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ORISE

OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

April 4, 1997

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U.S. Department of Energy
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**SUBJECT: INTERIM LETTER REPORT—VERIFICATION SURVEY OF THE ST. LOUIS AIRPORT SITE (SLAPS) VICINITY PROPERTY NO. 48, 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. 48 on November 12, 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 (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 48 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 east of the road. BNI remediated the contaminated soil from the property to depths of up to one meter below the surface. Figure 2 shows the remediated portions of VP 48. BNI then subdivided the excavated portion of the property into approximately

100 $m^2$ survey units (Figure 2) 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 48 following the completion of remedial activities and upon 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, and soil sampling.

Surface scans did not identify any locations of elevated direct gamma radiation within VP 48. ESSAP collected five systematic soil samples (0-15 cm) from grids 1 and 5. Samples were collected from the center and at four points equidistant from the grid center and grid corners. Figure 2 shows sampling locations. In addition, exposure rate measurements, using a microrem meter, were performed at one meter above the surface at each soil sampling location and results are presented in Table 1. Exposure rates ranged from 11 to 12 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. Radionuclide concentrations are summarized in Table 1. Concentration ranges were as follows: 1.1 to 2.1 pCi/g for Ra-226, less than 5.0 to 31.4 pCi/g for Th-230, and 0.8 to 1.8 pCi/g for U-238. Sample results were then compared to the generic and site-specific soil contamination 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 |

Because the surface these samples were collected from was originally and will again following backfill be at a depth of greater than 15 cm, the subsurface guideline is applicable. Three soil samples, two in grid 1 and one in grid 5, exceeded the Th-230 subsurface guideline. However, the guidelines permit averaging the radionuclide concentrations over an area of 100 $m^2$ and application of the hot spot criteria. For both grids 1 and 5, the 100 $m^2$ average Th-230 concentration satisfied the guideline and the hot spot criteria has also been met. Radionuclide concentration levels in all remaining soil samples were below the guideline.

In summary, verification surveys of the property identified locations of undocumented residual contamination where the average residual radionuclide concentration guidelines for Th-230 were exceeded—requiring ESSAP to perform additional averaging. The radiological status of the property

