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ORISE

OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

March 25, 1997

W. Alexander Williams, PhD
Designation and Certification Manager
U.S. Department of Energy
EM-421
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SUBJECT: REVISED INTERIM LETTER REPORT—VERIFICATION SURVEY OF THE ST. LOUIS AIRPORT SITE (SLAPS) VICINITY PROPERTY NO. 37, 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. 37 on July 22, 1996. Verification activities were performed in support of the remedial actions that Bechtel National, Inc. (BNI), the Formerly Utilized Sites Remedial Action Program project management contractor, performed for a number of the SLAPS VPs during Fiscal Year 1996.

SLAPS was acquired by the Manhattan Engineer District (MED) and 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 37 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 of Hazelwood Avenue to approximately 5 to 10 meters west of the road. Figure 2 shows the remediated portions of VP 37. BNI remediated the contaminated soil from the property to depths of approximately 0.5 to 1 meter below the surface. BNI then subdivided the excavated portion of the property into approximately 100 m^2 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 37 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 remediated areas status. 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, and soil sampling.

Surface scans identified one location of elevated direct gamma radiation within grid 2. ESSAP personnel collected five systematic surface (0-15 cm) soil samples from grid blocks 2 and 9. Samples were collected from the center and at four points equidistant from the grid center and the grid corners and included the location of elevated direct gamma radiation identified in grid 2. Sample locations are shown on Figure 2. In addition, exposure rate measurements using a microrem meter were performed at 1 meter above each surface soil sampling location and results are presented in Table 1. Exposure rates ranged from 10 to 14 μR/h and were comparable to background exposure rates obtained during previous SLAPS vicinity property surveys, which ranged from 9 to 10 μR/h (ORISE 1996).

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. Selected samples were also analyzed by alpha spectrometry for isotopic thorium. Radionuclide concentrations in soil samples, including background, are summarized in Table 1. Concentration ranges were as follows: 1.2 to 7.2 pCi/g for Ra-226, 1.45 to 261 pCi/g for Th-230, and 0.6 to 3.5 pCi/g for U-238. The highest concentrations of Ra-226 and Th-230 were from soil sample location 179 in grid block 2. BNI remediated this location and ESSAP collected a follow-up sample during a later survey visit. The radionuclide concentrations in this sample are also presented in Table 1. Concentrations were as follows: 0.9 pCi/g for Ra-226, less than 4.3 pCi/g for Th-230, and 0.9 pCi/g for U-238. The previously determined average background radionuclide concentrations in soil were 0.9 pCi/g for Ra-226, 1.31 pCi/g for Th-230, and 1.1 pCi/g for U-238 (ORISE 1996).

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

Radionuclide	Soil Concentration Above Background
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

All residual radionuclide levels, following the additional remediation satisfied these guidelines.

In summary, verification surveys of the property identified locations of undocumented residual contamination where the hot spot criteria and/or the 100 m^2 average residual radionuclide concentration guidelines were exceeded—requiring BNI to perform additional remediation. Followup investigations of these areas, together with verification surveys of the remaining portions of VP 37, indicated that the radiological status of the property satisfied the DOE guidelines for release for unrestricted use. A draft verification report will be prepared following the receipt of BNI's post-remedial action report. In the interim, please contact me at (423) 576-5073 or Eric Abelquist at (423) 576-3740 should you have any questions, comments, or require additional information.

Sincerely,

Eric W. Abelquist

FOR

Timothy J. Vitkus
Survey Projects Manager
Environmental Survey and Site
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TJV:dka

