Formerly Utilized Sites Remedial Action Program (FUSRAP)

# ADMINISTRATIVE RECORD

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# RESULTS OF THE RADIOLOGICAL SURVEY AT 68 AVENUE A (LJ022), LODI, NEW JERSEY

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# RESULTS OF THE RADIOLOGICAL SURVEY AT 68 AVENUE A (LJ022), LODI, NEW JERSEY

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Work performed as part of the
RADIOLOGICAL SURVEY ACTIVITIES PROGRAM

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# RESULTS OF THE RADIOLOGICAL SURVEY AT 68 AVENUE A, LODI, NEW JERSEY*

## INTRODUCTION

A radiological survey of 68 Avenue A, Lodi, New Jersey, was conducted by a survey team from Oak Ridge National Laboratory (ORNL) on April 12, 1985 at the request of the Department of Energy (DOE). This property was identified as being suspected of having contaminated material present during the mobile gamma scan of Lodi, New Jersey.[1]

The radiological survey conducted on this property was for the purpose of determining whether the property had any radioactive material onsite in excess of background radiation levels, and, if so, were these radioactive materials in excess of remedial action guidelines established by DOE such that the property could be "designated" for further investigation. This report summarizes the results of the "designation" survey performed on this property.

## SURVEY METHODS

The radiological survey of the property included: (1) a gamma scan of the entire property outdoors; and (2) sampling of surface (0-15 cm) soil. No indoor survey measurements were performed. These survey methods followed the plan outlined in Reference 2. A comprehensive description of the survey methods and instrumentation has been presented in another report.[3]

## SURVEY RESULTS

Applicable federal guidelines have been summarized in Table 1. The normal background levels for the northern New Jersey area are presented in Table 2. These data are provided for comparison with the survey results presented in this section. All direct measurement results presented in this report are gross readings at ground surface;

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* The survey was performed by members of the Radiological Survey Activities Group of the Health and Safety Research Division at Oak Ridge National Laboratory under DOE contract DE-AC05-840R21400.

background radiation levels have not been subtracted. Similarly, background concentrations have not been subtracted from radionuclide concentrations measured in environmental samples.

Systematic and Biased Soil Samples

Systematic soil samples were taken from various locations on the property for radionuclide analyses. Locations of the systematic (LJ22S) samples are shown in Fig. 1, with results of laboratory analyses provided in Table 3. No biased soil samples were taken. Concentrations of uranium, radium, and thorium were within normal background levels in both systematic samples.

Gamma Radiation Levels

Results of the gamma scan of the surface of the property showed no gamma exposure rates in excess of natural background radiation levels. The range of exposure rates is 6-8 μR/h over the entire property with block foundations measuring up to 11 μR/h, which is normal for some block compositions and geometry.

## SUMMARY

Measurements taken at 68 Avenue A indicate that the property contains no radioactive contamination above natural background levels. High purity germanium analysis of soil samples confirms the surface gamma scan measurements that only background radiation levels exist on this property.

## REFERENCES

1. R. W. Doane and B. A. Berven, "Results of the Mobile Gamma Scanning Activities in Lodi, New Jersey," Oak Ridge National Laboratory, ORNL/RASA-84/3 (October 1984).

2. W. D. Cottrell, ORNL, to A. J. Whitman, DOE/HQ, correspondence, "Radiological Survey of Private Properties in Lodi, New Jersey" (August 15, 1984).

3. Oak Ridge National Laboratory, Procedures Manual for the ORNL Remedial Action Survey and Certification Activities (RASCA) Program, ORNL/TM-8600 (October 1982).

4. U.S. Department of Energy, Radiological Survey of the Middlesex Municipal Landfill, Middlesex, New Jersey, DOE/EV-0005/20, April 1980.

5. T. E. Myrick and B. A. Berven, State Background Radiation Levels: Results of Measurements Taken During 1975-1979, Oak Ridge National Laboratory, ORNL/TM-7343 (November 1981).

