

**ADDENDUM #1 TO THE FINAL RADIOLOGICAL  
SURVEY  
PERFORMED AT GENERAL ATOMICS'  
OPEN LAND AREA  
LOCATED TO THE WEST, SOUTH AND SOUTHEAST  
OF BUILDING 27**

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Addendum #1, dated November 30, 1999 to the: “Final Survey Plan for Building 27 Outside Area, dated September 20, 1999.”

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“Release of Asphalt, Concrete and Soil from the Front Yard of Building 27,” dated November 30, 1999.

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## **Building 27 Land Area - Addendum #1 to the Final Radiological Survey Report**

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### **Introduction**

General Atomics (GA) is continuing its efforts directed at decontaminating, as appropriate, and obtaining the release to unrestricted use of selected facilities and land areas at General Atomics.

On December 2, 1999 (CAL/696-3159), GA submitted a request to the State of CA and the NRC to release "Portions of Land Areas Near and Adjacent to General Atomics' Building 27" to unrestricted use and to delete these portions of land areas from GA's licenses. GA submitted a Final Radiological Survey Report for this land area titled "Final Radiological Survey Performed at General Atomics' Open Land Area Associated with Building 27," dated November 30, 1999, in support of this request. Although the Final Survey Report contained radiological survey information for the north and northeast areas around Building 27 for which GA had originally intended to include in this request, GA excluded these areas from the request due to unresolved issues (e.g., inaccessibility). The north and northeast areas will be addressed at a future time. The total area to be released pursuant to this amended request to unrestricted use is approximately 584 m<sup>2</sup> (~ 6,286 ft<sup>2</sup>) and is shown in Figure 3.

In late November and early December 1999, GA removed the asphalt from the south and southeast portions of the site and the top 1 foot of soil and placed them in a Temporary Staging Area (TSA) until the State of CA and/or the NRC approved the release of the debris to unrestricted use. The State also requested GA to conduct a survey(s) on the newly exposed surfaces and to submit a report to the State providing the results of this survey. These surveys have been completed and GA has documented the results of the radiological measurements and soil sampling conducted on these newly exposed surfaces. The data provided demonstrate that the newly exposed land areas located to the south and southeast of Building 27 meet the approved criteria for release to unrestricted use.

In addition to the surveys on the newly exposed surfaces, this report provides locations and GA's results of gamma spectroscopy analysis of soil samples split with Ms. Lisa Brown (from the State of CA) during the confirmatory survey conducted by Ms. Lisa Brown from the State of CA on December 2-3, 1999. Ms. Lisa Brown conducted confirmatory surveys of the west, south and southeast areas.

### **Site Description**

The land area associated with Building 27 is located on General Atomics' Torrey Pines Mesa Site. A plan view of the GA Site is shown in Figure 1. The location of this open land area in relation to other facilities at GA's Main Site is shown in Figure 2. A diagram of the land area that GA is hereby requesting to be released to unrestricted use consists of three areas labeled as "west," "south" and "southwest" as shown in Figure 3.

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### South and Southeast Areas

This land area is shown in Figure 3. The total surface area of the land located to the south and southeast of Building 27 is ~ 488 m<sup>2</sup> (~ 5253 ft<sup>2</sup>). After completing surveys of the soil and/or then existing asphalt areas as documented in the Final Survey Report referenced above, GA removed the asphalt and approximately one foot of soil beneath the asphalt from the southeast area of the building and approximately one foot of soil from the south area of the building in preparation for resurfacing of these areas with asphalt for use as an employee parking lot. The removal of the asphalt and/or approximately one foot of soil from the south and southeast of the building exposed new soil. GA conducted radiological surveys and collected soil samples in these newly exposed areas of soil prior to the asphalt resurfacing. Ms. Brown also conducted a confirmatory survey (including the collection of soil samples) prior to asphalt resurfacing.

The location and details of the soil samples collected and surveys conducted within these areas are shown in Figure 4 and the results of gamma ray spectroscopy analyses on the soil samples are provided in Table 2. The asphalt and soil removed from these areas are presently being stored in GA's Temporary Storage Area (TSA) until the State of California and/or the NRC give their approval for its release to unrestricted use on GA's site or disposal to a local landfill. The soil and asphalt that were removed to the TSA were sampled by personnel from both GA and the State of California (RHB).

### West Area

This land area is shown in Figure 3. The total surface area located to the west of Building 27 is ~ 96 m<sup>2</sup> (~ 1033 ft<sup>2</sup>). Surface soil samples (0-6") were previously obtained from this area. Some trenches were also excavated in this area in order to remove old drain lines and to install new drain lines. Soil samples were collected from the bottom of these trenches. The data concerning the surveys/sampling of this strip of land to the west of Building 27 was provided in the "Final Radiological Survey Report for the Open Land Area Associated with Building 27," dated November 30, 1999.

The results of soil samples split with the State of CA which were collected within the west area (at two locations) are provided in this report.

### East/Northeast Areas

The locations of these areas are shown in Figure 3. The areas to the east and northeast of Building 27 were modified prior to a confirmatory survey by the RHB. After surveys of the existing asphalt/concrete and soil as documented in the Final Survey Report referenced above, GA removed the asphalt/concrete and approximately one foot layer of soil from these areas and transferred this material to the TSA. New concrete was poured within the areas located to the east and northeast of the building. The concrete that was poured precluded the State of California (RHB) from

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performing a confirmatory survey in this area. GA did collect soil samples and radiological surveys before the concrete was poured. These areas are not included in this request for unrestricted use due to unresolved issues and will be the subject of a separate request/submittal.

### **Previous Activities (History of Use) & Classification**

The newly exposed open land areas included within this "addendum" report were classified as an "unaffected area" due to the soil's sheltered location beneath the asphalt that was removed and/or the ~ one foot layer of soil that was also removed prior to soil sampling and radiological surveying. All of the newly exposed surfaces were composed of soil.

### **Criteria for Release to Unrestricted Use**

#### **Release Criteria for Soils**

The predominant radionuclides found in the soil at GA and the release criteria in pCi/g for these radionuclides are provided as follows:

Enriched Uranium (U-234 + U-235)	30 pCi/g
Thorium (Th-228 + Th-232)	10 pCi/g
Depleted Uranium	35 pCi/g
Cs-137	15 pCi/g
Co-60	8 pCi/g

If more than one radionuclide exists, the sum of the fractions of the concentrations is calculated as follows:

$$\sum_{i=1}^n \frac{C_i}{L_i}$$

$C_i$  = The average concentration of radionuclide  $i$  in the sample above background levels.

$L_i$  = The release criteria for radionuclide  $i$ .

The sum of the fractions must be less than or equal to one for the sample to meet the release criteria.

#### **Exposure Rate Guideline**

Exposure rates measured at 1 meter above the surface are not to exceed 10  $\mu$ R/hr above background levels.

