

ORISE
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

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SUBJECT: INTERIM LETTER REPORT—VERIFICATION SURVEY OF THE ST. LOUIS AIRPORT SITE (SLAPS) VICINITY PROPERTY NO. 33/34, HAZELWOOD, MISSOURI

Dear Dr. Williams:

The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) conducted verification activities at the St. Louis Airport Site (SLAPS) Vicinity Property (VP) No. 33/34 on November 12, 1996. Verification activities were performed in support of the SLAPS VP remedial actions that Bechtel National, Inc. (BNI), the Formerly Utilized Sites Remedial Action Program project management contractor (PMC), performed for a number of the SLAPS VPs during Fiscal Year 1996.

SLAPS was acquired by the Manhattan Engineer District (MED) and was operated from 1946 to 1966. The site was used for storage of waste materials that were generated during uranium processing from 1942 until the late 1950s at the Mallinckrodt facility, located in downtown St. Louis. These processing wastes, which consisted of pitchblende raffinate residues, radium-bearing residues, and barium sulfate cake, were purchased by Continental Mining and Milling Company of Chicago (CMMC) in 1966, and subsequently transported to 9200 Latty Avenue for storage under an Atomic Energy Commission (AEC), predecessor agency to the U.S. Department of Energy (DOE), license. During transit, some of the materials spilled onto the haul roads and contiguous properties, primarily collecting in the drainage ditches. The haul roads used for transport to the Latty Avenue storage site and other sites included McDonnell Boulevard, formerly Brown Avenue, Hazelwood Avenue, Pershall Road, Eva Avenue, Frost Avenue, and Latty Avenue.

VP 33/34 is located on Hazelwood Avenue in Hazelwood, Missouri (Figure 1). Soil contamination was confined to the right-of-way portion of the property and extended from the boundary with Hazelwood Avenue to approximately 5 to 15 meters east of the road. BNI remediated the contaminated soil from the property to a depth of approximately 0.5 meter below the surface. Figure 2 shows the remediated portions of Property 33/34. BNI then subdivided the excavated portion of the property into approximately 100 m² survey units and performed post-remedial action (post-RA) surveys and sampling of each survey unit. The results of BNI's post-RA survey and sampling indicated that contaminants had been reduced to levels below the acceptable residual contamination guidelines.

ESSAP performed independent verification surveys of VP 33/34 following the completion of remedial activities and upon the receipt of BNI's post-RA data. Independent verification is performed in order to provide independent survey and analytical data for use by the DOE in determining the adequacy and accuracy of the BNI conclusions as to the status of the remediated area. Verification activities included review of BNI's post-RA data, gamma surface scans using NaI scintillation detectors coupled to ratemeters with audible indicators, exposure rate measurements using a microrem meter, and soil sampling.

Surface scans identified locations of elevated direct gamma radiation within VP 33/34 in grids 4, 6 and 7. The elevated direct gamma radiation was concentrated in a strip approximately 0.4 meters wide and 1 meter from the road. Five systematic surface samples, one each from the center and four points equidistant from the grid center and the grid corners, were collected in grids 4, 6, and 7. Two additional samples were collected from locations of elevated surface activity in grid 7. Figure 2 shows ESSAP soil sampling locations. In addition, exposure rate measurements were performed at each soil sampling location and results are presented in Table 1. Exposure rates ranged from 12 to 16 $\mu\text{R/h}$ and were comparable to background exposure rates obtained during previous SLAPS vicinity property surveys, which ranged from 9 to 10 $\mu\text{R/h}$ (ORISE 1996). Based on past ESSAP survey findings from other SLAPS VPs, BNI performed additional remediation and sampling of grids 4, 6, and 7, prior to ESSAP completing the soil analysis. Post-RA samples collected by BNI were provided to ESSAP for independent analysis. Figure 3 shows where BNI remediated additional soil and collected post-RA samples.

Soil samples were analyzed by solid-state gamma spectrometry and the spectra were reviewed for the contaminants of interest, which were Ra-226, Th-230, and U-238. Radionuclide concentrations are summarized in Table 1. Concentration ranges were as follows: 1.0 to 11.8 pCi/g for Ra-226, less than 5.8 to 460 pCi/g for Th-230, and 1.0 to 7.8 pCi/g for U-238. Radionuclide concentrations in BNI post-RA split samples are summarized in Table 2 and were as follows: 0.9 to 1.3 pCi/g for Ra-226, less than 8.0 to 17.1 pCi/g for Th-230, and 1.2 to 2.0 pCi/g for U-238.