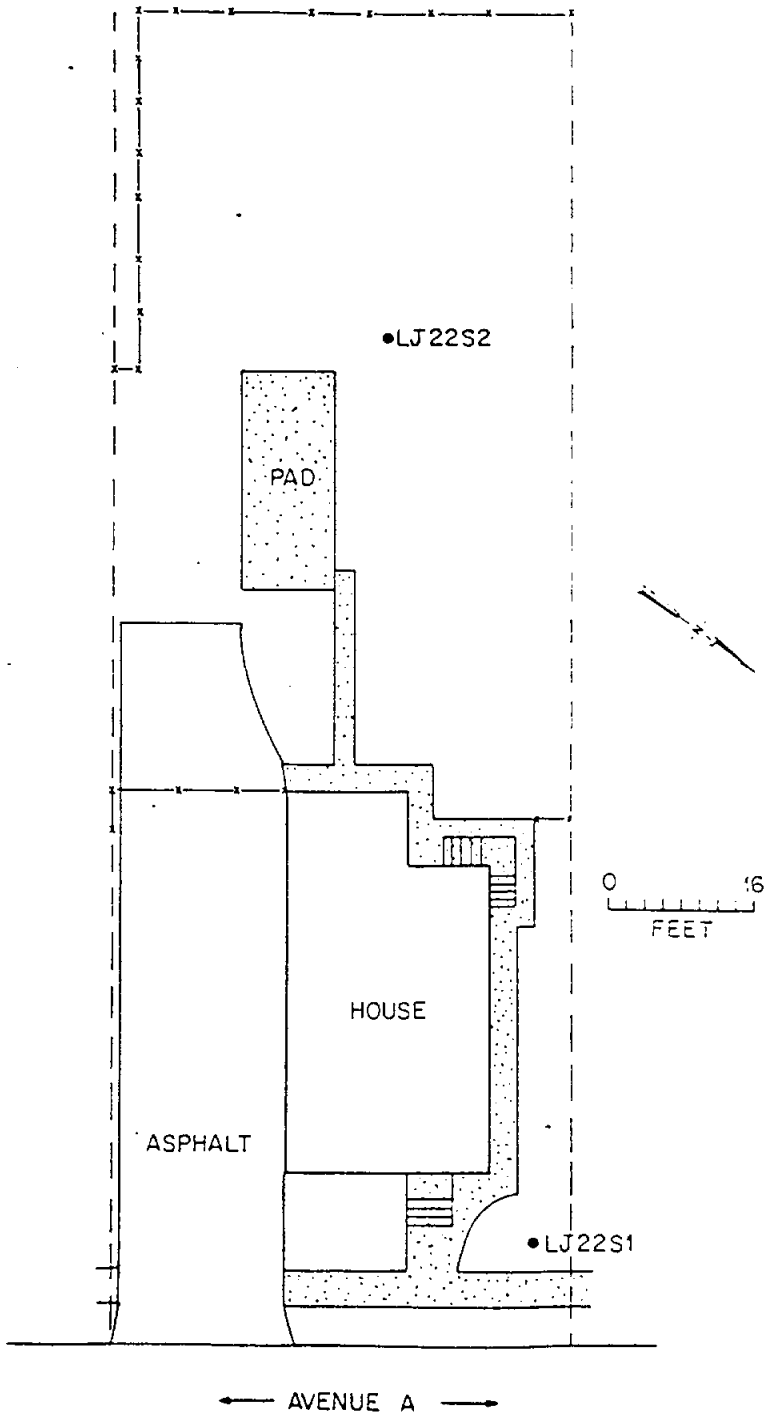


Fig. 1. Diagram showing locations of soil samples taken at 68 Avenue A, Lodi, New Jersey.

