

January 25, 1999

Mr. Anand Gupta
U.S. Department of Energy
EM-43
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SUBJECT: SECOND ADDENDUM TO THE VERIFICATION SURVEY OF THE BUILDING T064 SIDE YARD, SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CALIFORNIA (ORISE 1993 AND 1995)

Dear Mr. Gupta:

The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) recently completed the third verification of the Building T064 (now known as 4054) Side Yard at the Santa Susana Field Laboratory (SSFL) in Ventura County, California (Figure 1). Rocketdyne/Boeing, formerly known as Rockwell, operates the SSFL. The Energy Technology Engineering Center (ETEC) is that portion of the SSFL operated for the U.S. Department of Energy (DOE), where nuclear energy research and development programs were performed. Contract work for the Atomic Energy Commission (AEC) and the Energy Research and Development Administration (ERDA), predecessor agencies to the DOE, began in the early 1950's. Specific programs conducted for AEC/ERDA/DOE involved engineering, developing, testing, and manufacturing operations for nuclear reactor systems and components. Rocketdyne/Boeing is currently decommissioning a number of those facilities that were associated with the various nuclear research programs.

One of these SSFL facilities, the Building T064 Side Yard (Figure 2), was occasionally used for storage of recoverable uranium scrap, irradiated fuel elements, and miscellaneous radioactive wastes. In the early 1960's, the drain plug of a lead-pig cask containing irradiated "Seawolf" fuel and contaminated water failed and allowed the contaminated water to leak into the side yard. A 65 m² area was excavated immediately following the incident. However, a 1988 comprehensive radiological survey of the area around Building T064 identified elevated soil concentrations of Cs-137 (and an assumed equivalent amount of Sr-90). Further investigations determined that a 47 m² area of contamination was located within the northeast fence line and extended in the northeast direction past the fence line over an additional area of 370 m². A Cs-137 guideline was developed and the top 41 cm of soil was, subsequently, excavated from the area and a post-remedial action survey performed and documented. However, ESSAP verification surveys performed in 1992, and

then again in 1995, identified the presence of contamination in excess of the guideline (ORISE 1993, and 1995). Further remedial activities in 1996 included the removal of additional soils and a septic tank and its leach field. The additional soil excavated from the side yard extended southeast under G street to an area approximately 45 meters in diameter on the south side of the street. After these areas were decontaminated by Rocketdyne/Boeing, core sampling was performed to document the final radiological status of the area (Boeing 1998).

On September 29, 1998, ESSAP performed a reverification survey of the Building T064 Side Yard and the additional remediated land areas. The survey was conducted in accordance with a DOE approved site-specific survey plan (ORISE 1998). Survey procedures included gamma surface scans using NaI scintillation detectors coupled to ratemeters with audible indicators, exposure rate measurements using a microrem meter, and soil sampling.

ESSAP's surface scans of the area identified elevated direct gamma radiation in an area due west of the location where Building T064 formerly stood and outside of the project remediation boundary (Figure 2). Surface scans of the remaining excavated area did not identify any locations of elevated direct radiation. Soil samples were collected from 19 locations—four of which represented samples from the area of elevated direct gamma radiation detected by surface scans and the remaining 15 were from randomly selected locations (Figure 3). Exposure rate measurements were performed at one meter above each sampling location. Rocketdyne/Boeing personnel were notified that contamination was suspected in the area of elevated direct gamma radiation and they elected to perform additional remediation while ESSAP was on-site. ESSAP personnel then collected two post-remedial action samples.

Samples were analyzed by gamma spectroscopy at ESSAP's laboratory in Oak Ridge, Tennessee. Analytical results are provided in Table 1. Cesium-137 concentrations in soil samples from random locations ranged from less than 0.06 to 2.9 pCi/g and those collected from the area of elevated direct gamma radiation ranged from 23.4 to 80.6 pCi/g. The Cs-137 concentrations in the two post-remedial action samples were 0.4 and 0.6 pCi/g. Exposure rates ranged from 9 to 13 μ R/h.