Sample results were then compared to the generic and site-specific soil concentration guidelines (DOE 1990a and 1990b). These guidelines are as follows:

<u>Radionuclide</u>	<u>Soil Concentration Above Background</u>
Ra-226, Th-230	5 pCi/g averaged over the first 15 cm of soil below the surface; 15 pCi/g, averaged over 15 cm thick layers of soil greater than 15 cm below the surface.
U-238	50 pCi/g

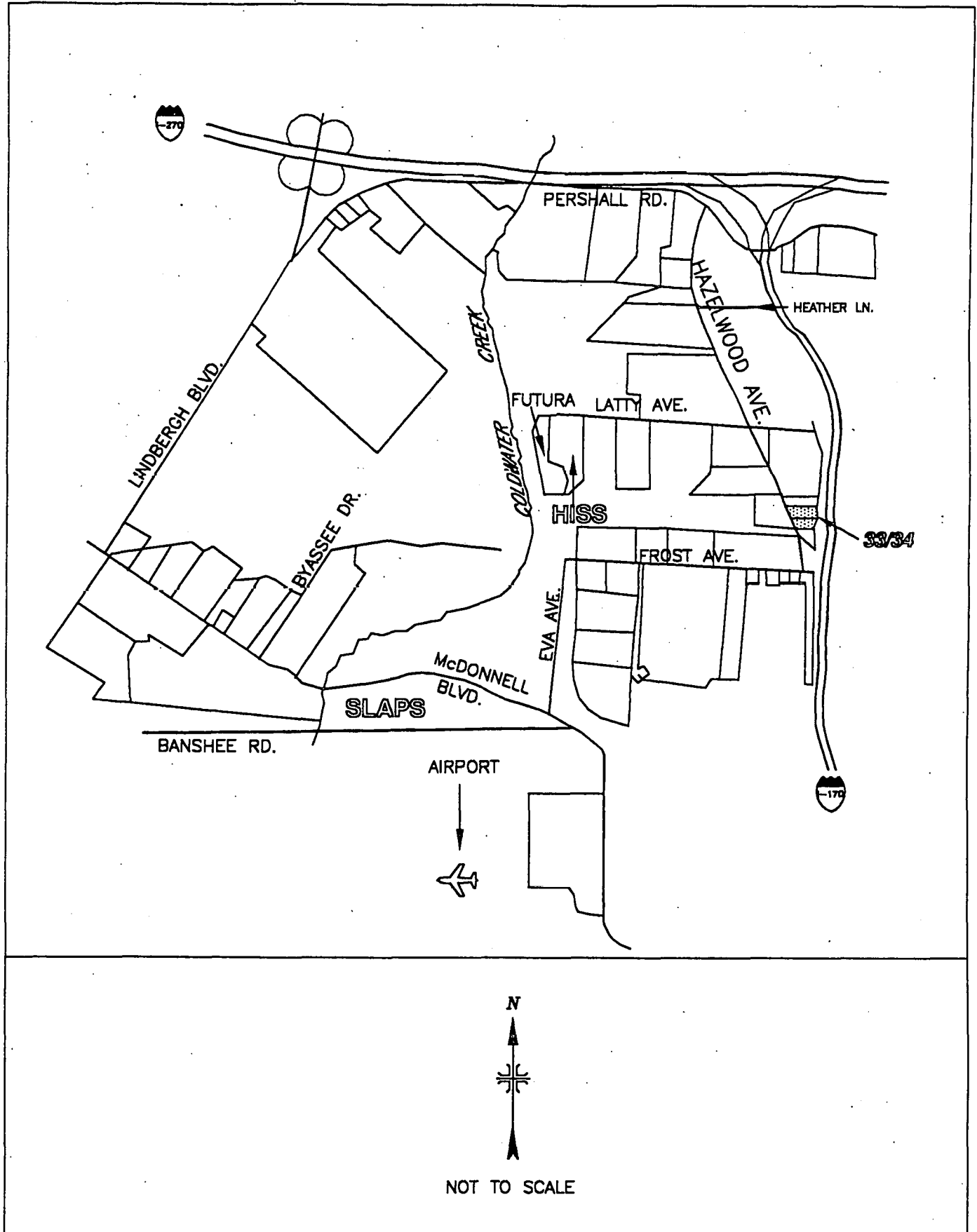


FIGURE 1: Location of SLAPS Vicinity Property Number 33/34

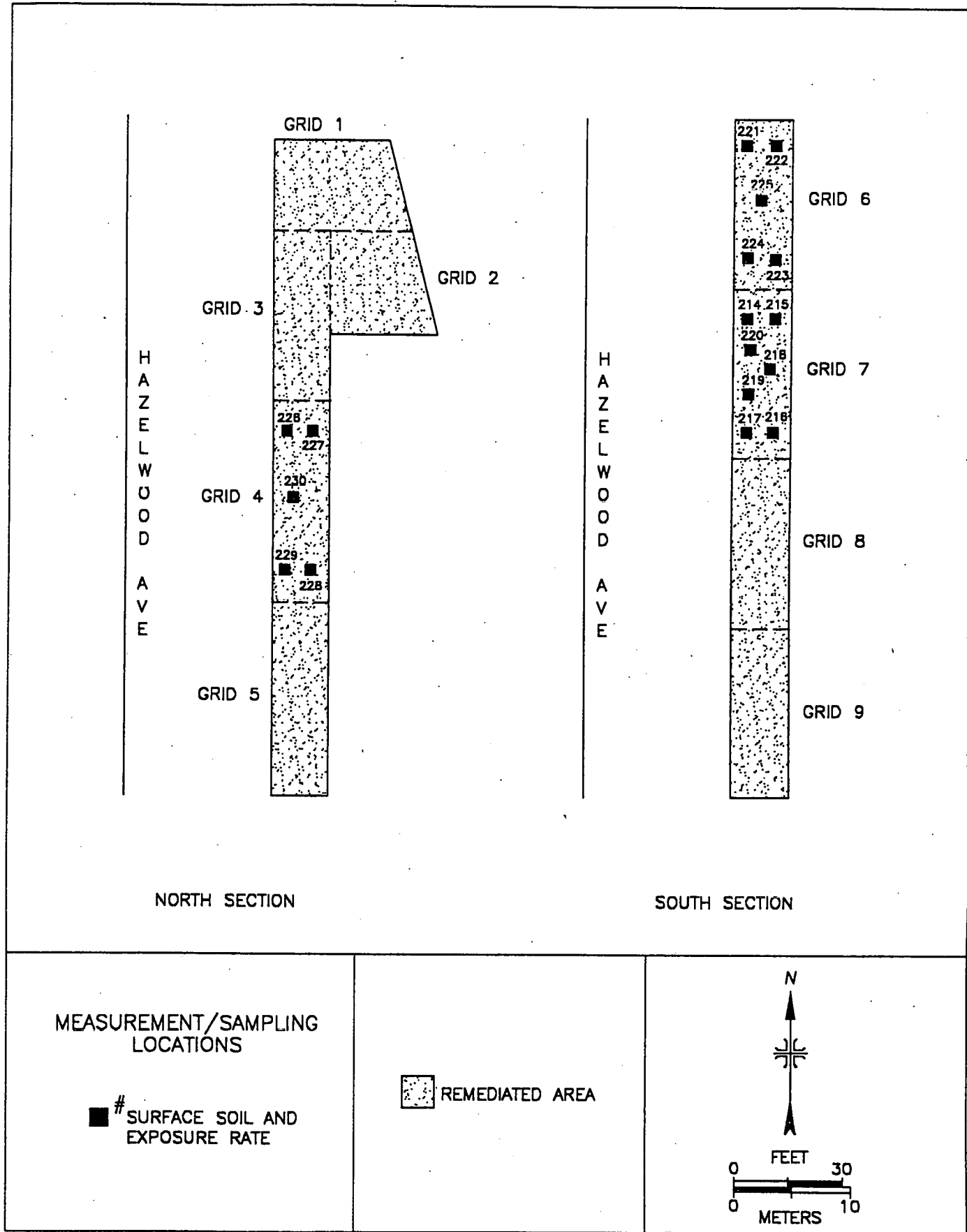


FIGURE 2: SLAPS Vicinity Properties, Property 33/34 – Measurement and Sampling Locations

