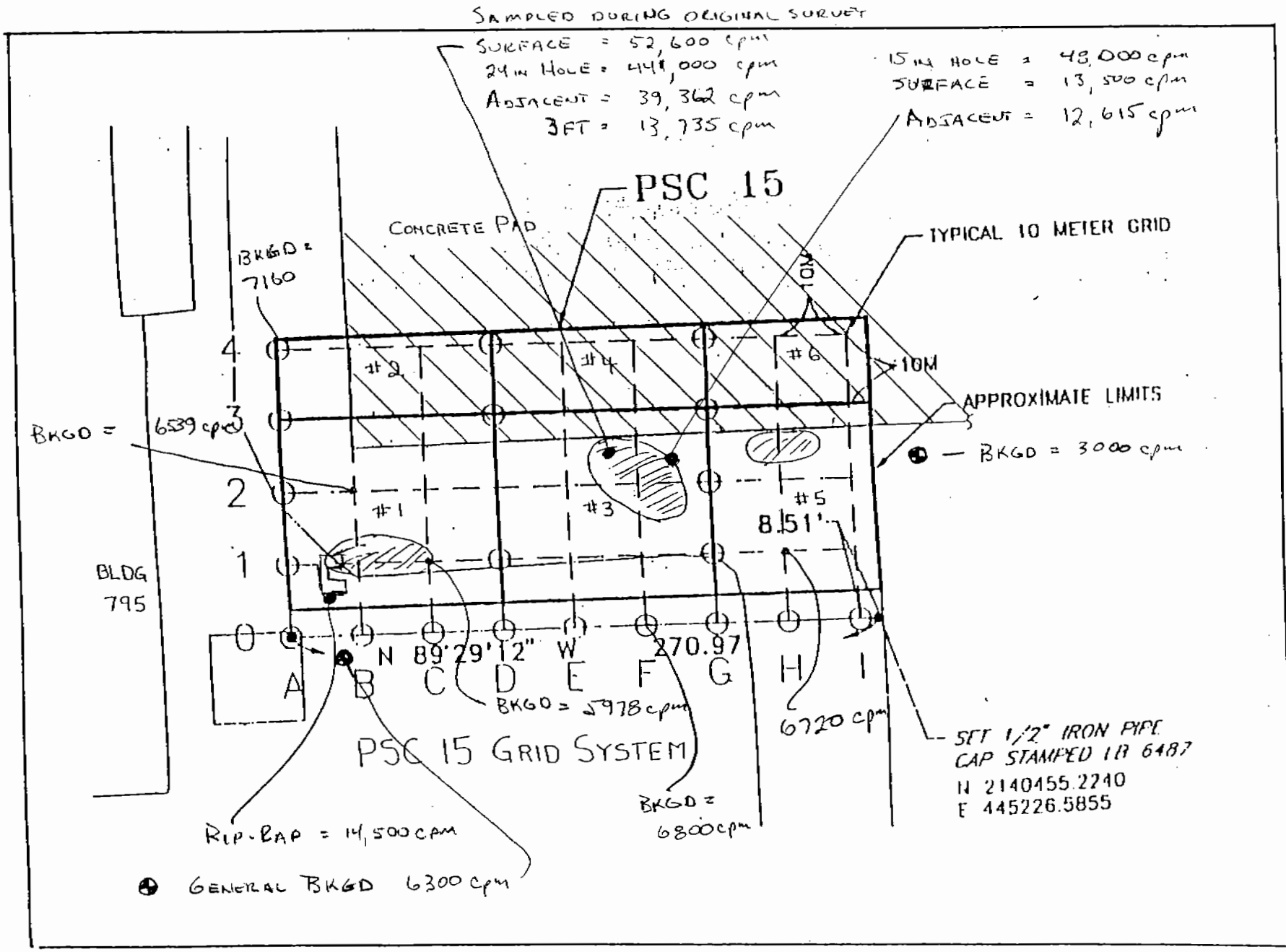


Figure 6-1 PSC 15 Potential Contaminated Areas of Concern

DIANE LANCASTER
542-2717 X119
12-1-97 2/2

22567 - 608 - 13995 PSC-9
22567 - 609 - 23995 PSC-15

APPENDIX B

DOSE RATE MEASUREMENTS

Location	Start Time	END Time	INtegar	Aver	max	min	STD Dev
1	0810	0828	2.2	7.5	9.1	6.5	0.4
2	0829	0847	2.2	7.4	9.2	6.3	0.4
3	0848	0906	2.3	7.9	9.8	6.7	0.5
4	0908	0926	2.5	8.3	10.0	7.3	0.4
5	0927	0945	3.0	9.9	11.7	8.6	0.5
6	0946	1004	2.8	9.4	10.8	8.3	0.4
7	1005	1023	2.9	9.3	13.0	8.0	0.5

12-3-97

0700 MORNING Meeting
0730 ORIENTation by Russ TEX
W20 Pons

0900 @ PSC 15 Has Rained
Briefly Today Cloudy Nearing
At this Time

1045 F. Bragdon came on-site
To inspect work done Yesterday
afternoon

PSC 15 (24) PIC Readings 12-3-97

Location	Start Time	END Time	Integer	Average	MAX	min	STD Dev
8	10:25	10:43	2.5	8.3	9.4	7.5	0.4
9	10:44	11:02	2.4	8.1	9.6	7.2	0.4
10	11:04	11:22	2.5	8.3	9.6	6.8	0.4
11	11:23	11:41	2.5	8.3	~~9.6~~ 9.6	~~7.5~~ 7.5	0.4
TOR 12-3-97 12							