The verification survey results were compared with the guidelines established for the SSFL (DOE 1996 and State of California 1996). The site-specific criterion for Cs-137 is 9.2 pCi/g (Table 2). After the additional remediation, Cs-137 concentrations were within this criterion. The DOE exposure rate guideline is 20 μ R/h above background (DOE 1990). However, Rocketdyne/Boeing has elected to use a more conservative criterion of 5 μ R/h above background. Exterior background exposure rates for the SSFL average 14 μ R/h. The T064 Side Yard exposure rates ranged from 9 to 13 μ R/h and therefore, satisfy this criterion.

In summary, ESSAP's verification survey supports Rocketdyne/Boeing's conclusion that the T064 Side Yard satisfies the criteria for release for unrestricted use. However, it is ESSAP's opinion that the source of the contaminated area that ESSAP identified outside of the project area should be investigated and addressed by Rocketdyne/Boeing.

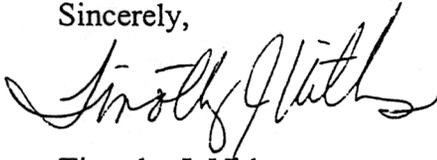
Mr. Anand Gupta

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Please contact me at (423) 576-5073 or Eric Abelquist at (423) 576-3740 should you have any questions or require additional information.

Sincerely,



Timothy J. Vitkus
Survey Projects Manager
Environmental Survey and
Site Assessment Program