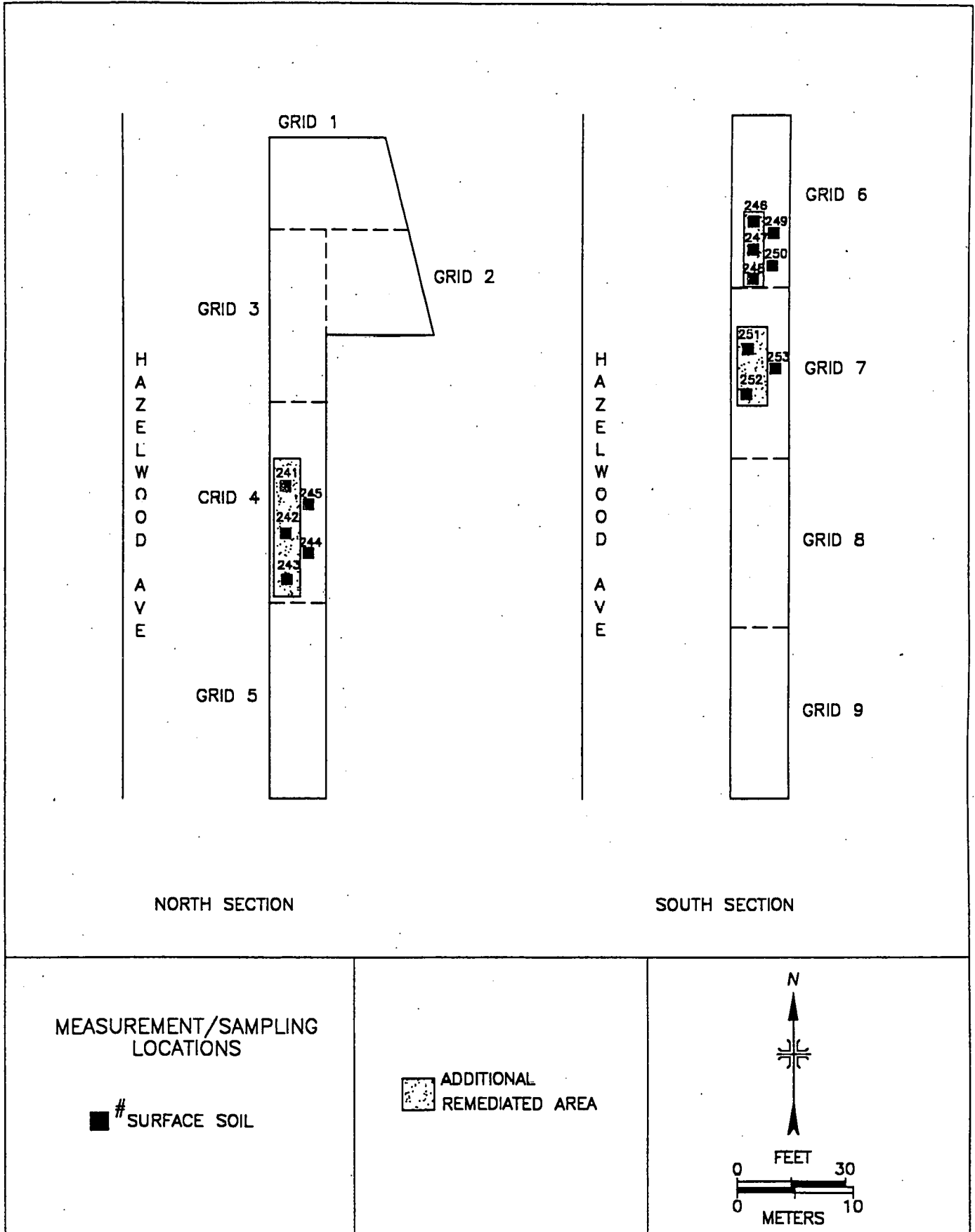


FIGURE 3: SLAPS Vicinity Properties, Property 33/34 -- Post-RA Sampling Locations