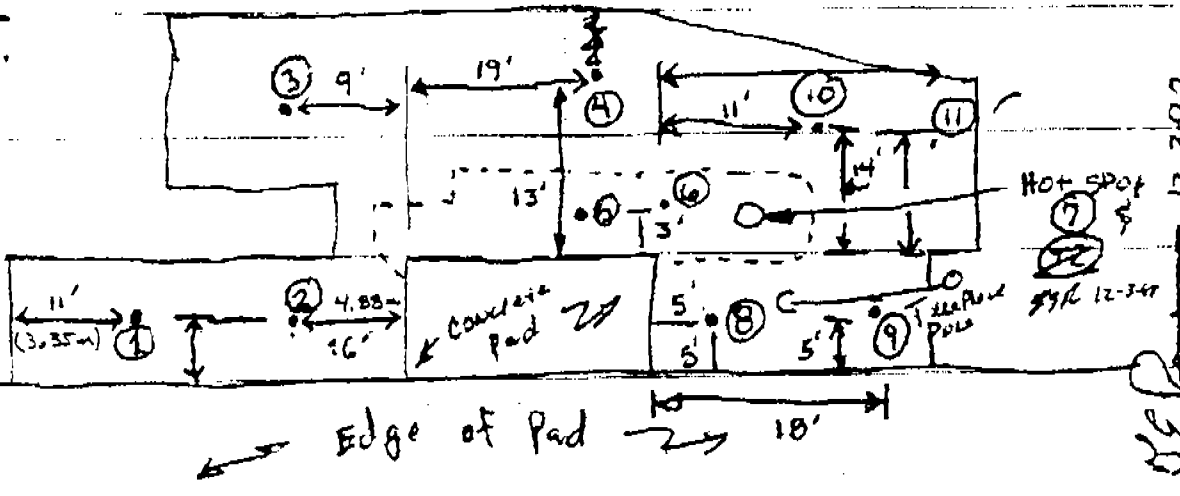
12-3-97 PSC 13A

(6) - Centered over FIRE main in line w/Edge of concrete Pad

(5) - Centered on concrete Pad CENTered over FIRE MAIN

(11) Centered on telephone Pole & in center of Excavation

PSC 15 12-3-97



12-3-97 PSC 13A

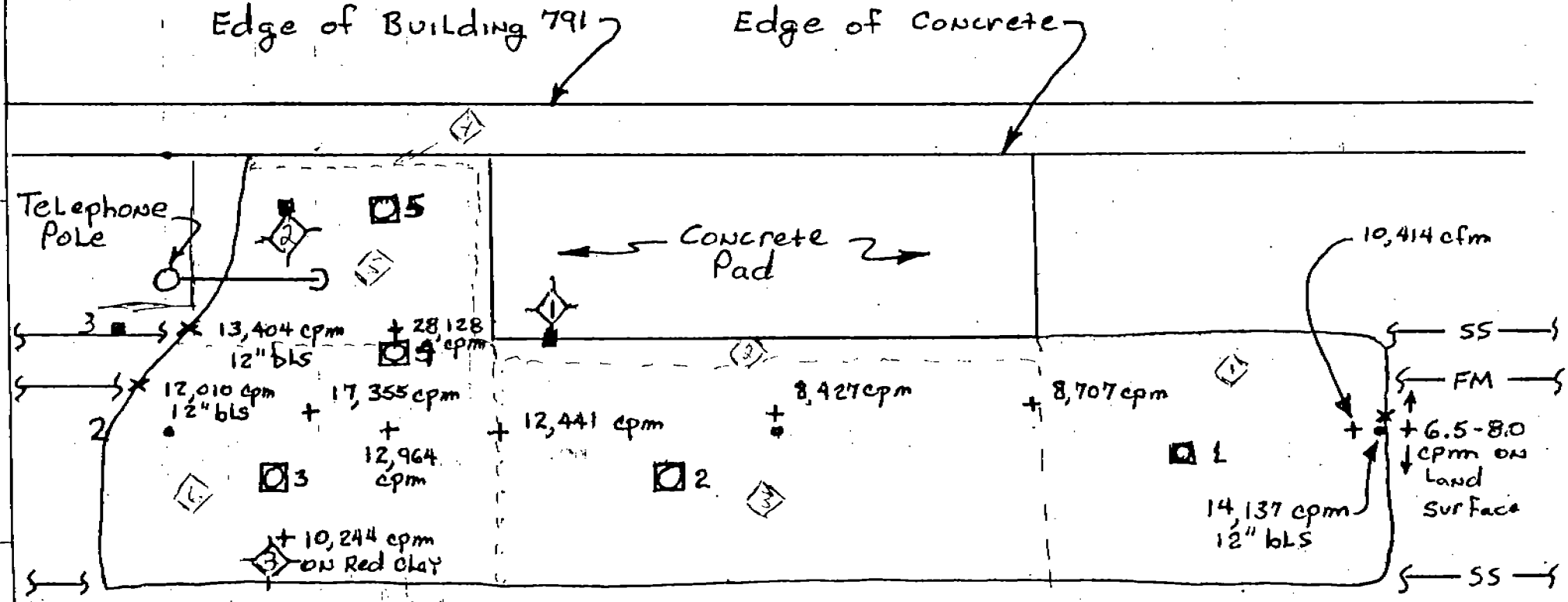
12-1-97 3/W

SS - Sanitary Sewer

FM - Fire main

Excavation = 2½ - 3 FT

~ 150 yd^3 to PSC 26



PIC Readings

\+ Surface Reading

X Sidewall Reading

■ Sidewall Soil Sample, 33,302 cpm, 18" below slab, black material

◇ - Composite Soil Samples (3 strikes)