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### **Instrumentation**

The instrument/detector used during the surveys was a Ludlum Model 3, serial number 153590, coupled to a Model 44-10 NaI(Tl) Scintillator, serial number 155190 and has a calibration due date of 03/09/2000. The instrument has four ranges, 0-500  $\mu\text{R/hr}$ . The instrument is used for measuring external dose rates on the surface and at one (1) meter from the surface. The scintillator [2" x 2" NaI(Tl)] is mounted externally. This exposure rate meter is calibrated quarterly and was in current calibration during the performance of these surveys.

### **Background Measurements**

#### **Exposure Rate Background**

Typical exposure rate background for this site using an exposure rate meter is about 15  $\mu\text{R/hr}$  measured at 1 meter from the surface. This value can be measured south of Building 15 (an office building on the eastern portion of the GA site). Measurements taken offsite in 10 different locations (9 offsite and 1 onsite at a non-impacted area near Building 15) over a period of 15 months also averaged  $\sim 15 \mu\text{R/hr}$  (measured at 1 m from the surface). The range of 12-18  $\mu\text{R/hr}$  is typical at the GA site for the external dose rates measured at 1 meter from the surface.

#### **Background Soil Concentrations of Concern**

Typical background concentrations measured by gamma spectroscopy in soil near the GA site have been established (at the 95% confidence level) and are provided in Table 1 with the locations where these samples were taken.

### **Final Surveys Performed**

#### **Objectives and Responsibilities**

The objectives of the final survey plans were: (1) to demonstrate that the soil sample results were well below GA's approved release criteria for unrestricted use and (2) that the exposure rate measurements taken throughout this open land area measured at 1 meter above the surface and on contact with the surface were less than 10  $\mu\text{R/hr}$  above background.

Surveys were taken in accordance with an approved survey plan only by qualified Health Physics Technicians having a minimum of three years health physics experience. Soil samples were counted in GA's Health Physics Laboratory which maintains an effective QA program.

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Every survey taken was documented on a daily basis to a worksheet/drawing showing the approximate locations surveyed/sampled. The documentation included the results of the measurements (including units), the technician's signature, date, instrument(s) used (including the model and serial number of both the ratemeter and detector), calibration due date, % efficiency, background readings (if applicable) and any other pertinent information.

Each soil sample collected was properly logged, labeled, packaged and tracked and the sampling locations were documented on a drawing.

### Survey Plans

A Final Survey Plan was developed based on the previous history of the open land area and adjacent buildings, the radionuclides of concern for this area, the potential for contamination, the various types of surfaces encountered and the classification of the area (unaffected).

The surveys/sampling conducted within the land areas located to the south and southeast of Building 27 were completed in accordance with an approved written survey plan. A copy of the final survey plan is provided in the appendix as follows: "Addendum #1 To: Final Survey Plan for Building 27 Outside Area," dated November 30, 1999.

### Removal of Asphalt & Soil

Details pertaining to the removal of the asphalt/concrete and approximately one foot of soil from the south, east and southeast areas to the TSA are summarized in the memo "Release of Asphalt, Concrete and Soil from the Front Yard of Building 27" in accordance with the Internal Correspondence labeled "JPT-99-15," dated November 30, 1999. This action was necessary before Addendum #1 could be implemented.

### Soil Sampling

After the removal of the asphalt and approximately one foot of soil to the TSA, soil samples were taken from the exposed ground soil areas. The locations selected took into consideration the 2m x 2m grid sampling plan as well as the proximity of the land area's boundary, potential drainage from this & other sites and the accessibility of the sampling locations.

Shallow soil samples were collected to a depth of 15 cm (0-6") using manual equipment (i.e., long handled spades). Each of the soil samples taken was approximately 1 kilogram in mass. The samples were properly logged, labeled, tracked and packaged into plastic bags. All debris (i.e., grass, rocks, sticks, asphalt and foreign objects) was removed from each sample. Each soil sample was individually crushed to reduce large lumps, dried, placed into a tared marinelli beaker (filled to the top), weighed, sealed and transported to GA's Health Physics Laboratory.



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Soil samples were analyzed in GA's Health Physics Laboratory with a Canberra Gamma Spectroscopy MCA System using a high purity Germanium Detector. The system is calibrated using NIST traceable standards and performance checked daily.

Soil samples were counted for a minimum of 30 minutes each. A 30 minute count was sufficient to detect the radionuclides of concern at levels well below GA's approved soil release criteria.

### **Survey Summary**

A summary of the number of exposure rate measurements and samples taken during the Addendum #1 Final Surveys and the State of California Confirmatory Surveys are provided as follows:

<b>Open Land Area (Building 27) Summary of Surveys Performed</b>		
<b>Survey</b>	<b># of Exposure Rate Measurements (<math>\mu</math>R/hr)</b>	<b># of Samples Taken and Analyzed</b>
Addendum #1 - Ground Soil located within the South & Southeast Land Areas	42	21
State of CA - Confirmatory - Soil & Asphalt Samples located within the TSA & West Land Areas	---	14

### **Results of the Final Surveys**

#### **Exposure Rate Measurements**

A total of 42 direct radiation exposure rate measurements were taken within the open land area. The measurements were taken at contact and at ~ 1 meter above the surface using Na(Tl) detectors. The exposure rate measurements and their locations are provided in Figure 4. The exposure rate measurement results were all less than 10  $\mu$ R/hr above background (i.e., < 25  $\mu$ R/hr).

#### **Soil Samples**

A total of 21 soil samples were collected from the exposed ground soil to the south and southeast of Building 27. Gamma spectroscopy results are provided for these samples in Table 2 and the approximate sample locations are shown in Figure 4. The isotopic results (pCi/g) showed Cs<sup>137</sup> contamination in 9 of the 21 samples but the results were all well below GA's soil release criteria and all concentrations were < 1 pCi/g. Uranium and Thorium concentrations were all at or near background levels. There was no Co<sup>60</sup> detected in any of these samples.

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### Samples Collected by both the State of California (RHB) and General Atomics Personnel

Ms. Brown from the State of California (RHB) arrived at the GA site on 12/02/99 to perform confirmatory surveys of the west land area and the freshly exposed soil surfaces in the south and southeast land areas associated with Building 27. She also collected samples of the soil and asphalt that was transferred from the outside yard areas of Building 27 and stored within the Temporary Storage Area (TSA). Some surface soil samples (0-6") were also collected from the west land area. She collected approximately 25 samples to be analyzed by gamma spectroscopy.

Fourteen of these samples were split with the State of California (RHB) and GA in order to be analyzed independently. Twelve of these samples were collected from material (i.e., soil & asphalt) transferred to the TSA and two surface soil samples (0-6") that were collected from the west land area. The samples collected from within the TSA were obtained at various depths into the mounds of material (i.e., some to a depth of 4').