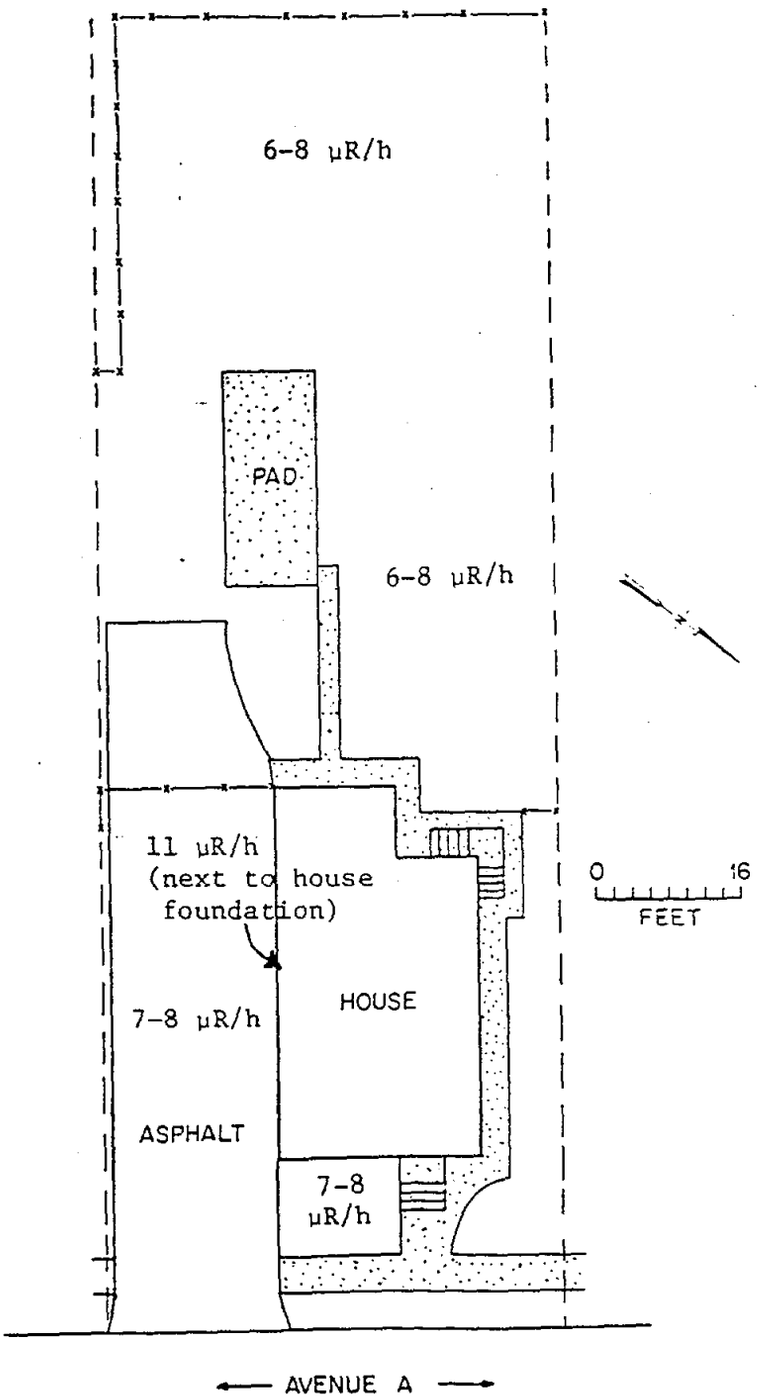


Fig. 2. Gamma radiation levels measured at 68 Avenue A, Lodi, New Jersey.

Table 1. A summary of applicable radiation guidelines for the FUSRAP program (July 1985).

| Mode of exposure | Exposure conditions | Guideline value | Guideline source |
|---|---|---|---|
| 1. Gamma radiation | Continuous exposure to individual in general population (whole body) | 57 μR/h | DOE Order 5480.1A Chapter 11 Requirements for Radiation Protection |
| 2. Radionuclide concentrations in soil | Maximum permissible concentration of the following radionuclides in soil above background levels averaged over 100 $m^2$ area | | U.S. Department of Energy Guidelines for Residual Radioactivity at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites (Revision 1, July 1985) |
| | $^{226}Ra$<br>$^{232}Th$ | 5 pCi/g averaged over the first 15 cm of soil below the surface; 15 pCi/g when averaged over 15-cm thick soil layers more than 15 cm below the surface and less than 1.5 m below the surface | |

Table 2. Background radiation levels for the northern New Jersey area.

| Type or radiation measurement or sample | Radiation level or radionuclide concentration |
|---|---|
| Gamma exposure rate at 1 m above floor or ground surface (μR/h) | 8[a] |
| Concentration of radionuclides in soil (pCi/g) | |
| $^{232}Th$ | 0.9[b] |
| $^{238}U$ | 0.9[b] |
| $^{226}Ra$ | 0.9[b] |

[a]Reference 4.
[b]Reference 5.

Table 3. Concentrations of radionuclides in soil at 68 Avenue A, Lodi, New Jersey.

| Sample[a] | Depth (cm) | Radionuclide concentration (pCi/g) | | |
|---|---|---|---|---|
| | | $^{226}Ra$[b] | $^{232}Th$[b] | $^{238}U$[c] |
| | Systematic samples | | | |
| LJ22S1 | 0 - 15 | 0.72 ± 0.07 | 0.92 ± 0.4 | 1.4 |
| LJ22S2 | 0 - 15 | 0.64 ± 0.04 | 0.81 ± 0.4 | 0.68 |

[a]Locations of soil samples are shown on Fig. 1.

[b]Indicated counting error is at the 95% confidence level (± 2 σ).

[c] Total analytical error of measurement results is less than ± 5% (95% confidence level).

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