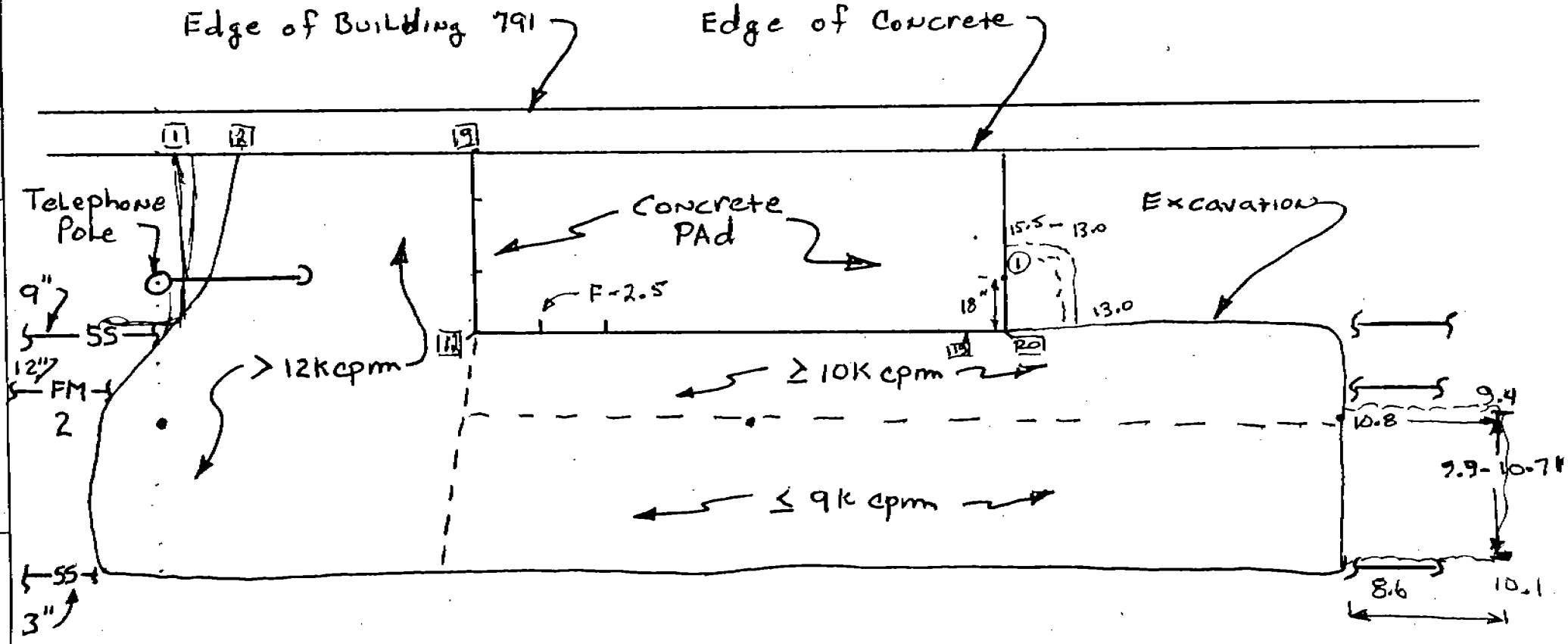
◇ - Hot Spot Sample

E F G

SS - Sanitary Sewer

FM - Fire Main

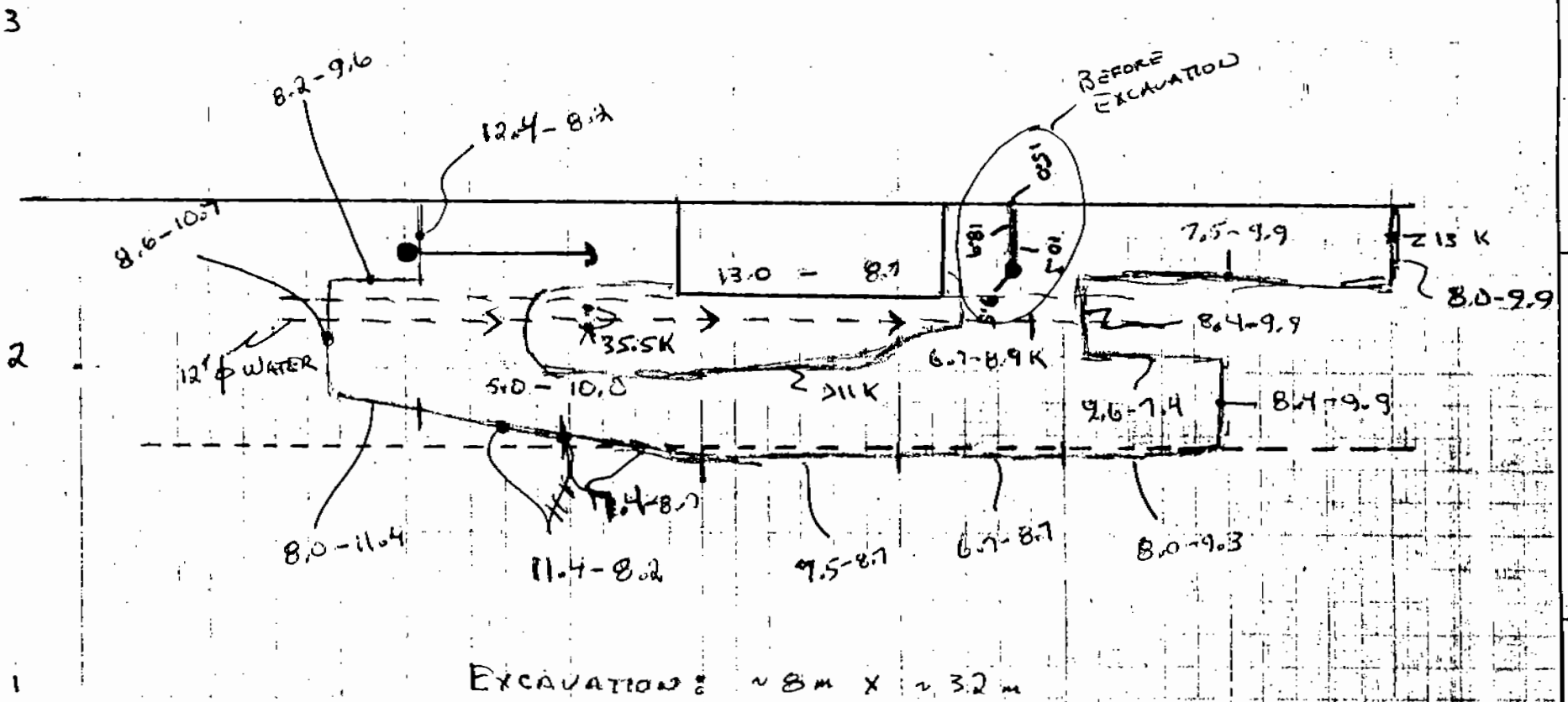
① 1 FT BELOW SURFACE 23326 cpm



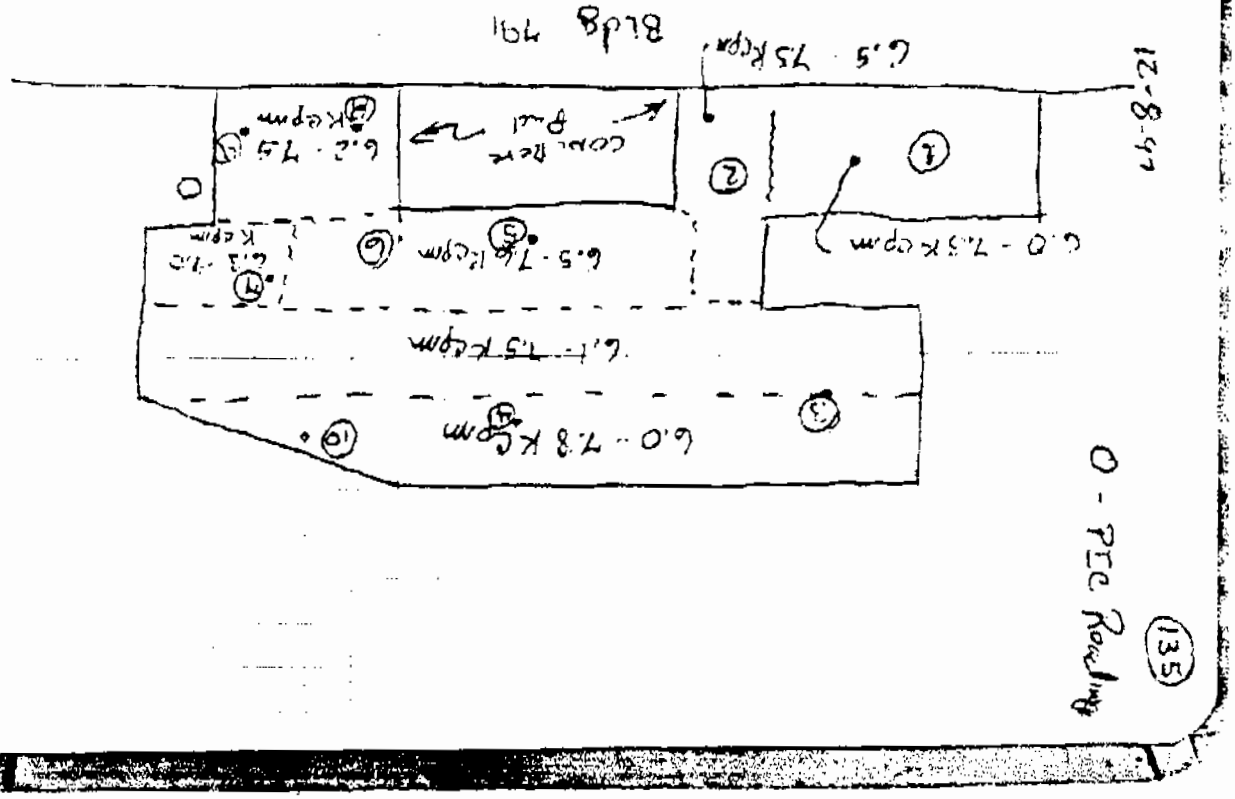
Walk over survey

E F G

2"x2" NaI Scan Surveys



Location	Start Time	END Time	Integer	Average	maximum	minimum	STD Dev
Location 1 Pg 128	12:49	13:07	2.2	7.4	8.8	6.3	0.4
(2)	13.08	13:26	2.2	7.4	9.4	6.5	0.4
(3)	13:27	13:45	2.3	7.6	9.0	6.7	0.4
(4)	13:47	14:05	2.2	7.5	8.8	6.2	0.4
(5)	14:06	14:24	2.2	7.6	9.0	6.8	0.4
(6)	14:24	14:42	2.2	7.6	9.1	6.3	0.4
(7)	14:43	15:01	2.2	7.5	9.1	6.5	0.4
(8)	15:02	15:20	2.2	7.2	8.8	6.2	0.4
(9)	15:21	15:39	2.1	7.2	8.6	6.0	0.4
(10)	15:40	1658	2.2	7.4	8.6	6.6	0.3
(11)	1609	1619	2.2	7.4	8.7	6.0	0.5