TJV:dkh

Enclosure

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Files/357 and 402

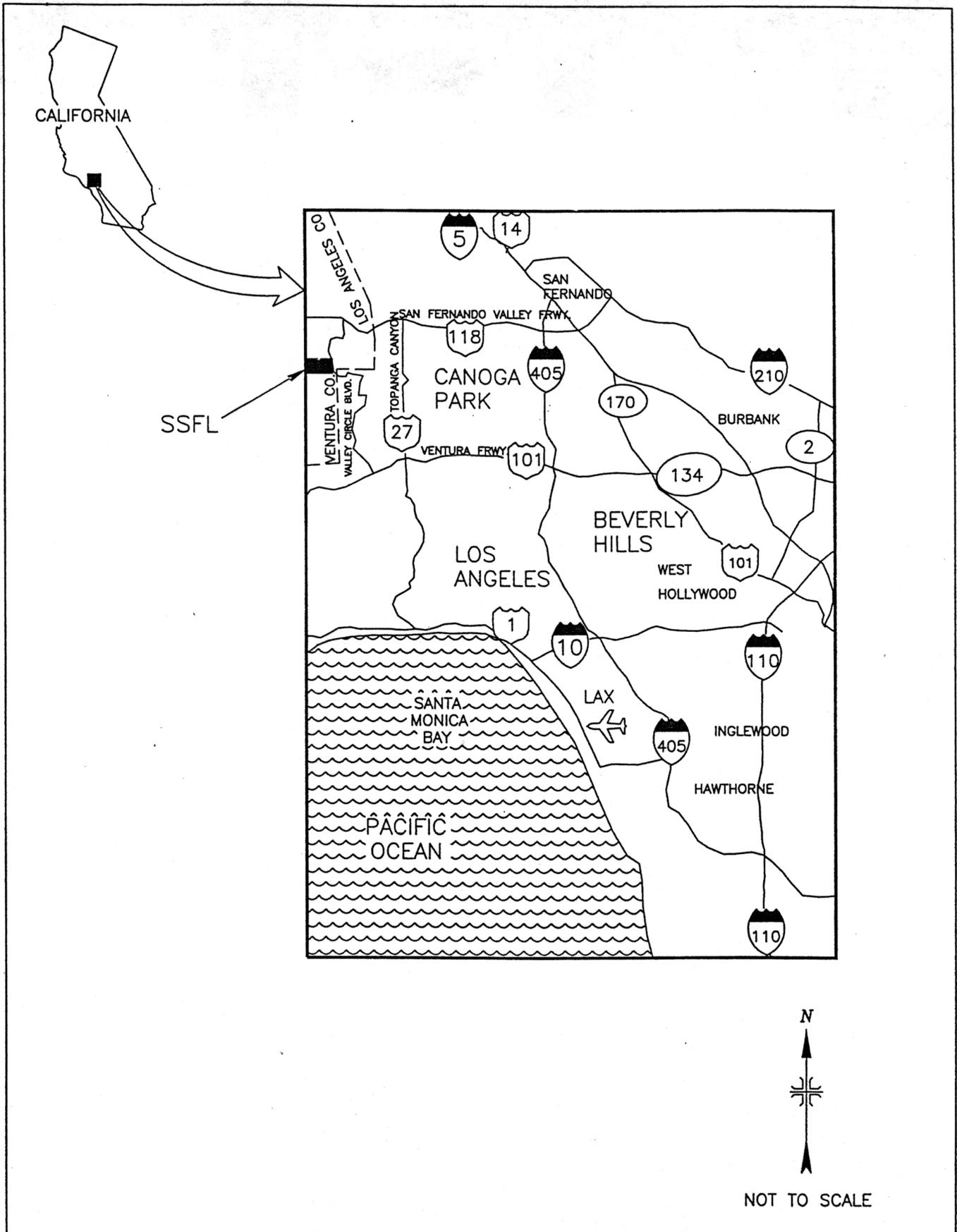


FIGURE 1: Los Angeles, California Area – Location of the Santa Susana Field Laboratory Site