Enclosure

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File/391

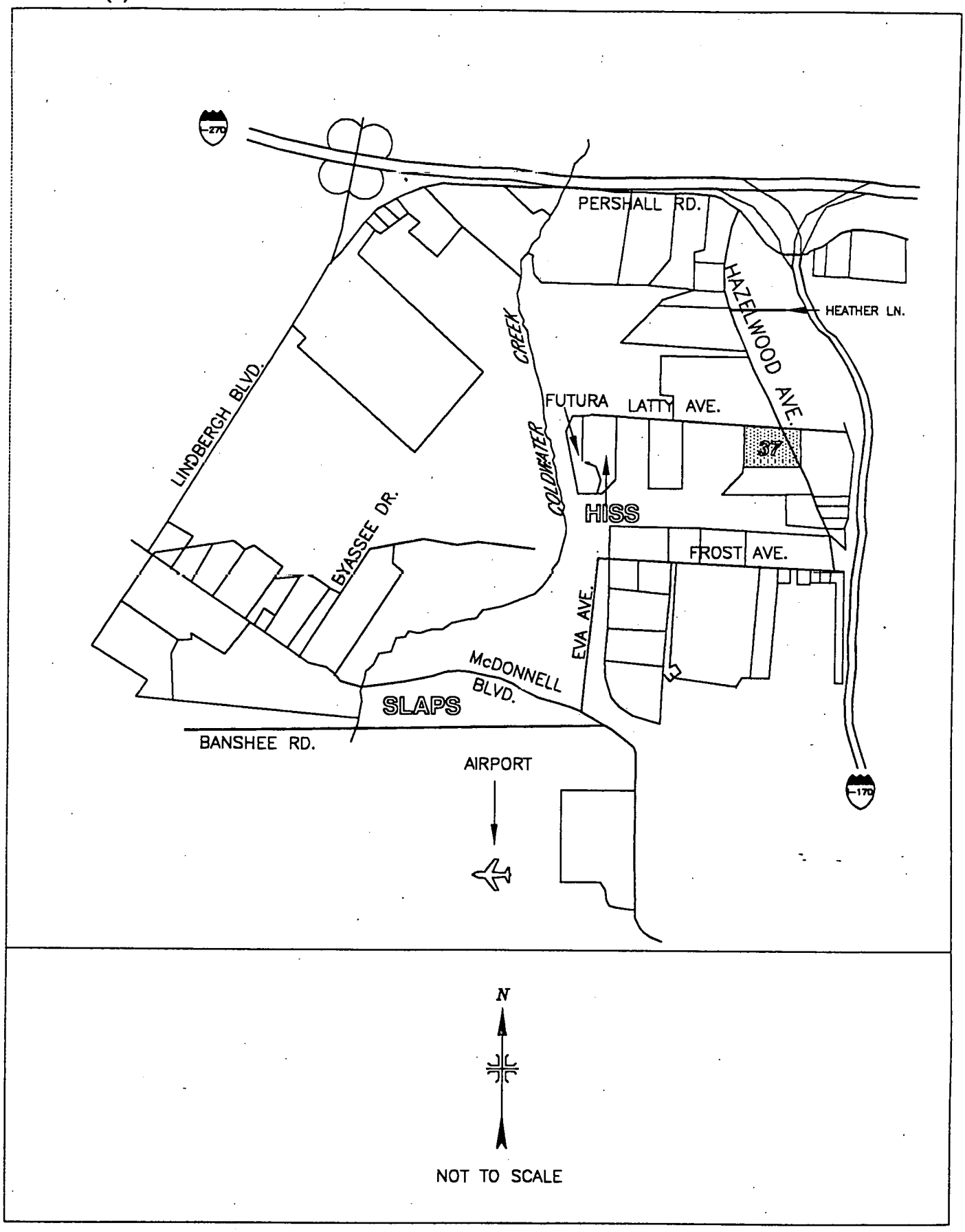

FIGURE 1: Location of SLAPS Vicinity Property Number 37

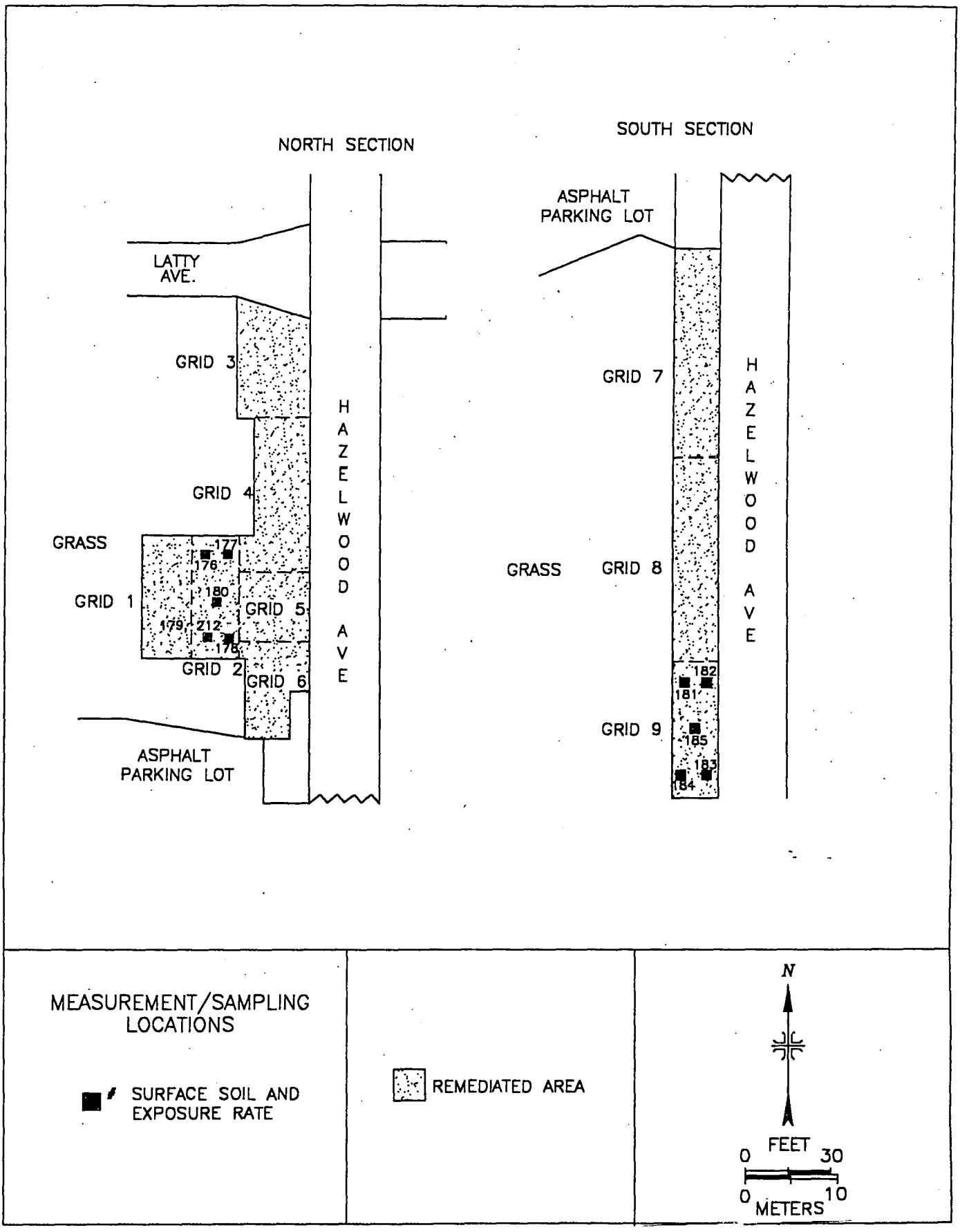

FIGURE 2: SLAPS Vicinity Properties, Property 37 – Measurement and Sampling Locations

TABLE 1

EXPOSURE RATES AND RADIONUCLIDE CONCENTRATIONS IN SOIL ST. LOUIS AIRPORT SITE VICINITY PROPERTY NUMBER 37 HAZELWOOD, MISSOURI

Sample Location[a]	Exposure Rates at 1 m (μR/h)[b]	Radionuclide Concentration (pCi/g)[b]		
		Ra-226	Th-230	U-238
GRID 2				
176	11	1.5 ± 0.2[c]	2.28 ± 0.33[d]	1.0 ± 0.9
177	13	1.3 ± 0.2	1.57 ± 0.24[d]	1.4 ± 1.0
178	12	1.5 ± 0.2	1.45 ± 0.27[d]	3.5 ± 1.9
179	12	7.2 ± 0.3	261 ± 23	2.4 ± 1.1
212 (After additional remediation of Location 179)	---[e]	0.9 ± 0.1	<4.3	0.9 ± 0.3
180	14	1.7 ± 0.2	2.64 ± 0.35[d]	1.3 ± 1.0
GRID 9				
181	11	1.7 ± 0.2	1.86 ± 0.27[d]	0.6 ± 1.0
182	11	1.5 ± 0.2	4.60 ± 0.54[d]	0.7 ± 0.7
183	11	1.3 ± 0.2	3.34 ± 0.41[d]	1.4 ± 0.9
184	10	1.2 ± 0.2	2.50 ± 0.33[d]	1.2 ± 0.8
185	12	1.4 ± 0.2	4.29 ± 0.51[d]	0.9 ± 1.0

[a]Refer to Figure 2.
[b]Results include background.
[c]Uncertainties represent the 95% confidence level, based only on counting statistics.
[d]Alpha spectrometry results.
[e]Measurement not performed.

REFERENCES

Oak Ridge Institute for Science and Education. Draft Reports-Verification Surveys of Properties 19, 20, 41, 43, 44, and 45, St. Louis Airport Site Vicinity Properties, Hazelwood and Berkeley, Missouri. Oak Ridge, TN; February 23, 1996.

U.S. Department of Energy (DOE). Radiation Protection of the Public and Environment. Washington, DC: DOE Order 5400.5. June 5, 1990a.

U.S. Department of Energy. Memorandum from J. Fiore to L. Price, "Uranium Cleanup Guidelines for St. Louis, MO, FUSRAP Sites." November 6, 1990b.

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Formerly Utilized Sites Remedial Action Program (FUSRAP)

ADMINISTRATIVE RECORD

for the St. Louis Site, Missouri

U.S. Department of Energy