APPENDIX C

SAMPLE RESULTS

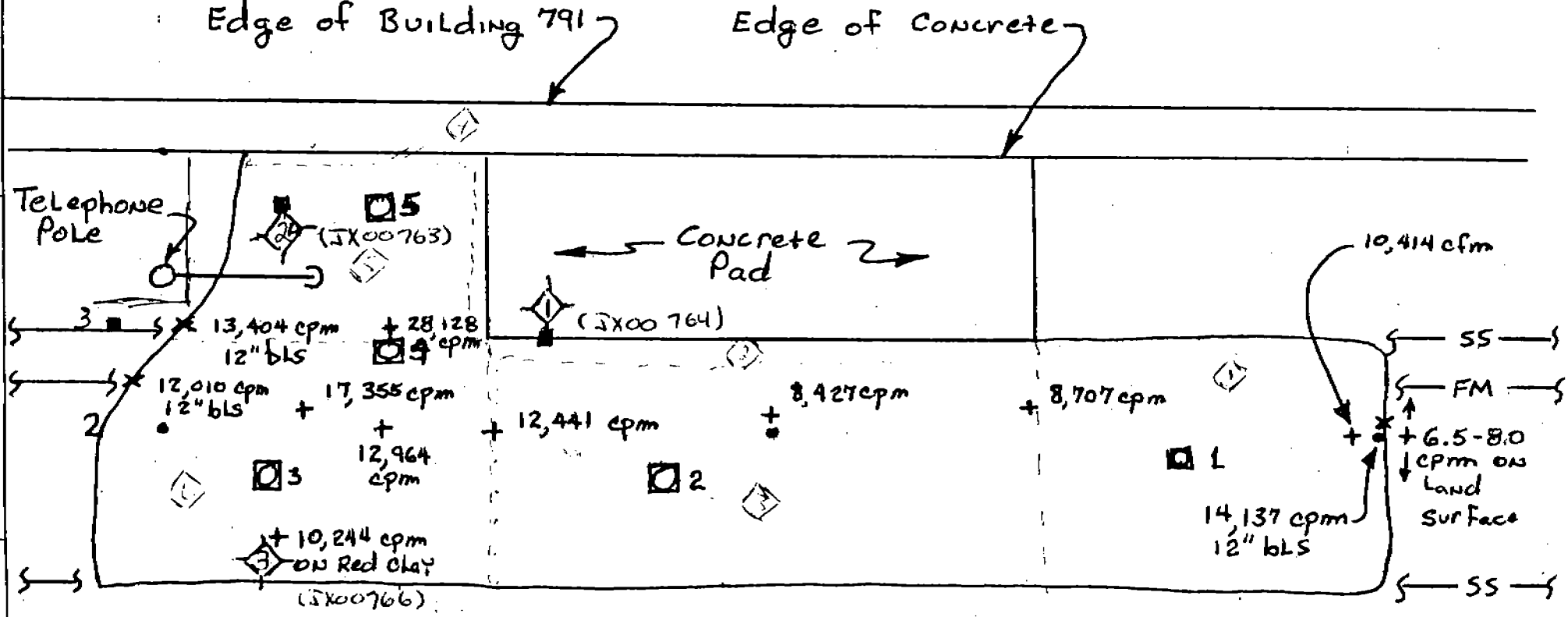
Dec 1, 1997

SS - Sanitary Sewer

FM - Fire main

Excavation = 2½ - 3 Ft

~ 150 yd^3 to PSC 26



□ PIC Readings

+ Surface Reading

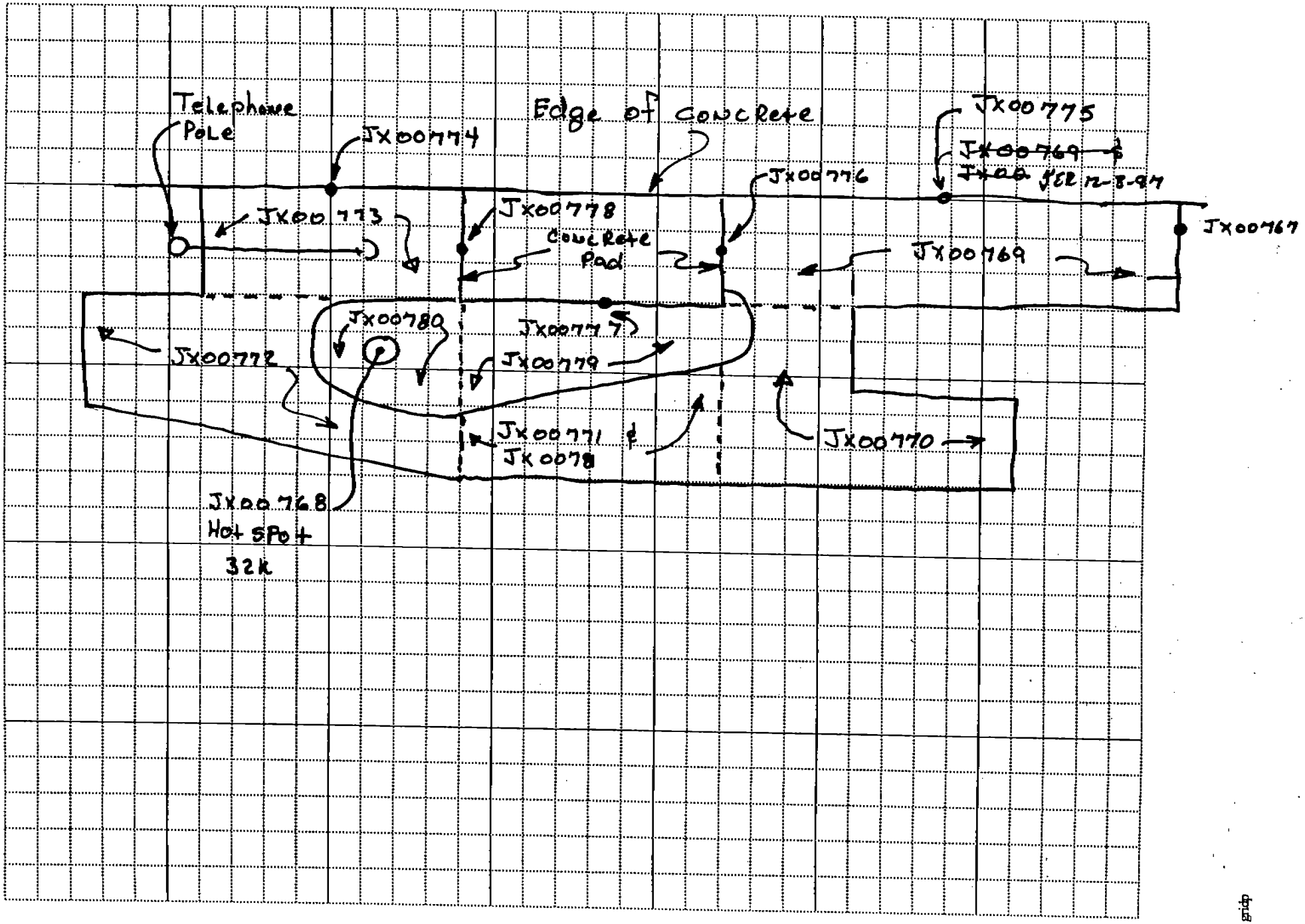
X Sidewall Reading

■ Sidewall Soil Sample, 33,302 cpm, 8" below slab, black material

◇ - Composite Soil Sample (3 Points)

◈ - Hot Spot Sample

E F G



Logbook: JX-DA-004

grid

NAVY RAC SOLID SAMPLING RECORD

Sampling Event: Rad. Characterization	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
L5-1A	SL

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00947	SFS	ENV	0"	0"

Collection Method	Date	Time	By
Sledge hammer	11-18-97	1415	T. Rountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX.058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8oz glass	None	01	—

Remarks: Material is the "Rip Rap" @ the west end of the Site Around the storm sewer outfall. obtained a Rock & Reduced its size W/a Sledge hammer (TO fit into a Jar).

Recorded by:	Date	Reviewed by	Date
JE Rountree	11-25-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: December 30, 1997 Page 1 of 2

RIP RAP MATERIAL

DITCH CULVERT AREA (GRID A-8/0-1)

Sample ID	: JX00747
Lab ID	: 9711646-01
Matrix	: Soil
Date Collected	: 11/17/97
Date Received	: 11/21/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C	U	ND		1	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	U	ND	+/- 0.0320	.05	.1	pCi/g	1.0	EJB	12/12/97	1123	112712	2
POTASSIUM-40		39.8	+/- 4.34	0.50	5	pCi/g	1.0					
RADIUM-226		1.2	+/- 0.188	0.10	1	pCi/g	1.0					
RADIUM-228		1.7	+/- 0.377	0.20	1	pCi/g	1.0					
THORIUM-228	J	2.0	+/- 0.249	0.08	5	pCi/g	1.0					
THORIUM-230	J	1.2	+/- 0.188	0.10	5	pCi/g	1.0					
THORIUM-232	J	1.9	+/- 0.243	0.08	5	pCi/g	1.0					
THORIUM-234	U	ND	+/- 1.66	1.71	15	pCi/g	1.0					
URANIUM-235	U	ND	+/- 0.176	.295	5	pCi/g	1.0					
URANIUM-238	U	ND	+/- 1.66	1.71	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87483
NC	233	
SC	10120	10582
TN	02934	02934

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: December 30, 1997

Sample ID : JX00747

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC 15 Characterize.	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-2A	BH

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00763	SFS	ENV	24"	24"

Collection Method	Date	Time	By
SS Auger	11-20-97	14:08	T. Rountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8 oz glass	NONE	01	—

Remarks: This sample is from A Previously Sampled Location. The is beside the Guide wire To the telephone Pole. APPRoximate Reading was 450K cpm @ bottom of hole. TAKEN BEFORE COMPLETION OF EXCAVATION

Recorded by:	Date	Reviewed by	Date
JE Rountree	12-03-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: December 30, 1997 RED CLAY Page 1 of 2

Sample ID : JX00763
Lab ID : 9711646-02
Matrix : Soil
Date Collected : 11/20/97
Date Received : 11/21/97
Priority : Routine
Collector : Client

LOCATION IE-2A

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		11.6		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	U	ND	+/- 0.0910	.139	.1	pCi/g	1.0	EJB	12/12/97	1124	112712	2
POTASSIUM-40	J	1.9	+/- 1.37	1.8	5	pCi/g	1.0					
RADIUM-226		96.2	+/- 11.4	0.30	1	pCi/g	1.0					
RADIUM-228	U	ND	+/- 0.449	.593	1	pCi/g	1.0					
THORIUM-228	J	0.89	+/- 0.246	0.30	5	pCi/g	1.0					
THORIUM-230		96.2	+/- 11.4	0.30	5	pCi/g	1.0					
THORIUM-232	J	0.87	+/- 0.241	0.30	5	pCi/g	1.0					
THORIUM-234	U	ND	+/- 3.16	5.73	15	pCi/g	1.0					
URANIUM-235	U	ND	+/- 0.550	.95	5	pCi/g	1.0					
URANIUM-238	U	ND	+/- 3.16	5.73	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: December 30, 1997