satisfies 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,

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

Enclosure

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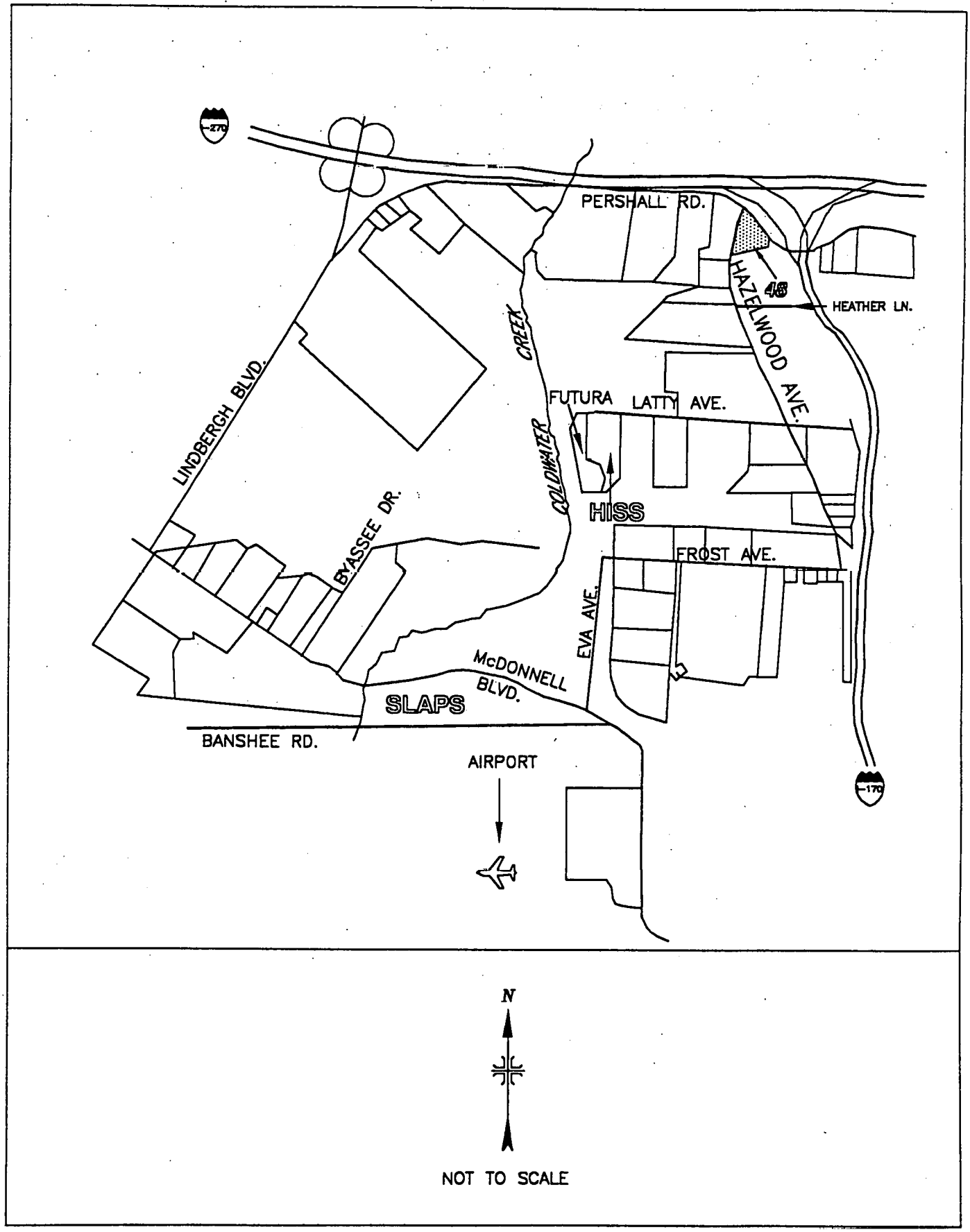