The two surface soil samples collected from the west land area were obtained from grids A-27 (OAW-S1) and A-18 (OAW-S2). Three samples (T23-1, 2 & 3) were collected from the soil that was transferred to the TSA from the equipment storage pad located in the northeast area. Four samples (T36-1, 2, 3 & 4) were samples collected from the soil that was transferred to the TSA during the excavation of a ditch for the new sewer line located in front of Building 27 (south area). One sample (T37-1) was a sample collected from the asphalt that was transferred to the TSA from the parking lot (southeast area). Four samples (T38-1, 2, 3 & 4) were samples collected from the soil that was transferred to the TSA from the south land area and the parking lot (southeast area).

The isotopic results (pCi/g) showed Cs<sup>137</sup> contamination in 5 of the 14 samples but all of the results were well below GA's soil release criteria and all concentrations were < 1 pCi/g. Uranium and Thorium concentrations were all at or near background levels. There was no Co<sup>60</sup> detected in any of these samples. Isotopic results are provided for these samples in Table 3 and their approximate locations are shown in Figures 4 and 5.

### **Conclusion**

Final contamination and radiation surveys, as well as soil sample results provided in this report demonstrate that the west, south and southeast open land areas associated with Building 27 meet the approved criteria for release to unrestricted use.

**Table 1: Typical Background Radionuclide Concentrations (pCi/g) in Soil <sup>1,2</sup>**

Sample ID <sup>3</sup>	Cs-137	Th-228	Ra-228 (Th-232)	Total Thorium (Th-228 + Th-232)	U-238	U-235
AJ	ND	1.28 ± 0.07	1.47 ± 0.14	2.75	1.98 ± 0.31	0.15 ± 0.03
G2	0.12 ± 0.03	0.92 ± 0.07	1.01 ± 0.12	1.93	1.86 ± 0.29	0.12 ± 0.02
AC	ND	1.29 ± 0.07	1.34 ± 0.14	2.63	2.27 ± 0.27	0.20 ± 0.03
BKG-1	ND	1.40 ± 0.16	1.44 ± 0.28	2.84	2.06 ± 0.48	0.19 ± 0.06
BKG-2	ND	1.54 ± 0.15	1.57 ± 0.27	3.11	2.30 ± 0.45	0.17 ± 0.05
BKG-3	ND	1.40 ± 0.14	1.62 ± 0.26	3.02	ND	0.19 ± 0.05
BKG-4	ND	0.67 ± 0.09	0.84 ± 0.17	1.51	1.15 ± 0.37	0.09 ± 0.04
BKG-5	ND	1.51 ± 0.16	1.79 ± 0.31	3.30	2.77 ± 0.67	0.12 ± 0.06
BKG-6	ND	0.68 ± 0.09	0.76 ± 0.16	1.44	ND	0.08 ± 0.03
BKG-7	ND	1.17 ± 0.12	1.28 ± 0.22	2.45	1.83 ± 0.43	0.11 ± 0.04
Mean ± 2σ		1.19 ± 0.64	1.31 ± 0.68	2.5 ± 1.32	2.03 ± 0.93	0.14 ± 0.09

<sup>1</sup> Samples gamma scanned for 1 hour.

<sup>2</sup> ND = < 0.1 pCi/g for Cs-137, < 1.0 pCi/g for U-238

<sup>3</sup> Samples collected in June and August 1993, typically about 1-2 miles from the Building 37 site at the following locations:

- AJ Collected on a hillside west of Building 39 & northwest of building 37, ~3' from GA's fence.
- G2 Collected about 1200 feet west of Bldg 1 (near T.P. RD.), and ~7/8 of a mile southwest of Building 37.
- AC Collected about 1 mile southeast of the main site & about 2 miles southeast of Building 37.
- BKG-1 Collected about 1 mile from Building 37 at the Scripps Hospital Entrance, east of Genesee Ave.
- BKG-2 Collected about 1.2 miles from Building 37 at Sorrento Court Rd. by North entrance to Post Office.
- BKG-3 Collected about 1.5 miles from Building 37 at Sorrento Vista Parkway near Lusk Blvd. South.
- BKG-4 Collected about 1 mile west from Building 37, west off Genesee corner of North Torrey Pines Road and Torrey Pines Scenic Drive
- BKG-5 Collected about 2 miles west of GA off of La Jolla Shores Drive.
- BKG-6 Collected about 2 miles northwest of Building 37 on North Torrey Pines Road
- BKG-7 Collected about 2 miles near V.A. Hospital on La Jolla Village Drive (southwest)

**Table 2: Gamma Spectroscopy Results of Soil Samples Collected Outside Building 27 within the East, South & Southeast Areas <sup>1</sup>**

*Radionuclide Concentration (pCi/g) - Results ± % Error (± 2σ) - Backgrounds not Subtracted - Approximately 30 Minute Counts - Surface Samples (0-6")*

Sample ID	<sup>238</sup> U 92.77 keV peak	<sup>235</sup> U 186 (144) keV peak	Total Thorium <sup>228</sup> Th + <sup>232</sup> Th	<sup>137</sup> Cs 661.6 keV peak	<sup>60</sup> Co Average of 1173 and 1332 peaks
#1	2.13 ± 37.1%	0.18 ± 57.7%	2.55	0.22 ± 36.6%	ND <sup>2</sup>
#2	2.24 ± 29.7%	0.10 ± 90.1%	2.67	ND	ND
#3	2.13 ± 36.5%	0.28 ± 36.8%	3.34	ND	ND
#4	3.62 ± 22.7%	0.30 ± 32.8%	3.04	ND	ND
#5	2.15 ± 64.5%	0.17 ± 50.8%	3.00	0.07 ± 114.8%	ND
#6	1.58 ± 42.8%	0.21 ± 36.8%	2.03	ND	ND
#7	2.48 ± 40.6%	0.11 ± 87.3%	2.48	0.26 ± 35.5%	ND
#8	2.48 ± 28.4%	0.13 ± 52.9%	2.09	ND	ND
#9	3.08 ± 30.0%	0.19 ± 46.7%	2.76	ND	ND
#10	1.91 ± 36.5%	0.16 ± 44.5%	2.14	0.09 ± 74.1%	ND
#11	1.84 ± 33.9%	0.20 ± 39.5%	2.29	ND	ND
#12	1.89 ± 33.3%	0.16 ± 40.4%	1.68	0.13 ± 59.6%	ND
#13	1.46 ± 48.7%	0.13 ± 83.5%	2.47	ND	ND
#14	2.61 ± 27.4%	0.16 ± 39.3%	1.65	0.18 ± 25.8%	ND
#15	1.52 ± 42.4%	0.12 ± 73.1%	2.88	ND	ND
#16	0.84 ± 62.2%	0.11 ± 62.1%	1.66	0.53 ± 17.8%	ND
#17	2.54 ± 33.8%	0.12 ± 66.4%	2.14	ND	ND
#18	1.94 ± 31.3%	0.16 ± 39.7%	2.02	ND	ND
#19	1.52 ± 50.8%	0.16 ± 64.5%	2.61	0.11 ± 74.0%	ND
#20	2.26 ± 30.1%	0.15 ± 39.8%	2.24	0.08 ± 62.4%	ND
#21	1.51 ± 47.5%	0.15 ± 57.5%	2.58	ND	ND

<sup>1</sup> Locations where the soil samples were collected are provided in Figure 4.