Sample ID : JX00763

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414

(803) 556-8171 • Fax (803) 766-1178

9711646-02

NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC 15 Rad Rem	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-F	SL, ~~SS~~ TR 12-3-97

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00764	SFS	ENV	0"	1"

Collection Method	Date	Time	By
SS Spoon	11-26-97	10:05	T. Pountney

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8oz glass	None	01	—
		NEA		

Remarks: Taken from south facing sidewall under concrete House Keeping Pad, 30" East of west end, 18" under Bottom of Slab, Black Material 33,302 cpm

Recorded by:	Date	Reviewed by	Date
JE Pountney	12-3-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

SAMPLE LOCATION IS-1

Sample ID	: I5-1 JXOO 764
Lab ID	: 9712128-06
Matrix	: Soil
Date Collected	: 11/26/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		11.8		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	U	0.04	+/- 0.0317	0.05	0.10	pCi/g	1.0	EJB	12/23/97	1324	112998	2
POTASSIUM-40	J	2.8	+/- 0.770	0.60	5	pCi/g	1.0					
RADIUM-226		20.2	+/- 2.53	0.10	1	pCi/g	1.0					
RADIUM-228	J	0.72	+/- 0.227	0.20	1	pCi/g	1.0					
THORIUM-228	J	0.85	+/- 0.122	0.10	5	pCi/g	1.0					
THORIUM-230		20.2	+/- 2.53	0.10	5	pCi/g	1.0					
THORIUM-232	J	0.83	+/- 0.119	0.10	5	pCi/g	1.0					
THORIUM-234	U	0.30	+/- 1.34	1.7	15	pCi/g	1.0					
URANIUM-235	U	-.06	+/- 0.216	0.40	5	pCi/g	1.0					
URANIUM-238	U	0.30	+/- 1.34	1.7	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
*indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client:	Bechtel
	PO Box 350
	Oak Ridge, Tennessee 37831-0350
Contact:	Ms. Lori Davenport
Project Description:	Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-1 JXOO 764

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414

(803) 556-8171 • Fax (803) 766-1178

Sampling Event: PSC 15 Rad. Rem.	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-2	SL

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
Jx00766	SLS	ENV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-1-97	16:00	T. Rountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
-	-	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8oz SL	NONE	01	—
		NFG		
		JSR		

Remarks: Grab Sample of Red Clay that underlies Site. TAKEN AFTER COMPLETION OF EXCAVATION

NFG

JSR

Recorded by:	Date	Reviewed by	Date
JE Rountree	12-3-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

SAMPLE 15-2

Sample ID	: 15-2 JXOO 765
Lab ID	: 9712128-07
Matrix	: Soil
Date Collected	: 12/01/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		14.6		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	U	-.003	+/- 0.0205	0.04	0.10	pCi/g	1.0	EJB	12/23/97	1325	112998	2
POTASSIUM-40	J	4.0	+/- 0.694	0.30	5	pCi/g	1.0					
RADIUM-226	J	0.96	+/- 0.144	0.06	1	pCi/g	1.0					
RADIUM-228		1.1	+/- 0.218	0.20	1	pCi/g	1.0					
THORIUM-228	J	1.2	+/- 0.159	0.06	5	pCi/g	1.0					
THORIUM-230	J	0.96	+/- 0.144	0.06	5	pCi/g	1.0					
THORIUM-232	J	1.2	+/- 0.156	0.05	5	pCi/g	1.0					
THORIUM-234	J	2.2	+/- 1.73	1.8	15	pCi/g	1.0					
URANIUM-235	U	0.20	+/- 0.118	0.20	5	pCi/g	1.0					
URANIUM-238	J	2.2	+/- 1.73	1.8	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
*indicates that a quality control analyte recovery is outside of specified acceptance criteria.

reported in mass/mass units is reported as 'dry weight'.

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9712128-07

Client:	Bechtel
	PO Box 350
	Oak Ridge, Tennessee 37831-0350
Contact:	Ms. Lori Davenport
Project Description:	Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-2 JXOO 765

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

NAVY RAC SOLID SAMPLING RECORD -24

Sampling Event: PSC 15 Rad Rem	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-3	SL

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
Jx00766	SPS	ENV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-1-97	16:03	T. Bountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
~	-	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8oz gl	None	01	-
	VER	NFE		
		12-3-97		

Remarks: Sample of sand that lyes above Red Clay
10,401 cpm

Recorded by:	Date	Reviewed by	Date
JE	12-3-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998 SAMPLE 15-3

Sample ID	: 15-3 JXOO766
Lab ID	: 9712128-08
Matrix	: Soil
Date Collected	: 12/01/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		11.0		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	U	-.004	+/- 0.0173	0.04	0.10	pCi/g	1.0	EJB	12/23/97	1327	112998	2
POTASSIUM-40	J	2.4	+/- 0.539	0.40	5	pCi/g	1.0					
RADIUM-226	J	0.50	+/- 0.114	0.06	1	pCi/g	1.0					
RADIUM-228	J	0.69	+/- 0.163	0.10	1	pCi/g	1.0					
THORIUM-228	J	0.73	+/- 0.105	0.04	5	pCi/g	1.0					
THORIUM-230	J	0.50	+/- 0.114	0.06	5	pCi/g	1.0					
THORIUM-232	J	0.72	+/- 0.103	0.04	5	pCi/g	1.0					
THORIUM-234	J	0.67	+/- 0.456	0.40	15	pCi/g	1.0					
URANIUM-235	U	0.04	+/- 0.0746	0.20	5	pCi/g	1.0					
URANIUM-238	J	0.67	+/- 0.456	0.40	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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9712128-08

GENERAL ENGINEERING LABORATORIES
Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-3 JXOO 766

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

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9712128-08

NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC 15 Road Ram	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-4	SL, EP JER 12-3-97

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00767	SFS	ENV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-2-97	1442	T. Rountree

Weather Conditions: clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
		JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gramma Spec	8oz gl	None	01	-
		NFG JER		

Remarks: Sample @ East End of Excavation, > 13K cpm NFG JJL

Recorded by:	Date	Reviewed by	Date
JE Rountree	12-3-97		

SAMPLING STATION

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394

Report Date: January 08, 1998

SAMPLE LOCATION 15-4

Sample ID	: 15-4 JXOO 767
Lab ID	: 9712128-09
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		9.6		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	U	0.04	+/- 0.0636	0.07	0.10	pCi/g	1.0	EJB	12/23/97	1426	112998	2
POTASSIUM-40	J	2.9	+/- 0.783	0.80	5	pCi/g	1.0					
RADIUM-226		6.4	+/- 0.796	0.20	1	pCi/g	1.0					
RADIUM-228	J	0.65	+/- 0.264	0.30	1	pCi/g	1.0					
THORIUM-228	J	0.73	+/- 0.133	0.20	5	pCi/g	1.0					
THORIUM-230		6.4	+/- 0.796	0.20	5	pCi/g	1.0					
THORIUM-232	J	0.71	+/- 0.131	0.20	5	pCi/g	1.0					
THORIUM-234	U	0.50	+/- 1.33	2.3	15	pCi/g	1.0					
URANIUM-235	U	0.09	+/- 0.210	0.40	5	pCi/g	1.0					
URANIUM-238	U	0.50	+/- 1.33	2.3	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998 SAMPLE LOCATION 15-41

Sample ID	: 15-4 JXOO 767
Lab ID	: 9712128-09
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		9.6		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	U	0.04	+/- 0.0636	0.07	0.10	pCi/g	1.0	EJB	12/23/97	1426	112998	2
POTASSIUM-40	J	2.9	+/- 0.783	0.80	5	pCi/g	1.0					
RADIUM-226		6.4	+/- 0.796	0.20	1	pCi/g	1.0					
RADIUM-228	J	0.65	+/- 0.264	0.30	1	pCi/g	1.0					
THORIUM-228	J	0.73	+/- 0.133	0.20	5	pCi/g	1.0					
THORIUM-230		6.4	+/- 0.796	0.20	5	pCi/g	1.0					
THORIUM-232	J	0.71	+/- 0.131	0.20	5	pCi/g	1.0					
THORIUM-234	U	0.50	+/- 1.33	2.3	15	pCi/g	1.0					
URANIUM-235	U	0.09	+/- 0.210	0.40	5	pCi/g	1.0					
URANIUM-238	U	0.50	+/- 1.33	2.3	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

a reported in mass/mass units is reported as 'dry weight'.

NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC 15 Rad Rem	Logbook ID: JX-DA-004	Form 1 of 1

Station ID	Station Type
15 - 5	SL

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00768	SFS	ENV	0"	1'

Collection Method	Date	Time	By
SS Spoon	12-2-97	14:45	T. Countryman

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8oz gl	None	01	—
		NFG		
		JSR 12-3-97		

Remarks: Hot Spot Location For Location see back of Pg 25

NFG
JSR 12-3-97

Recorded by:	Date	Reviewed by	Date
JE Countryman	12-3-97		

GENERAL ENGINEERING LABORATORIES
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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 20, 1998

Sample ID : 15-6 IXOO 769
Lab ID : 9712128-11
Matrix : Soil
Date Collected : 12/02/97
Date Received : 12/04/97
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		8.2		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	U	ND	+/- 0.0158	.026	.1	pCi/g	1.0	EJB	12/23/97	1730	112998	2
POTASSIUM-40	J	2.9	+/- 0.478	0.30	5	pCi/g	1.0					
RADIUM-226		1.3	+/- 0.179	0.05	1	pCi/g	1.0					
RADIUM-228	J	0.78	+/- 0.160	0.08	1	pCi/g	1.0					
THORIUM-228	J	0.74	+/- 0.0950	0.04	5	pCi/g	1.0					
THORIUM-230	J	1.3	+/- 0.179	0.05	5	pCi/g	1.0					
THORIUM-232	J	0.72	+/- 0.0930	0.04	5	pCi/g	1.0					
THORIUM-234	J	1.2	+/- 0.830	0.70	15	pCi/g	1.0					
URANIUM-235	U	ND	+/- 0.0891	.158	5	pCi/g	1.0					
URANIUM-238	J	1.2	+/- 0.830	0.70	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/IX

cc: BECH00394 Report Date: January 20, 1998 Page 2 of 2

Sample ID : 15-6 IXOO 769

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

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9712128-11

NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC 15 Rad Rem.	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-7	SL, CP

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00779D	SFS	ENV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-2-97	14:53	T. Rountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX 058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8oz gl	None	01	—

NFC
JEL
12-4-97

Remarks: see back of Pg 25 for Location

NFC
JEL 12-4-97

Recorded by:	Date	Reviewed by	Date
JE Rountree	12-4-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Location 15-7

Sample ID	: 15-7 JXOO 770
Lab ID	: 9712128-12
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		11.7		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	U	-.01	+/- 0.0186	0.03	0.10	pCi/g	1.0	EJB	12/23/97	1859	112998	2
POTASSIUM-40	J	3.0	+/- 0.585	0.40	5	pCi/g	1.0					
RADIUM-226		1.0	+/- 0.174	0.06	1	pCi/g	1.0					
RADIUM-228	J	0.87	+/- 0.181	0.20	1	pCi/g	1.0					
THORIUM-228	J	0.89	+/- 0.125	0.05	5	pCi/g	1.0					
THORIUM-230	J	1.0	+/- 0.174	0.06	5	pCi/g	1.0					
THORIUM-232	J	0.87	+/- 0.122	0.05	5	pCi/g	1.0					
THORIUM-234	J	0.42	+/- 0.453	0.50	15	pCi/g	1.0					
URANIUM-235	U	0.04	+/- 0.118	0.20	5	pCi/g	1.0					
URANIUM-238	J	0.42	+/- 0.453	0.50	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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9712128-12 0024

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client:	Bechtel
	PO Box 350
	Oak Ridge, Tennessee 37831-0350
Contact:	Ms. Lori Davenport
Project Description:	Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-7 JXOO 770

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

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9712128-12

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NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC 15 Rad Rem	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-8	SL, CP

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00771	SFS	ENV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-2-97	15:00	T. Rountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
-	-	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8oz GL	None	01	—
		NFE per 12-4-97		

Remarks: See back of Pg 25 for Location

Recorded by:	Date	Reviewed by	Date
T.E. Rountree	12-4-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998 SAMPLE 15-8

Sample ID	: 15-8 JXOO 771
Lab ID	: 9712128-13
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		14.0		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	U	0.04	+/- 0.0335	0.04	0.10	pCi/g	1.0	EJB	12/23/97	1910	112998	2
POTASSIUM-40	J	2.9	+/- 0.521	0.30	5	pCi/g	1.0					
RADIUM-226		1.9	+/- 0.246	0.05	1	pCi/g	1.0					
RADIUM-228	J	0.75	+/- 0.186	0.20	1	pCi/g	1.0					
THORIUM-228	J	0.88	+/- 0.127	0.05	5	pCi/g	1.0					
THORIUM-230	J	1.9	+/- 0.246	0.05	5	pCi/g	1.0					
THORIUM-232	J	0.87	+/- 0.125	0.05	5	pCi/g	1.0					
THORIUM-234	U	0.50	+/- 1.11	1.5	15	pCi/g	1.0					
URANIUM-235	J	0.19	+/- 0.168	0.20	5	pCi/g	1.0					
URANIUM-238	U	0.50	+/- 1.11	1.5	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

a reported in mass/mass units is reported as 'dry weight'.

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9712128-13

GENERAL ENGINEERING LABORATORIES
Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-8 JXOO 771

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

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Sampling Event: PSC 15 Rad Rem	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-9	SL, CP

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00772	SFS	ENV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-2-94	15:03	T. Rountree

Weather Conditions:

Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
–	–	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8 oz glass	None	01	–

TER NFC 12-4-94

Remarks: See back of Pg 25 for Location

NFC TER 12-4-94

Recorded by:	Date	Reviewed by	Date
TER	12-4-94		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998 SAMPLE 15-9

Sample ID	:15-9 JXOO 772
Lab ID	: 9712128-14
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		12.7		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	J	0.03	+/- 0.0150	0.03	0.10	pCi/g	1.0	EJB	12/23/97	1922	112998	2
POTASSIUM-40	J	2.6	+/- 0.622	0.40	5	pCi/g	1.0					
RADIUM-226		2.0	+/- 0.264	0.06	1	pCi/g	1.0					
RADIUM-228	J	0.74	+/- 0.193	0.20	1	pCi/g	1.0					
THORIUM-228	J	0.81	+/- 0.110	0.06	5	pCi/g	1.0					
THORIUM-230	J	2.0	+/- 0.264	0.06	5	pCi/g	1.0					
THORIUM-232	J	0.79	+/- 0.107	0.06	5	pCi/g	1.0					
THORIUM-234	U	0.40	+/- 1.31	1.2	15	pCi/g	1.0					
URANIUM-235	U	0.20	+/- 0.183	0.30	5	pCi/g	1.0					
URANIUM-238	U	0.40	+/- 1.31	1.2	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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9712128-14

00028

Client:	Bechtel
	PO Box 350
	Oak Ridge, Tennessee 37831-0350
Contact:	Ms. Lori Davenport
Project Description:	Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-9 JXOO 772

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC 15 Rad Rem	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-10	SL, CP

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00773	SFS	GNV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-2-97	15:08	T. Kountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8 oz gL	NONE	01	—

NFE
JER 12-4-97

Remarks: see back of Pg 25 for Location.

NFE
JER 12-4-97

Recorded by:	Date	Reviewed by	Date
JE	12-4-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998 SAMPLE 15-10

Sample ID	: 15-10 JX00773
Lab ID	: 9712128-15
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		15.4		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	U	0.02	+/- 0.0218	0.04	0.10	pCi/g	1.0	EJB	12/23/97	1938	112998	2
POTASSIUM-40	J	2.5	+/- 0.680	0.40	5	pCi/g	1.0					
RADIUM-226		2.3	+/- 0.300	0.07	1	pCi/g	1.0					
RADIUM-228	J	0.86	+/- 0.203	0.20	1	pCi/g	1.0					
THORIUM-228	J	0.91	+/- 0.141	0.06	5	pCi/g	1.0					
THORIUM-230	J	2.3	+/- 0.300	0.07	5	pCi/g	1.0					
THORIUM-232	J	0.89	+/- 0.138	0.06	5	pCi/g	1.0					
THORIUM-234	U	0.80	+/- 1.04	1.2	15	pCi/g	1.0					
URANIUM-235	U	0.20	+/- 0.116	0.30	5	pCi/g	1.0					
URANIUM-238	U	0.80	+/- 1.04	1.2	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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9712128-15

0030

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-10.JX00773

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valeric Davis at (803) 769-7391.