FIGURE 1: Location of SLAPS Vicinity Property Number 48

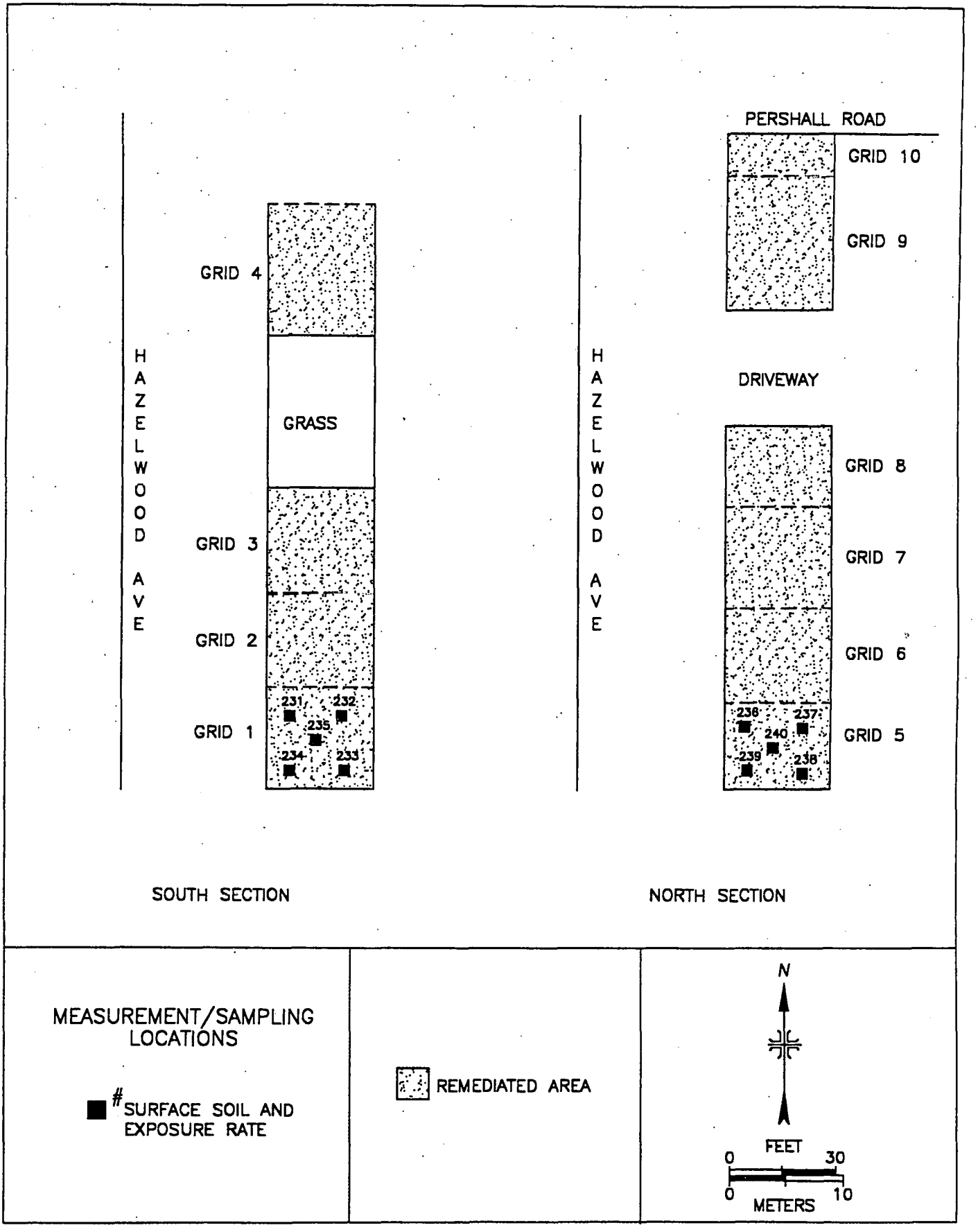


FIGURE 2: SLAPS Vicinity Properties, Property 48 – Measurement and Sampling Locations

## TABLE 1

## EXPOSURE RATES AND RADIONUCLIDE CONCENTRATIONS IN SOIL SAMPLES ST. LOUIS AIRPORT SITE VICINITY PROPERTY NUMBER 48 HAZELWOOD, MISSOURI

| Sample Location[a] | Exposure Rates at 1 m (μR/h)[b] | Radionuclide Concentrations (pCi/g) | | |
|---|---|---|---|---|
| | | Ra-226 | Th-230 | U-238 |
| **GRID 1** | | | | |
| Location 231 | 12 | 2.1 ± 0.1[b] | 23.7 ± 4.9 | 1.4 ± 0.5 |
| Location 232 | 12 | 1.1 ± 0.1 | <4.8 | 1.3 ± 0.4 |
| Location 233 | 12 | 1.2 ± 0.1 | 5.8 ± 3.3 | 1.0 ± 0.4 |
| Location 234 | 11 | 1.5 ± 0.1 | 25.8 ± 4.1 | 1.8 ± 0.5 |
| Location 235 | 11 | 1.2 ± 0.1 | <4.0 | 0.9 ± 0.4 |
| 100 $m^2$ Average | NA | --- | 12.8 | --- |
| **GRID 5** | | | | |
| Location 236 | 12 | 1.2 ± 0.1 | 5.2 ± 3.5 | 1.2 ± 0.4 |
| Location 237 | 12 | 1.1 ± 0.1 | <4.8 | 0.9 ± 0.4 |
| Location 238 | 12 | 1.1 ± 0.1 | <3.8 | 0.1 ± 0.3 |
| Location 239 | 12 | 1.8 ± 0.1 | 31.4 ± 4.0 | 1.3 ± 0.4 |
| Location 240 | 12 | 1.1 ± 0.1 | <5.0 | 0.8 ± 0.4 |
| 100 $m^2$ Average | NA | --- | 10.0 | --- |

[a]Refer to Figure 2.
[b]Uncertainties represent the 95% confidence level, based only on counting statistics.

## REFERENCES

Oak Ridge Institute for Science and Education (ORISE). 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