<sup>2</sup> ND (Not Detected) = ≤ 0.1 pCi/g for Cs<sup>137</sup> and ≤ 0.1 pCi/g for Co<sup>60</sup>.

**Table 3: Gamma Spectroscopy Results of Samples Collected by the State of California and General Atomics' Personnel <sup>1</sup>**

*Radionuclide Concentration (pCi/g) - Results ± % Error (± 2σ) - Backgrounds not Subtracted - Approximately 30 Minute Counts*

Sample ID	<sup>238</sup> U 92.77 keV peak	<sup>235</sup> U 186 (144) keV peak	Total Thorium <sup>228</sup> Th + <sup>232</sup> Th	<sup>137</sup> Cs 661.6 keV peak	<sup>60</sup> Co Average of 1173 and 1332 peaks
<b>Samples Collected from the Temporary Storage Area (TSA)</b>					
T23-1	3.04 ± 48.1%	0.20 ± 42.2%	2.45	ND <sup>2</sup>	ND
T23-2	2.37 ± 37.3%	0.20 ± 44.8%	2.75	ND	ND
T23-3	1.75 ± 38.4%	0.17 ± 34.6%	2.03	ND	ND
T36-1	1.38 ± 46.7%	0.13 ± 63.4%	2.40	ND	ND
T36-2	1.99 ± 26.9%	0.19 ± 31.8%	2.15	ND	ND
T36-3	1.49 ± 51.3%	0.16 ± 64.5%	2.48	ND	ND
T36-4	2.14 ± 30.2%	0.16 ± 47.4%	2.48	ND	ND
T37-1	1.89 ± 49.2%	0.13 ± 62.7%	2.95	0.07 ± 111.3%	ND
T38-1	2.12 ± 30.7%	0.19 ± 32.7%	2.23	0.08 ± 84.1%	ND
T38-2	1.47 ± 38.9%	0.15 ± 60.1%	2.71	ND	ND
T38-3	1.90 ± 31.7%	0.15 ± 54.1%	2.05	0.12 ± 43.5%	ND
T38-4	1.85 ± 31.4%	0.17 ± 45.2%	1.84	ND	ND
<b>Soil Samples Collected from the West Side of Building 27</b>					
OAW-S1	1.88 ± 33.3%	0.18 ± 35.7%	2.48	0.04 ± 114.6%	ND
OAW-S2	2.50 ± 37.3%	0.19 ± 45.4%	2.14	0.22 ± 34.0%	ND

<sup>1</sup> Locations where the soil samples were collected are provided in Figures 4 and 5.

<sup>2</sup> ND (Not Detected) = ≤ 0.1 pCi/g for Cs<sup>137</sup> and ≤ 0.1 pCi/g for Co<sup>60</sup>.

GA's Typical Background Soil Sample Results [in pCi/g at ± 2σ (& % Error at ± 2σ)]

<sup>U</sup> <sup>238</sup>	2.03 ± 0.93 (± 45.8%)
<sup>U</sup> <sup>235</sup>	0.14 ± 0.09 (± 64.3%)
Total Thorium (Th <sup>228</sup> + Th <sup>232</sup> )	2.50 ± 1.32 (± 52.8%)
Cs <sup>137</sup>	0.07
Co <sup>60</sup>	ND