Reviewed By

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9712128-15

NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC 15 Rad Rem	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-11	SL, CP

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00774	SFS	ENV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-2-97	15:12	T. Rountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8 oz gl	None	01	—

NFE
JER 12-4-97

Remarks: See back of Pg 25 for Location, sidewall

NFE
JER 12-4-97

Recorded by:	Date	Reviewed by	Date
JE Flood	12-4-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998 SAMPLE 15-11

Sample ID	: 15-11 JX00774
Lab ID	: 9712128-16
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		10.4		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	J	0.04	+/- 0.0330	0.04	0.10	pCi/g	1.0	EJB	12/23/97	2142	112998	2
POTASSIUM-40	J	3.1	+/- 0.597	0.40	5	pCi/g	1.0					
RADIUM-226		2.4	+/- 0.325	0.08	1	pCi/g	1.0					
RADIUM-228	J	0.77	+/- 0.221	0.20	1	pCi/g	1.0					
THORIUM-228	J	0.74	+/- 0.111	0.08	5	pCi/g	1.0					
THORIUM-230	J	2.4	+/- 0.325	0.08	5	pCi/g	1.0					
THORIUM-232	J	0.73	+/- 0.109	0.07	5	pCi/g	1.0					
THORIUM-234	U	0.20	+/- 1.07	1.2	15	pCi/g	1.0					
URANIUM-235	U	0.20	+/- 0.140	0.30	5	pCi/g	1.0					
URANIUM-238	U	0.20	+/- 1.07	1.2	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client:	Bechtel
	PO Box 350
	Oak Ridge, Tennessee 37831-0350
Contact:	Ms. Lori Davenport
Project Description:	Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-11-JX00774

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC 15 Rad Ram	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-12	SL, CP

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00745	SFS	GNV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-2-97	15:15	T. Rountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec.	8 oz gl	None	01	—

NFE TER 12-4-97

Remarks: Side wall sample see back of Pg 25 for Location

NFE TR 12-4-97

Recorded by:	Date	Reviewed by	Date
TE	12-4-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998 SAMPLE 15-12

Sample ID	: 15-12 JX00775
Lab ID	: 9712128-17
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		9.2		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	J	0.04	+/- 0.0167	0.02	0.10	pCi/g	1.0	EJB	12/24/97	0047	112998	2
POTASSIUM-40	J	2.2	+/- 0.368	0.20	5	pCi/g	1.0					
RADIUM-226		1.9	+/- 0.254	0.04	1	pCi/g	1.0					
RADIUM-228	J	0.43	+/- 0.116	0.08	1	pCi/g	1.0					
THORIUM-228	J	0.55	+/- 0.0714	0.04	5	pCi/g	1.0					
THORIUM-230	J	1.9	+/- 0.254	0.04	5	pCi/g	1.0					
THORIUM-232	J	0.54	+/- 0.0699	0.04	5	pCi/g	1.0					
THORIUM-234	U	0.60	+/- 0.594	0.60	15	pCi/g	1.0					
URANIUM-235	U	0.20	+/- 0.0788	0.20	5	pCi/g	1.0					
URANIUM-238	U	0.60	+/- 0.594	0.60	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
[illegible]icates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client:	Bechtel
	PO Box 350
	Oak Ridge, Tennessee 37831-0350
Contact:	Ms. Lori Davenport
Project Description:	Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-12 JX00775

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

9712128-17

NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC 15 Rad Rem	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-13	SL, CP

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JK00776	SFS	ENV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-2-94	15:20	T. Rountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8oz gl	None	01	—

NFG
JER 12-9-94

Remarks: side wall sample, for Location see back of Pg 25

NFG
JER 12-4-94

Recorded by:	Date	Reviewed by	Date
JE Rountree	12-4-94		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client:	Bechtel
	PO Box 350
	Oak Ridge, Tennessee 37831-0350
Contact:	Ms. Lori Davenport
Project Description:	Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-15 JX00778

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC LS- Rad Rem	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-16	SL, CP

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00779	SFS	ENV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-2-97	15:35	T. Rountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8 oz GL	None	01	—

NFE per SER 12-4-97

Remarks: For Location see back of Pg 25-

NFE per SER 12-4-97

Recorded by:	Date	Reviewed by	Date
TE Rountree	12-4-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998 SAMPLE 15-17

Sample ID	: 15-17 JX00780
Lab ID	: 9712128-22
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		13.3		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	J	0.03	+/- 0.0216	0.03	0.10	pCi/g	1.0	EJB	12/25/97	1519	113003	2
POTASSIUM-40	J	3.0	+/- 0.519	0.30	5	pCi/g	1.0					
RADIUM-226		4.6	+/- 0.580	0.05	1	pCi/g	1.0					
RADIUM-228	J	0.78	+/- 0.162	0.09	1	pCi/g	1.0					
THORIUM-228	J	0.92	+/- 0.112	0.05	5	pCi/g	1.0					
THORIUM-230	J	4.6	+/- 0.580	0.05	5	pCi/g	1.0					
THORIUM-232	J	0.90	+/- 0.109	0.05	5	pCi/g	1.0					
THORIUM-234	J	0.79	+/- 0.776	0.80	15	pCi/g	1.0					
URANIUM-235	U	0.06	+/- 0.0952	0.20	5	pCi/g	1.0					
URANIUM-238	J	0.79	+/- 0.776	0.80	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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9712128-22

0043

GENERAL ENGINEERING LABORATORIES
Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-17 JX00780

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

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NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC LS Rad Rem	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
16-18	CP, SL

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00791	FDP	GNV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-2-94	—	T. Rountree

Weather Conditions: clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
FIELD	Duplicate	of JX00791		—

NFG
VER
12-4-94

Remarks:

Recorded by:	Date	Reviewed by	Date
[signature]	12-4-94		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

SAMPLE 15-18

Sample ID	: DUP JXOO781 DUPLICATE OF 15-8
Lab ID	: 9712128-24
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		11.8		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	J	0.03	+/- 0.0101	0.02	0.10	pCi/g	1.0	EJB	12/25/97	0901	113003	2
POTASSIUM-40	J	3.1	+/- 0.476	0.20	5	pCi/g	1.0					
RADIUM-226		1.9	+/- 0.243	0.04	1	pCi/g	1.0					
RADIUM-228	J	0.88	+/- 0.160	0.07	1	pCi/g	1.0					
THORIUM-228	J	0.89	+/- 0.107	0.04	5	pCi/g	1.0					
THORIUM-230	J	1.9	+/- 0.243	0.04	5	pCi/g	1.0					
THORIUM-232	J	0.87	+/- 0.104	0.04	5	pCi/g	1.0					
THORIUM-234	J	0.98	+/- 0.630	0.60	15	pCi/g	1.0					
URANIUM-235	U	0.08	+/- 0.0770	0.20	5	pCi/g	1.0					
URANIUM-238	J	0.98	+/- 0.630	0.60	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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9712128-24 0046

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client:	Bechtel
	PO Box 350
	Oak Ridge, Tennessee 37831-0350
Contact:	Ms. Lori Davenport
Project Description:	Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : DUP JXOO781

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

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9712128-24

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

RINSATE WATER

PSC-15

Sample ID	: 15-18 JX00782
Lab ID	: 9712128-23
Matrix	: GroundH2O
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 20 items												
CESIUM-137	U	-1	+/- 3.03	5.4	10	pCi/L	1.0	EJB	12/29/97	0759	113011	1
POTASSIUM-40	U	26.4	+/- 76.6	62.4	50	pCi/L	1.0					
RADIUM-226	U	5.1	+/- 11.0	15.3	15	pCi/L	1.0					
RADIUM-228	U	14.1	+/- 21.3	26.7	15	pCi/L	1.0					
THORIUM-228	U	8.0	+/- 11.7	10.3	15	pCi/L	1.0					
THORIUM-230	U	5.1	+/- 11.0	15.3	15	pCi/L	1.0					
THORIUM-232	U	7.8	+/- 11.4	10.1	15	pCi/L	1.0					
THORIUM-234	U	105	+/- 229	216.0	250	pCi/L	1.0					
URANIUM-235	U	-10	+/- 20.7	34.9	50	pCi/L	1.0					
URANIUM-238	U	105	+/- 229	216.0	500	pCi/L	1.0					

M = Method	Method-Description
M 1	HASL 300

Notes:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client:	Bechtel
	PO Box 350
	Oak Ridge, Tennessee 37831-0350
Contact:	Ms. Lori Davenport
Project Description:	Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-18 JX00782

M = Method	Method-Description

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GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-4 JXOO 767