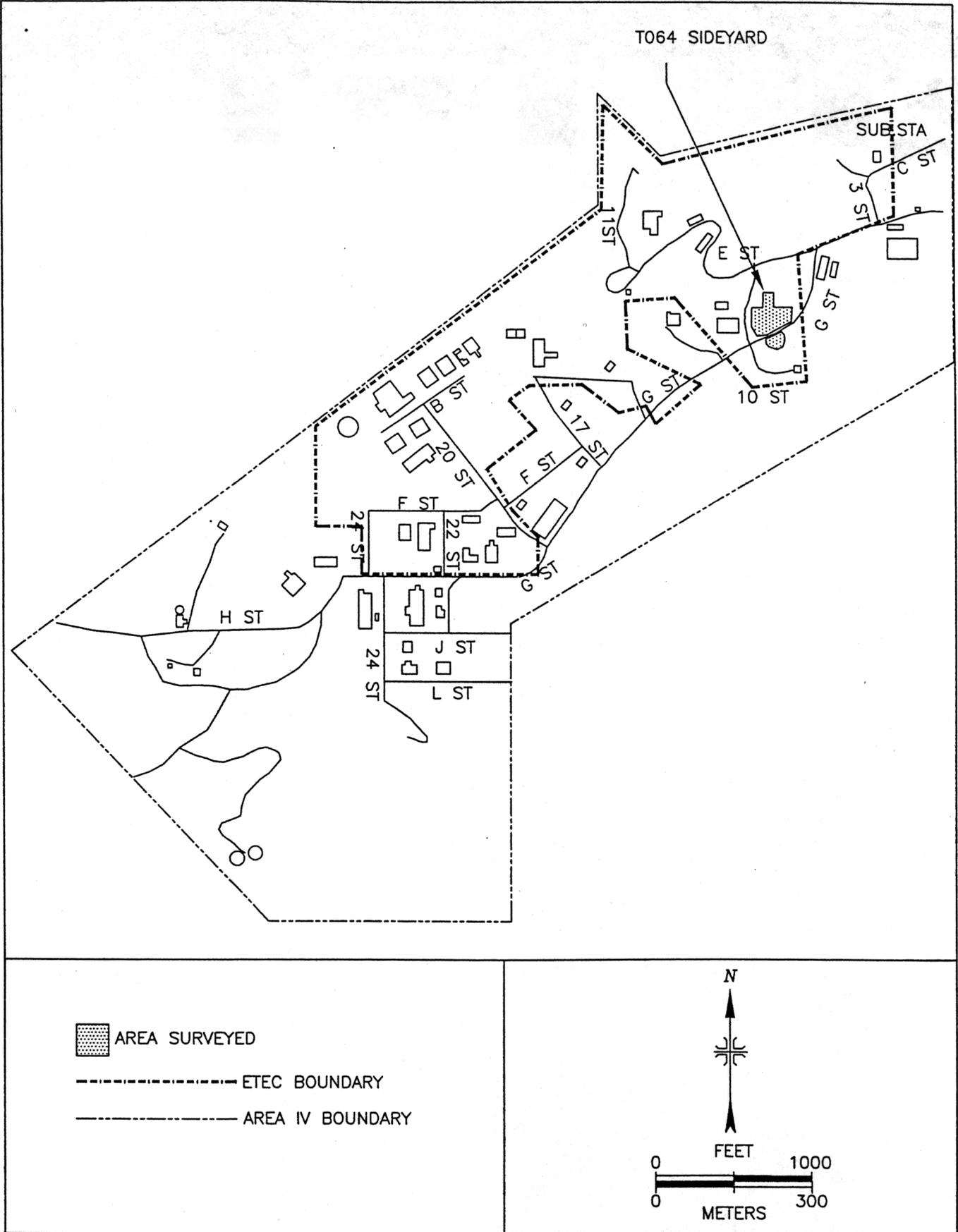


FIGURE 2: Santa Susana Field Laboratory Area IV, Plot Plan – Location of Building T064 Side Yard