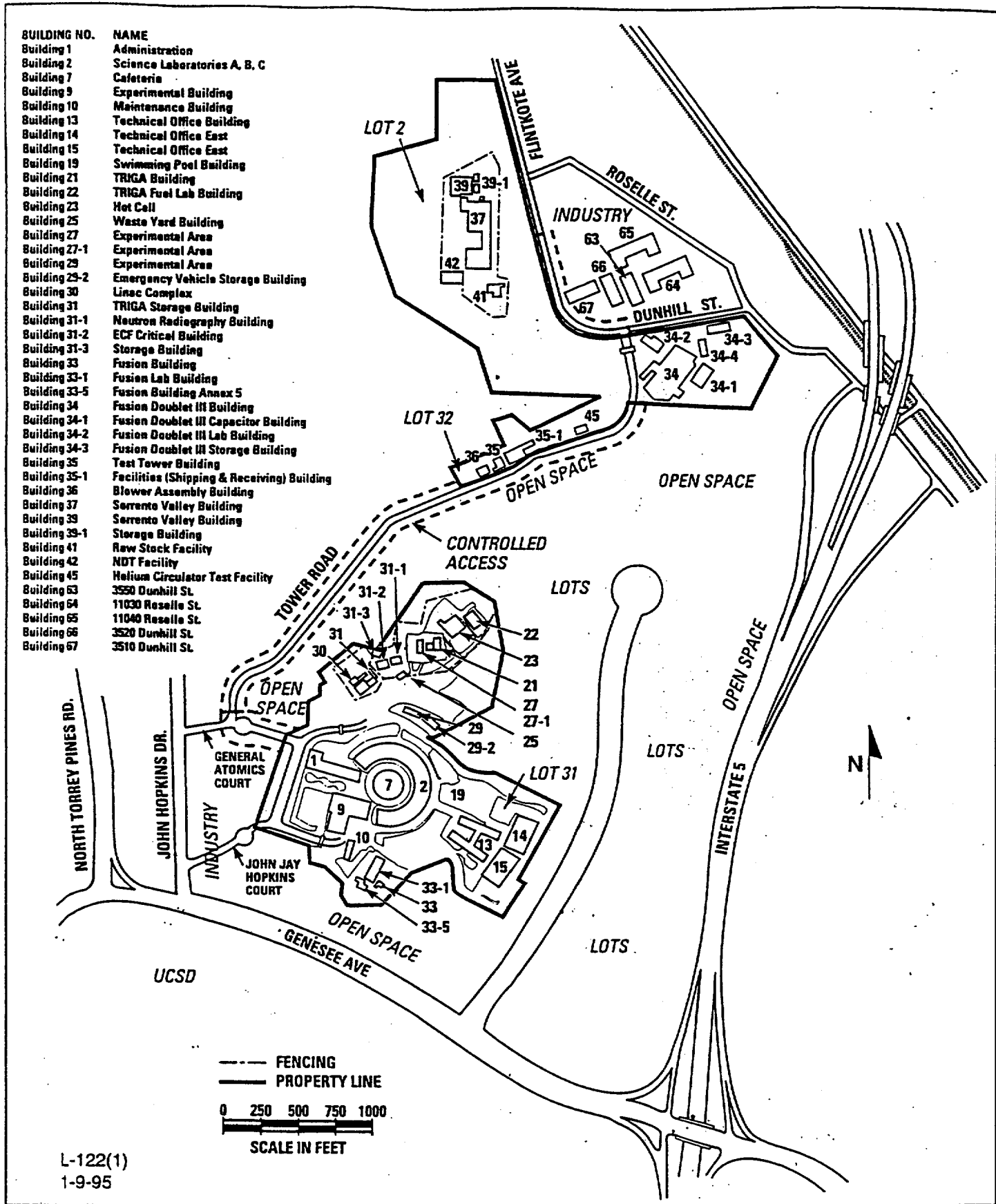
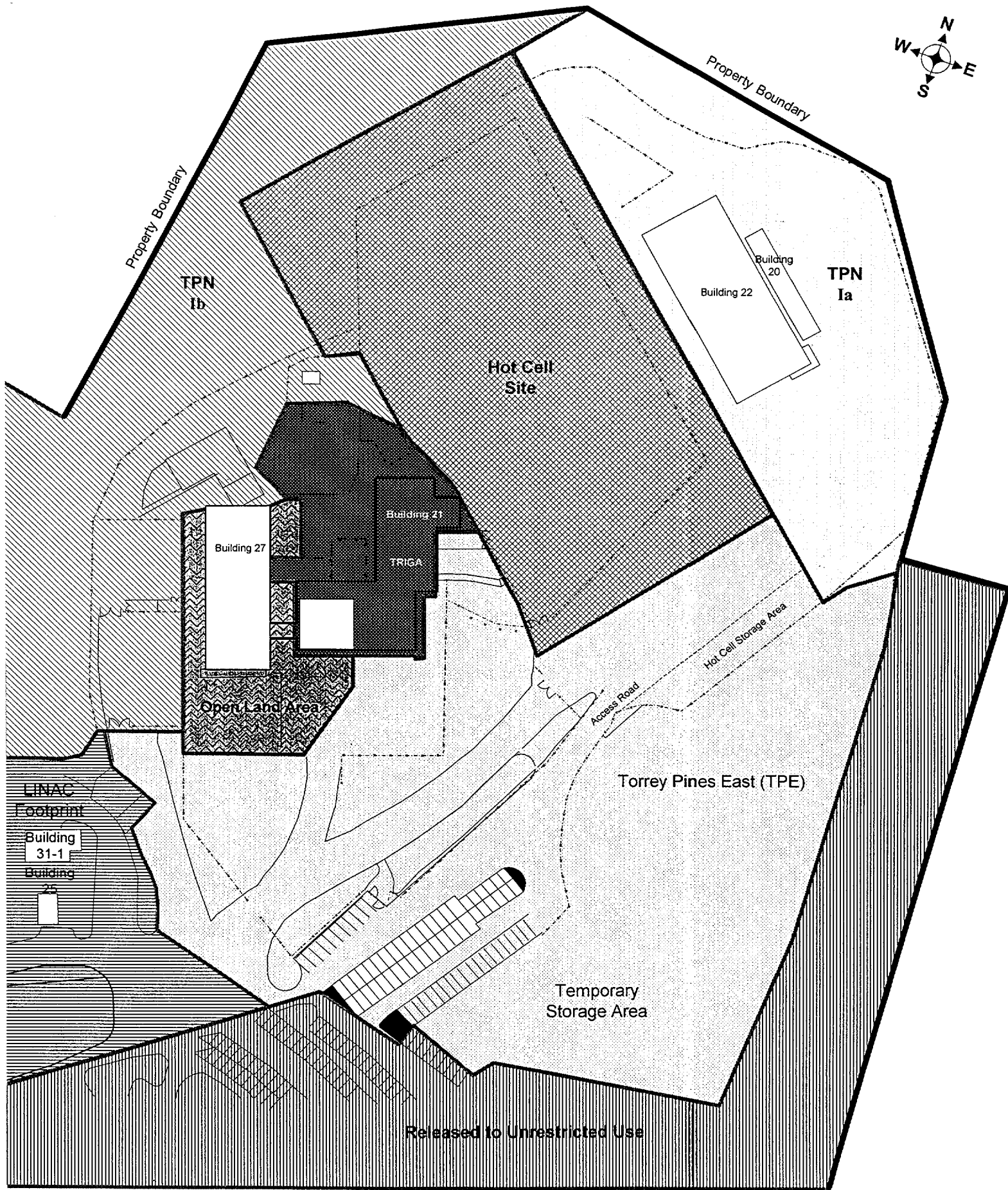
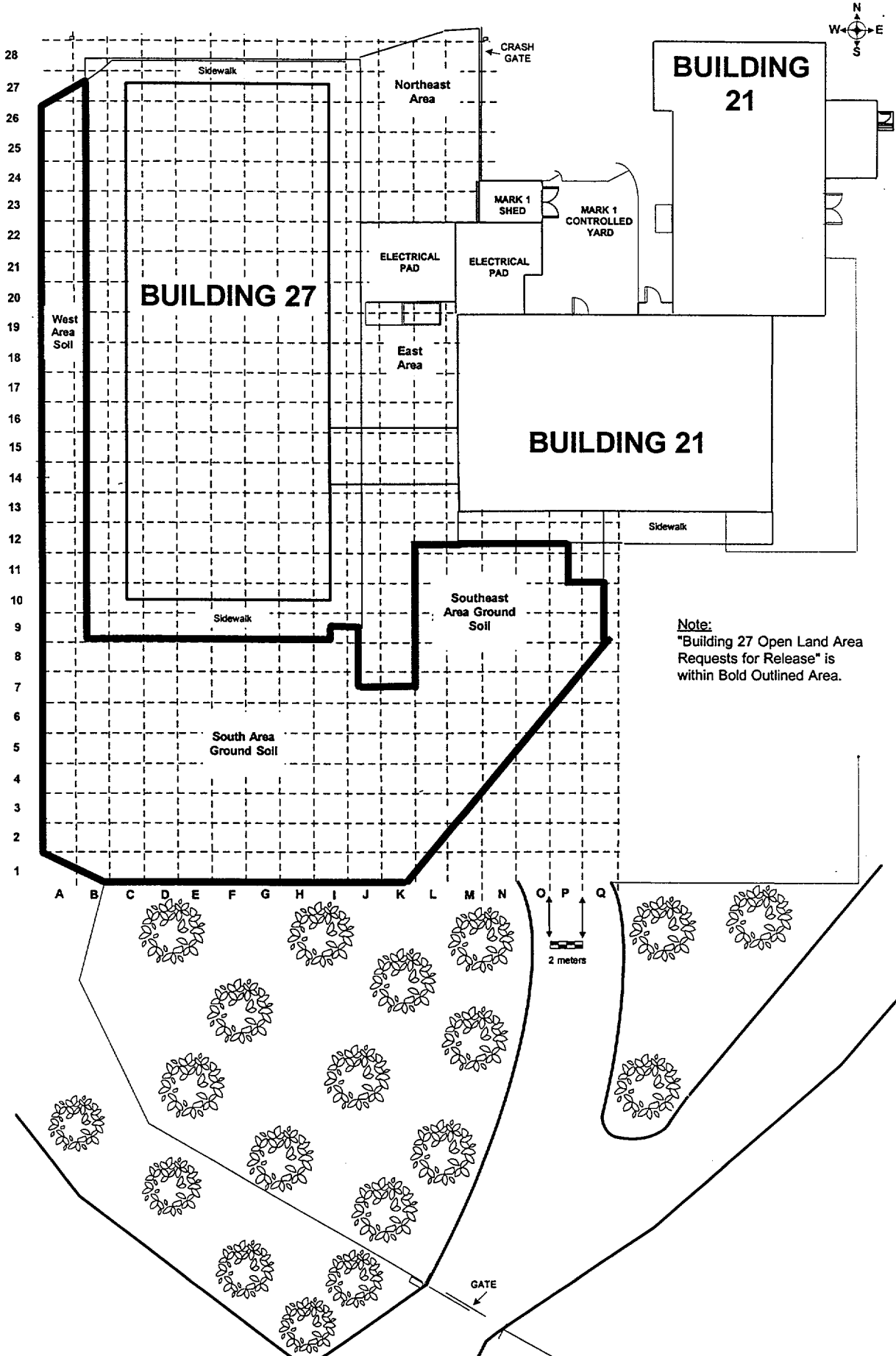