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

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NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC 15 Rad Ram	Logbook ID: JX-DA-004	Form 1 of 1

Station ID	Station Type
15 - 5	SL

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00768	SFS	ENV	0"	1'

Collection Method	Date	Time	By
SS Spoon	12-2-97	14:45	T. Rountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8oz gl	None	01	—
		WPC		
		JER 12-3-97		

Remarks: Hot Spot Location For Location see back of Pg 25

NFG

JER 12-3-97

Recorded by:	Date	Reviewed by	Date
JE Rountree	12-3-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998 SAMPLE LOCATION 15-5

Sample ID	: 15-5 JXOO 768
Lab ID	: 9712128-10
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		13.4		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	U	-.0007	+/- 0.0692	0.20	0.10	pCi/g	1.0	EJB	12/23/97	1729	112998	2
POTASSIUM-40	J	3.3	+/- 1.49	1.3	5	pCi/g	1.0					
RADIUM-226		67.9	+/- 7.70	0.30	1	pCi/g	1.0					
RADIUM-228	U	0	+/- 0.364	0.50	1	pCi/g	1.0					
THORIUM-228	J	1.0	+/- 0.205	0.30	5	pCi/g	1.0					
THORIUM-230		67.9	+/- 7.70	0.30	5	pCi/g	1.0					
THORIUM-232	J	0.98	+/- 0.201	0.30	5	pCi/g	1.0					
THORIUM-234	U	-1	+/- 4.05	7.6	15	pCi/g	1.0					
URANIUM-235	U	0.07	+/- 0.464	0.90	5	pCi/g	1.0					
URANIUM-238	U	-1	+/- 4.05	7.6	15	pCi/g	1.0					

Comments:
Ra-228 not quantified due to low abundance

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

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9712128-10

GENERAL ENGINEERING LABORATORIES

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Client:	Bechtel
	PO Box 350
	Oak Ridge, Tennessee 37831-0350
Contact:	Ms. Lori Davenport
Project Description:	Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-5 JXOO 768

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

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NAVY RAC SOLID SAMPLING RECORD

Sampling Event: PSC 15 Rad Rem	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-6	SL, CP

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00769	SFS	ENV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-2-97	14:50	T. Rountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8oz GL	None	01	—

NFE JEP 12-3-97

Remarks: See back of pg 25 for Location

NFE JEP 12-3-97

Recorded by:	Date	Reviewed by	Date
JE Flow	12-3-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394

Report Date: January 08, 1998

SAMPLE 15-13

Sample ID	: 15-13 JX00776
Lab ID	: 9712128-18
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		11.0		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	U	-.04	+/- 0.0323	0.06	0.10	pCi/g	1.0	EJB	12/23/97	0117	112998	2
POTASSIUM-40	J	2.7	+/- 0.721	0.50	5	pCi/g	1.0					
RADIUM-226		13.0	+/- 1.51	0.10	1	pCi/g	1.0					
RADIUM-228	U	0	+/- 0.243	0.30	1	pCi/g	1.0					
THORIUM-228	J	0.83	+/- 0.125	0.09	5	pCi/g	1.0					
THORIUM-230		13.0	+/- 1.51	0.10	5	pCi/g	1.0					
THORIUM-232	J	0.82	+/- 0.123	0.09	5	pCi/g	1.0					
THORIUM-234	U	0.30	+/- 1.56	2.0	15	pCi/g	1.0					
URANIUM-235	U	0.00	+/- 0.182	0.40	5	pCi/g	1.0					
URANIUM-238	U	0.30	+/- 1.56	2.0	15	pCi/g	1.0					

Comments:
Ra-228 not quantified due to low abundance

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client:	Bechtel
	PO Box 350
	Oak Ridge, Tennessee 37831-0350
Contact:	Ms. Lori Davenport
Project Description:	Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-13 JX00776

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
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Data reported in mass/mass units is reported as 'dry weight'.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

NAVY RAC SOLID SAMPLING RECORD

35

Sampling Event: PSC 15 Rad Rem	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-14	SL CP

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00777	SFS	GNV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-2-97	15:26	T. Nowotnee

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8 oz gL	NONE	01	—

NFC
VER 12-4-97

Remarks: side wall SAMPLE, see back of Pg 25 for Location

NFC
VER 12-4-97

Recorded by:	Date	Reviewed by	Date
[signature]	12-4-97		

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998 SAMPLE 15-14

Sample ID	: 15-14 JX00777
Lab ID	: 9712128-19
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		9.6		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	J	0.04	+/- 0.0362	0.05	0.10	pCi/g	1.0	EJB	12/24/97	0122	112998	2
POTASSIUM-40	J	2.8	+/- 0.626	0.50	5	pCi/g	1.0					
RADIUM-226		12.3	+/- 1.43	0.07	1	pCi/g	1.0					
RADIUM-228	J	0.89	+/- 0.218	0.20	1	pCi/g	1.0					
THORIUM-228	J	0.96	+/- 0.140	0.07	5	pCi/g	1.0					
THORIUM-230		12.3	+/- 1.43	0.07	5	pCi/g	1.0					
THORIUM-232	J	0.94	+/- 0.137	0.07	5	pCi/g	1.0					
THORIUM-234	U	0.70	+/- 1.86	2.1	15	pCi/g	1.0					
URANIUM-235	U	0.02	+/- 0.148	0.30	5	pCi/g	1.0					
URANIUM-238	U	0.70	+/- 1.86	2.1	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
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Data reported in mass/mass units is reported as 'dry weight'.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client:	Bechtel
	PO Box 350
	Oak Ridge, Tennessee 37831-0350
Contact:	Ms. Lori Davenport
Project Description:	Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998

Sample ID : 15-14 JX00777

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

NAVY RAC SOLID SAMPLING RECORD 36

Sampling Event: PSC 15 Rad Rem	Logbook ID: JX-DA-004	Form 1 of 1

SAMPLING STATION

Station ID	Station Type
15-15	CP, SL

SAMPLE

Sample ID	Sample Matrix	Sample Type	Depth Interval Start:	Depth Interval End:
JX00778	SFS	EnV	0"	1"

Collection Method	Date	Time	By
SS Spoon	12-2-94	16:30	T. Rountree

Weather Conditions: Clear

Field Logbook(s) Pages	ES&H Jrnl(s) Pgs	SEIR No.:
—	—	JX058

Container Information

ANALYTES	CONTAINER	PRESERVATIVE	CONTAINER ID	COMMENT
Gamma Spec	8oz gl	None	01	—

TJR 12-4-94 PFC

Remarks: Side wall sample, Biased High with black material for Location see back of Pg 25.

WPC TJR 12-21-94

Recorded by:	Date	Reviewed by	Date
TE	12-4-94		

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Meeting today's needs with a vision for tomorrow.

Client: Bechtel
PO Box 350
Oak Ridge, Tennessee 37831-0350
Contact: Ms. Lori Davenport
Project Description: Cecil Field/JX

cc: BECH00394 Report Date: January 08, 1998 SAMPLE 15-15

Sample ID	: 15-15 JX00778
Lab ID	: 9712128-20
Matrix	: Soil
Date Collected	: 12/02/97
Date Received	: 12/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Evaporative Loss @ 105 C		11.4		1.0	1	wt%	1.0	PCW	12/16/97	1200	112553	1
Gamma PHA - 20 items												
CESIUM-137	J	0.05	+/- 0.0213	0.02	0.10	pCi/g	1.0	EJB	12/24/97	2310	113003	2
POTASSIUM-40	J	2.6	+/- 0.447	0.30	5	pCi/g	1.0					
RADIUM-226		4.2	+/- 0.535	0.04	1	pCi/g	1.0					
RADIUM-228	J	0.69	+/- 0.145	0.08	1	pCi/g	1.0					
THORIUM-228	J	0.72	+/- 0.0884	0.04	5	pCi/g	1.0					
THORIUM-230	J	4.2	+/- 0.535	0.04	5	pCi/g	1.0					
THORIUM-232	J	0.70	+/- 0.0864	0.04	5	pCi/g	1.0					
THORIUM-234	J	0.86	+/- 0.673	0.70	15	pCi/g	1.0					
URANIUM-235	U	0.20	+/- 0.0855	0.20	5	pCi/g	1.0					
URANIUM-238	J	0.86	+/- 0.673	0.70	15	pCi/g	1.0					

M = Method	Method-Description
M 1	GL-OA-E-020
M 2	HASL 300

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte between DL (Detect Limit) and RL (Report Limit)
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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