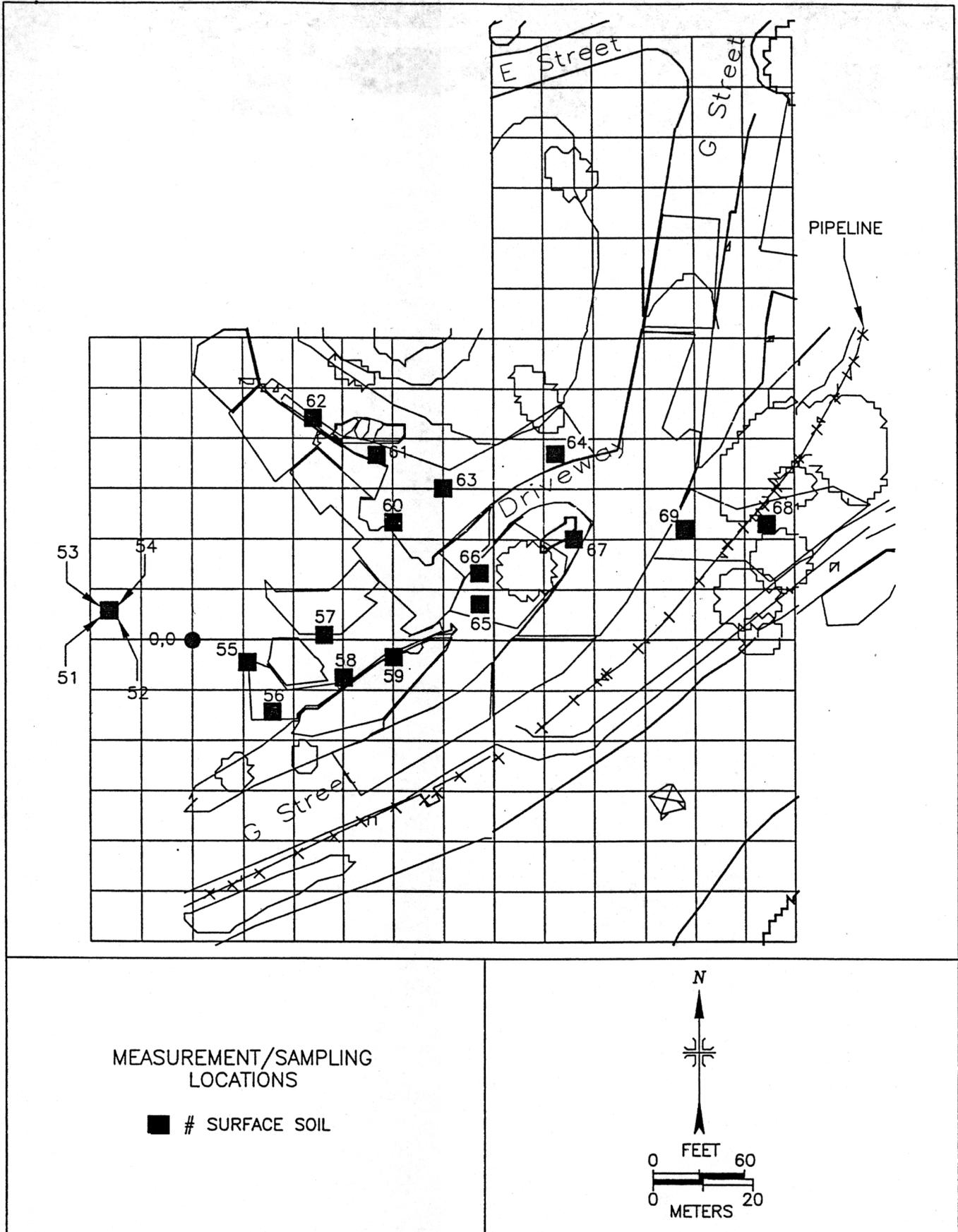


FIGURE 3: Building T064 Side Yard – Measurement and Sampling Locations

TABLE 1

**CS-137 CONCENTRATIONS IN SOIL AND EXPOSURE RATES
BUILDING T064 SIDE YARD
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA**

Location ^a	Exposure Rates at 1 m ($\mu\text{R/h}$)	Cs-137 Concentration (pCi/g)
51	11	27.75 ± 0.28^b
52	11	80.63 ± 0.44
53	13	23.38 ± 0.22
54	13	55.61 ± 0.13
70 (Post-Remedial Action from Locations 51-54)	9	0.37 ± 0.03
71 (Post-Remedial Action from Locations 51-54)	9	0.57 ± 0.07
55	10	<0.05
56	11	1.83 ± 0.12
57	11	0.07 ± 0.03
58	13	0.50 ± 0.05
59	12	<0.06
60	11	0.57 ± 0.07
61	12	0.49 ± 0.06
62	12	0.35 ± 0.04
63	11	0.07 ± 0.03
64	12	0.10 ± 0.03
65	12	<0.04
66	11	0.47 ± 0.04
67	11	0.13 ± 0.04
68	12	<0.04
69	12	2.93 ± 0.17

*Refer to Figure 3.

^bUncertainties are total propagated uncertainties at the 95% confidence level.

TABLE 2

**SITE-WIDE LIMITS FOR SOIL AND WATER
(REFERENCE N001SRR140127)^a
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA**

Radionuclide	Soil Guidelines (pCi/g)	Water (pCi/L)
Am-241	5.44	1.5
Co-60	1.94	200
Cs-134	3.33	75
Cs-137	9.20	110
Eu-152	4.51	840
Eu-154	4.11	570
Fe-55	629,000	9,000
H-3	31,900	20,000 ^b
K-40	27.6	290
Mn-54	6.11	2,000
Na-22	2.31	480
Ni-59	151,000	26,000
Ni-63	55,300	9,500
Pu-238	37.2	1.7
Pu-239	33.9	1.6
Pu-240	33.9	1.6
Pu-241	230	80
Pu-242	35.5	1.6
Ra-226	5 ^d and 15 ^d	4.1
Sr-90	36.0	8 ^b
Th-228	5 ^d and 15 ^d	6.8
Th-232	5 ^d and 15 ^d	2.0
U-234	30 ^c	---
U-235	30 ^c	total uranium 20 ^b
U-238	35 ^c	---
Gross alpha (not including radon and uranium)	---	15 ^b
Gross beta	---	50 ^b

^aReference taken from Rocketdyne/Boeing 96ETEC-DRF-0374, Enclosure A, June 28, 1996.

^bState of California Maximum Contaminant Levels, CCR Title 22.

^cGenerally more conservative NRC limits for uranium isotopes are proposed.

^dDOE Order 5400.5 limits are proposed (5 pCi/g averaged over first 15 cm of soil depth and 15 pCi/g averaged over 15 cm layers below the top 15 cm).

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