Figure 1: Plan View of General Atomics Site

Figure 2: Building 27 Open Land Area and Surrounding Areas



**FIGURE 3: BUILDING 27 "WEST, SOUTH AND SOUTHEAST LAND AREAS."**





**FIGURE 4: SOIL SAMPLES COLLECTED at BUILDING 27 YARD per "ADDENDUM #1" and TWO SOIL SAMPLES COLLECTED from the WEST LAND AREA**

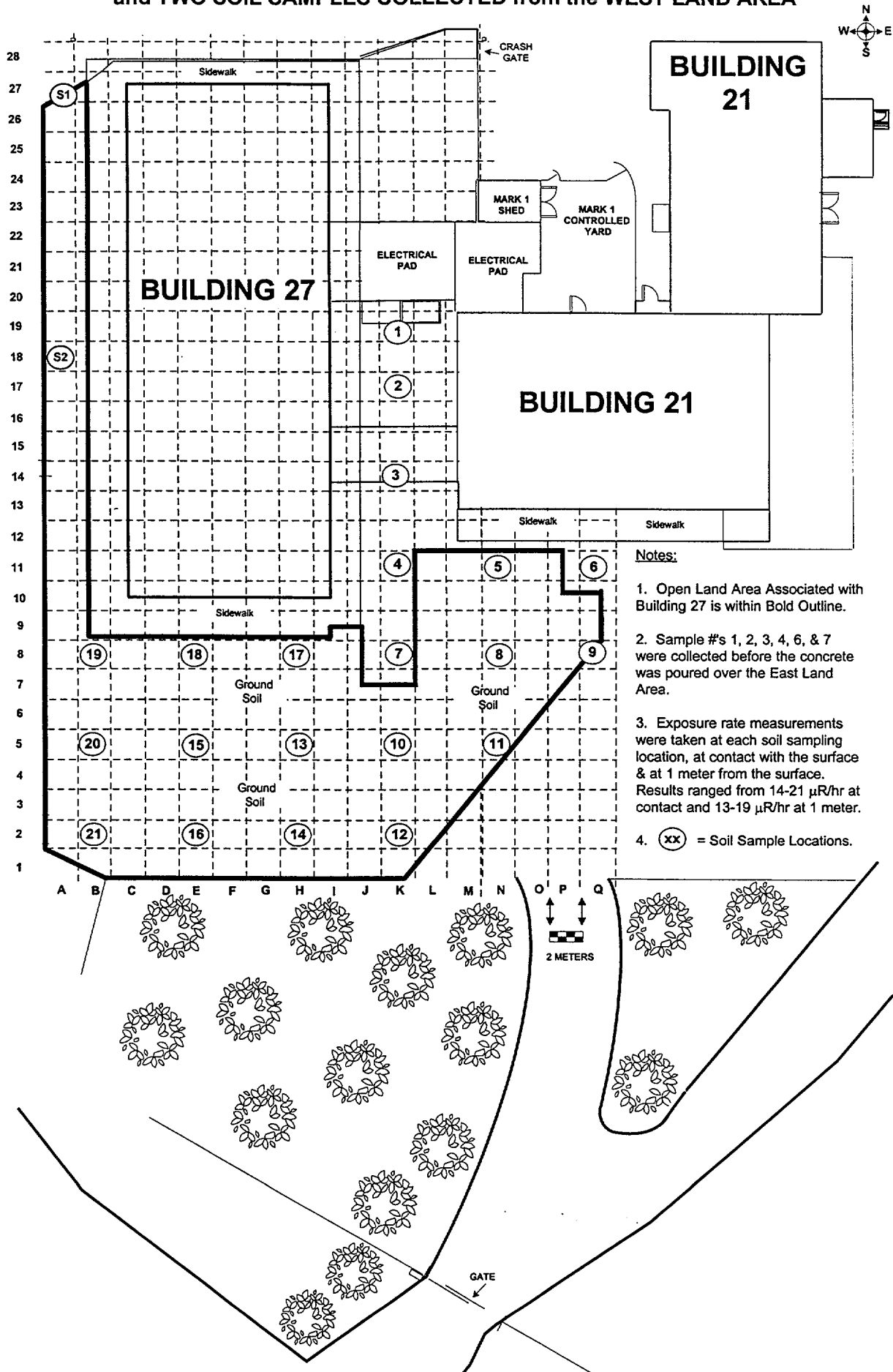
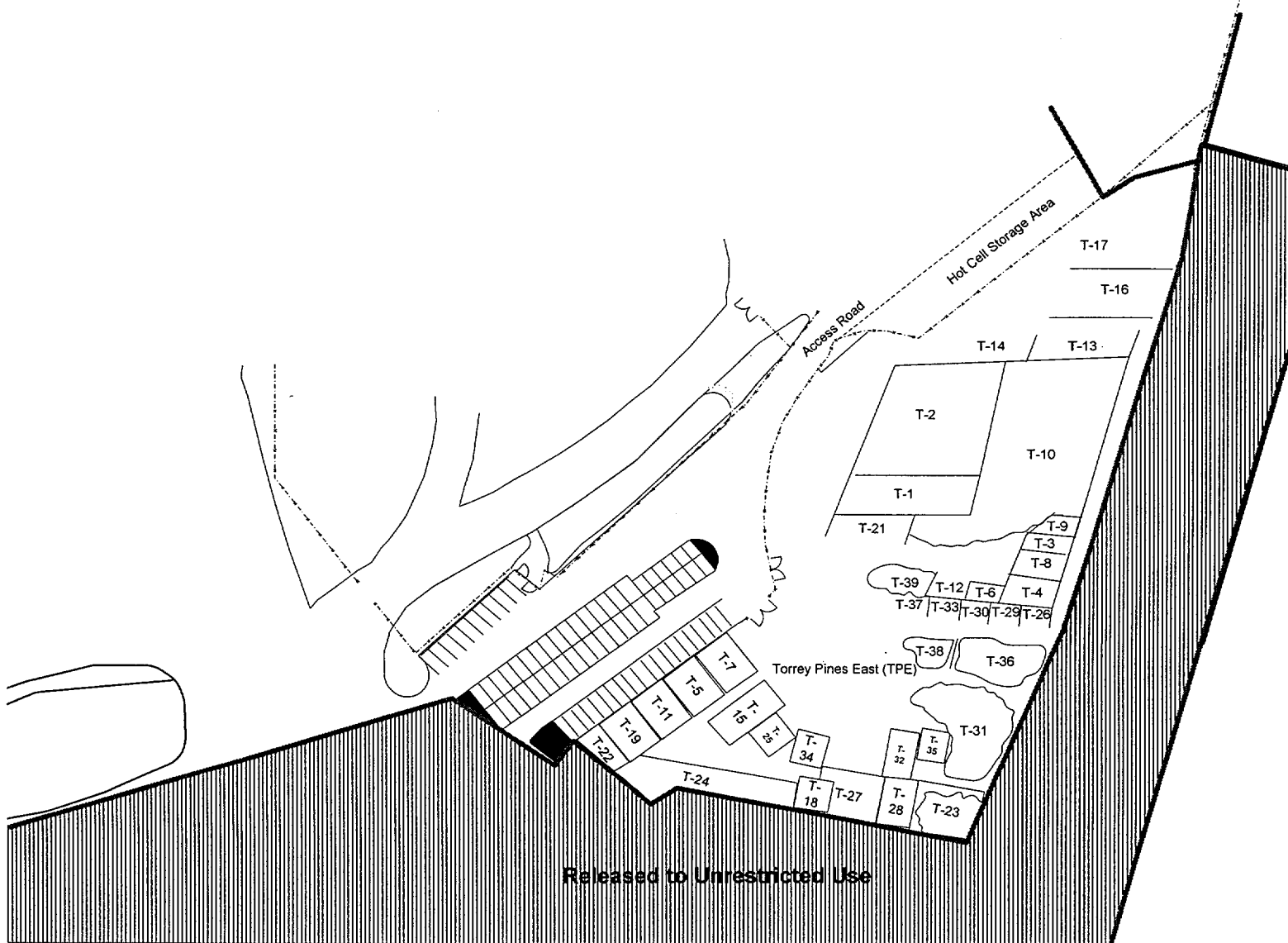