TABLE 1

**EXPOSURE RATES AND RADIONUCLIDE CONCENTRATIONS IN SOIL
HAZELWOOD AVENUE PROPERTY NUMBERS 33 AND 34
ST. LOUIS AIRPORT SITE VICINITY PROPERTIES
ST. LOUIS, MISSOURI**

Location ^a	Exposure Rates at 1 m (μR/h)	Radionuclide Concentrations (pCi/g)		
		Ra-226	Th-230	U-238
GRID 4				
Location 226	14	3.1 ± 0.1 ^b	85.7 ± 4.9	3.1 ± 0.4
Location 227	14	1.0 ± 0.1	<3.9	1.0 ± 0.4
Location 228	12	1.1 ± 0.1	2.5 ± 2.6	1.0 ± 0.4
Location 229	12	11.8 ± 0.3	460 ± 15	7.8 ± 1.6
Location 230	14	11.4 ± 0.3	360 ± 18	4.0 ± 1.7
GRID 6				
Location 221	13	1.1 ± 0.1	<4.9	1.0 ± 0.4
Location 222	12	1.1 ± 0.1	<4.7	1.0 ± 0.5
Location 223	14	1.3 ± 0.1	<5.8	1.0 ± 0.4
Location 224	16	3.3 ± 0.1	87.6 ± 5.4	2.3 ± 0.5
Location 225	16	2.7 ± 0.1	69.6 ± 5.6	1.1 ± 0.5
GRID 7				
Location 214	16	3.2 ± 0.1	96.8 ± 5.0	2.5 ± 0.5
Location 215	13	1.3 ± 0.1	4.8 ± 3.5	1.0 ± 0.4
Location 216	12	1.2 ± 0.1	<4.2	1.2 ± 0.4
Location 217	13	2.1 ± 0.1	36.0 ± 3.9	1.7 ± 0.4
Location 218	12	1.2 ± 0.1	<4.2	1.3 ± 0.4
Location 219	15	9.1 ± 0.2	344.2 ± 8.1	5.7 ± 0.7
Location 220	16	10.3 ± 0.2	413.1 ± 9.0	4.9 ± 0.9

^aRefer to Figure 2.

^bUncertainties represent the 95% confidence level, based only on counting statistics.

TABLE 2

**RADIONUCLIDE CONCENTRATIONS IN POST-RA SOIL
HAZELWOOD AVENUE PROPERTY NUMBERS 33 AND 34
ST. LOUIS AIRPORT SITE VICINITY PROPERTIES
ST. LOUIS, MISSOURI**

Location ^a	Radionuclide Concentrations (pCi/g)		
	Ra-226	Th-230	U-238
GRID 4			
Location 241	1.0 ± 0.1 ^b	5.4 ± 4.9	1.4 ± 0.5
Location 242	1.0 ± 0.1	9.7 ± 4.1	1.6 ± 0.7
Location 243	1.1 ± 0.1	13.9 ± 5.8	2.0 ± 0.6
Location 244	1.0 ± 0.1	<8.0	1.6 ± 0.6
Location 245	1.0 ± 0.2	7.5 ± 4.9	1.2 ± 0.6
GRID 6			
Location 246	1.1 ± 0.1	17.1 ± 5.1	1.5 ± 0.6
Location 247	1.0 ± 0.1	<7.4	1.4 ± 0.7
Location 248	1.3 ± 0.2	13.5 ± 5.9	1.7 ± 0.7
Location 249	0.9 ± 0.1	<5.6	1.2 ± 0.5
Location 250	0.9 ± 0.1	<5.6	1.6 ± 0.6
100 m ² Average	---	9.8	---
GRID 7			
Location 251	1.0 ± 0.1	4.2 ± 4.7	1.8 ± 0.7
Location 252	1.0 ± 0.1	6.3 ± 4.8	1.5 ± 0.6
Location 253	0.9 ± 0.1	4.7 ± 3.7	1.2 ± 0.5

^aRefer to Figure 3.

^bUncertainties represent the 95% confidence level, based only on counting statistics.

REFERENCES

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Formerly Utilized Sites Remedial Action Program (FUSRAP)

ADMINISTRATIVE RECORD

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