Figure 5: Building 27 Torrey Pines Temporary Storage Area



**Appendix**

**Addendum #1 to the Final Radiological Survey**

**Performed at General Atomics'**

**Open Land Area**

**Located to the West, South and Southeast**

**of Building 27,**

**dated January 24, 2000**

**Addendum #1, dated November 30, 1999 to the: "Final  
Survey Plan for Building 27 Outside Area,  
dated September 20, 1999"**

**&**

**"Release of Asphalt, Concrete and Soil from the Front Yard  
of Building 27," dated November 30, 1999.**

November 30, 1999  
Prepared by: John Turner

Approved by: Paul R. Mascherba

Date: 12/1/99

### ADDENDUM #1 TO:

#### **“Final Survey Plan for Building 27 Outside Area” dated September 20, 1999.**

After the asphalt and concrete has been removed from the east and south of Building 27 and the ground soil has been excavated to a depth of one (1) foot:

- (1) Collect 21 surface soil samples at ~ 6 meters apart (see the figure that follows),
- (2) Take exposure rate measurements at each soil sampling location, at contact and at 1 meter from the surface.

The surface beneath the asphalt/concrete and soil was classified as an “unaffected area.”

#### Alert Levels

Exposure Rate Measurements ---- > 25  $\mu$ R/hr at contact, &  
> 20  $\mu$ R/hr at 1 meter.

#### Soil Release Criteria

The predominant radionuclides found in the soil at GA and the release criteria in pCi/g for these radionuclides are provided as follows:

Enriched Uranium (U-234 + U-235)	30 pCi/g
Thorium (Th-228 + Th-232)	10 pCi/g
Depleted Uranium	35 pCi/g
Cs-137	15 pCi/g
Co-60	8 pCi/g

If more than one radionuclide exists, the sum of the fractions of the concentrations is calculated as follows:

$$\sum_{i=1}^n \frac{C_i}{L_i}$$

$C_i$  = The average concentration of radionuclide  $i$  in the sample above background levels.

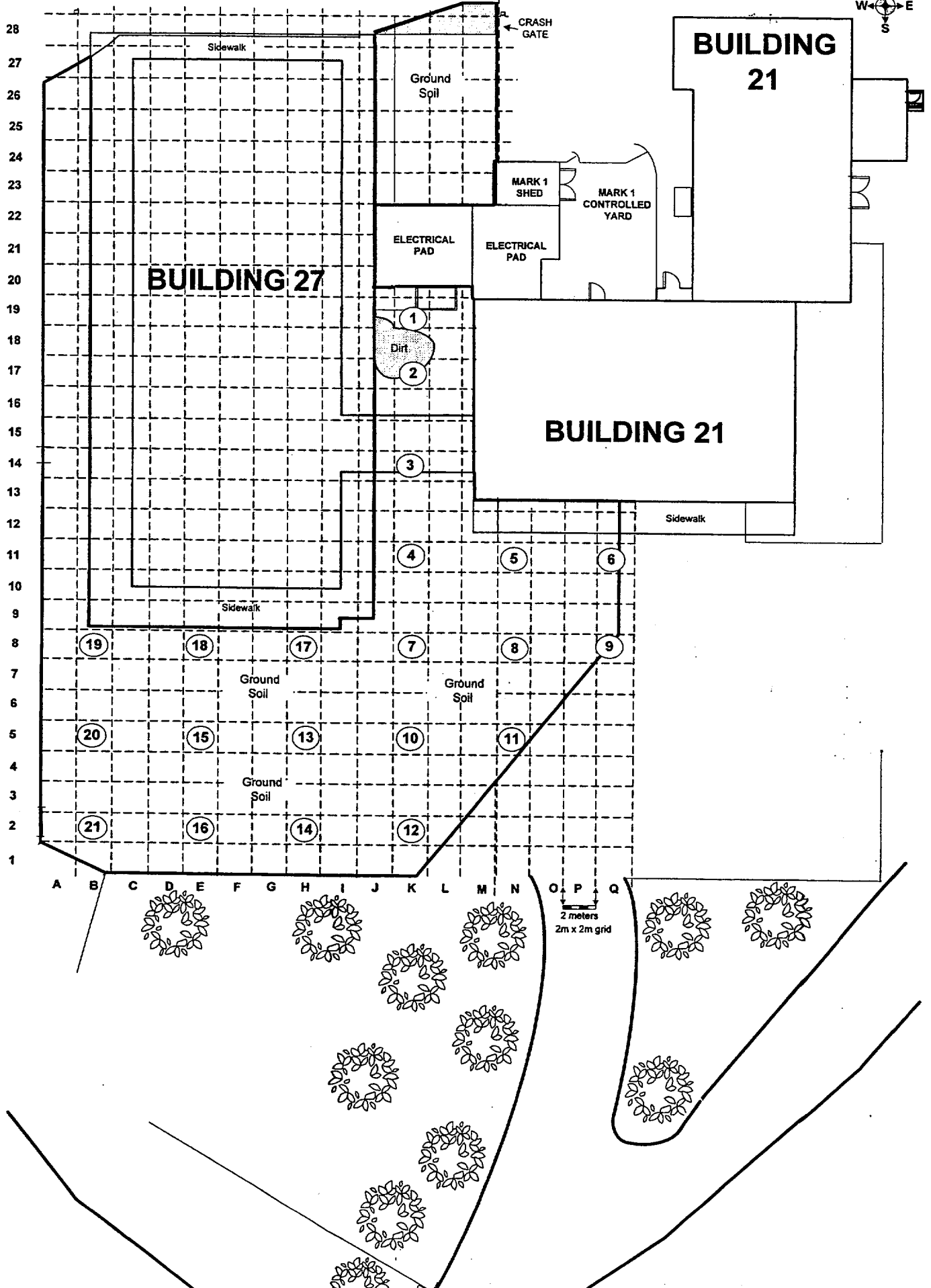
$L_i$  = The release criteria for radionuclide  $i$ .

The sum of the fractions must be less than or equal to one for the sample to meet the release criteria.

**BUILDING 27 YARD ADDENDUM #1**

**SOIL SAMPLES**

11/30/99



 **GENERAL ATOMICS**  
INTERNAL CORRESPONDENCE

**Date:** 11/30/99

**To:** F. Dahms **IN RESPONSE**

**From:** John Turner <sup>JT</sup> **REFER TO: JPT-99-15**

**Subject:** Release of Asphalt, Concrete and Soil from the Front Yard of Building 27.

**Purpose:** To allow permission to remove this material to the temporary storage area (TSA).

The surveys of the asphalt, concrete and soil located in the east and southeast of Building 27 have been completed and it was determined that this material meets the criteria for release to unrestricted use.

Permission is given to remove this material to the Temporary Storage Area (TSA) until the NRC/State of CA gives approval for its release to unrestricted use.

cc: Laura Gonzales  
Paul Maschka  
Cornelius Stanley/Barbara Lyons

November 29, 1999

## **Evaluation of the asphalt covered parking lot and asphalt/concrete walkways within the open land area associated with Building 27.**

The asphalt parking lot located to the southeast of Building 27 and the asphalt and concrete walkways located between Building 27 and Building 21 is to be removed in order to construct a new parking lot and walkway. Some soil will also be removed. This area encompasses ~ 264 m<sup>2</sup>.

The surveys were conducted according to the Final Survey Plan dated September 20, 1999. The survey sheets included the location, purpose, dates, HP technician's names and signatures, results of the surveys and data for the instruments used during the surveys (i.e., instrument and detector serial numbers, calibration due dates and efficiencies).

The asphalt and concrete surfaces were scanned 100% for beta with a 434 cm<sup>2</sup> detector. The maximum results was 2432 cpm for asphalt (the background on asphalt for the instrument used was 2175-2460 cpm), therefore all measurements were < background levels. The maximum results was 2541 cpm for concrete (the background on concrete for the instrument used was 1600-1995 cpm). This location as well as several other locations that had readings at ~ 2500 cpm on the concrete surfaces were scanned with a 15 cm<sup>2</sup> GM pancake detector. All results were ≤ typical background levels (≤ 80-100cpm).

The asphalt and concrete surfaces were scanned 10% for alpha with a 434 cm<sup>2</sup> detector. The maximum results were all < 20 cpm (the background on asphalt for the instrument used was 0-32 cpm and 0-26 cpm for concrete), therefore all measurements were < background levels.

Twenty-two (22) two minute fixed beta measurements were taken on the asphalt with a 100 cm<sup>2</sup> beta detector and the maximum results was 693 dpm/100 cm<sup>2</sup> (MDA for this instrument on asphalt = 315 dpm/100 cm<sup>2</sup>). Nine (9) two minute fixed beta measurements were taken on the concrete with a 100 cm<sup>2</sup> beta detector and the maximum results was 794 dpm/100 cm<sup>2</sup> (MDA for this instrument on concrete = 290 dpm/100 cm<sup>2</sup>).

Thirty (30) fixed alpha measurements were taken with a 50 cm<sup>2</sup> alpha detector on the asphalt and concrete surfaces and the maximum result was 139 dpm/100 cm<sup>2</sup> (MDA for this instrument for asphalt and concrete = 121 dpm/100 cm<sup>2</sup>).

Twenty-eight (28) smears (100 cm<sup>2</sup>) were taken and the results measured < 15 dpm/100 cm<sup>2</sup> for both α and β.

Six (6) soil samples were taken from beneath the asphalt parking lot and all of the gamma spec results were well below GA's typical release criteria.

Dose rate measurements were taken throughout this area with a micro R meter. The surface was scanned 100% and the dose rates ranged from 15-22 μR/hr. Sixty (60) measurements were taken at 1 meter from the surface and results ranged from 15-20 μR/hr.

Based on these survey measurements the asphalt/concrete and soil may be removed from this area and stored in the Temporary Storage Area until the State of CA (RHB) or NRC approves the release of this material to a local landfill.

Evaluated by:

John Duma

Date:

11/30/99

FIGURE 3: DIAGRAM OF THE OPEN LAND AREA ASSOCIATED WITH BUILDING 27

