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ADMINISTRATIVE RECORD

for the Maywood Site, New Jersey



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RESULTS OF THE RADIOLOGICAL SURVEY AT
LODI MUNICIPAL PARK, REDSTONE LANE (LJ032), LODI, NEW JERSEY

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RESULTS OF THE RADIOLOGICAL SURVEY AT
LODI MUNICIPAL PARK, REDSTONE LANE, LODI, NEW JERSEY*

INTRODUCTION

A radiological survey of Lodi Municipal Park, Redstone Lane, Lodi, New Jersey, was conducted by a survey team from Oak Ridge National Laboratory (ORNL) on October 20, 1985 at the request of the Department of Energy (DOE).

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.

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 1. A comprehensive description of the survey methods and instrumentation has been presented in another report.²

SURVEY RESULTS

The normal background radiation levels for the northern New Jersey area are presented in Table 1. These data are provided for comparison with survey results presented in this section. All direct measurement results presented in this report are gross readings at ground surface; background radiation levels have not been subtracted. Similarly, background concentrations have not been subtracted from radionuclide concentrations measured in environmental samples.

*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-AC05-84OR21400.

Systematic and Biased Soil Samples

Systematic and biased soil samples were taken from various locations on the property for radionuclide analyses. Locations of the systematic (LJ32S) and biased (LJ32B) samples are shown in Fig. 1, with results of laboratory analyses provided in Table 1. Concentrations of uranium, radium, and thorium were within normal background levels in the systematic samples. However, concentrations of thorium in the biased soil samples exceeded normal background levels for the northern New Jersey area. The range of ^{232}Th was 1.4 pCi/g to 150 pCi/g.

Gamma Radiation Levels

Results of the gamma scan of the surface of the property showed where gamma exposure rates are in excess of natural background radiation levels. Locations and exposure rates are shown in Fig. 2. These results locate where ^{232}Th -bearing material exists. Gamma exposure rates up to 140 $\mu\text{R/h}$ exist on the surface of the property.

SUMMARY

Measurements taken at Lodi Municipal Park on Redstone Lane indicate that the property contains radioactive contamination primarily from the ^{232}Th decay chain with some contamination from the ^{238}U decay chain. These radionuclide distributions are typical of the type of material processed at the former Maywood Chemical site. The concentration and extent of ^{232}Th on this property is in excess of the relevant DOE criteria.³ This material was found in the locations shown in Fig. 2. Based on the results of this radiological assessment, it is recommended that this property be "designated" for further characterization.

REFERENCES

1. W. D. Cottrell, ORNL, to A. J. Whitman, DOE/HQ, correspondence, "Radiological Survey of Private Properties in Lodi, New Jersey" (August 15, 1984).
2. Oak Ridge National Laboratory, Procedures Manual for the ORNL Remedial Action Survey and Certification Activities (RASCA) Program, ORNL/TM-8600 (October 1982).
3. U.S. Department of Energy, Guidelines for Residual Radioactivity at Formerly Utilized Sites, Remedial Action Program and Remote Surplus Facilities Management Program Sites (Rev. 1, July 1985).

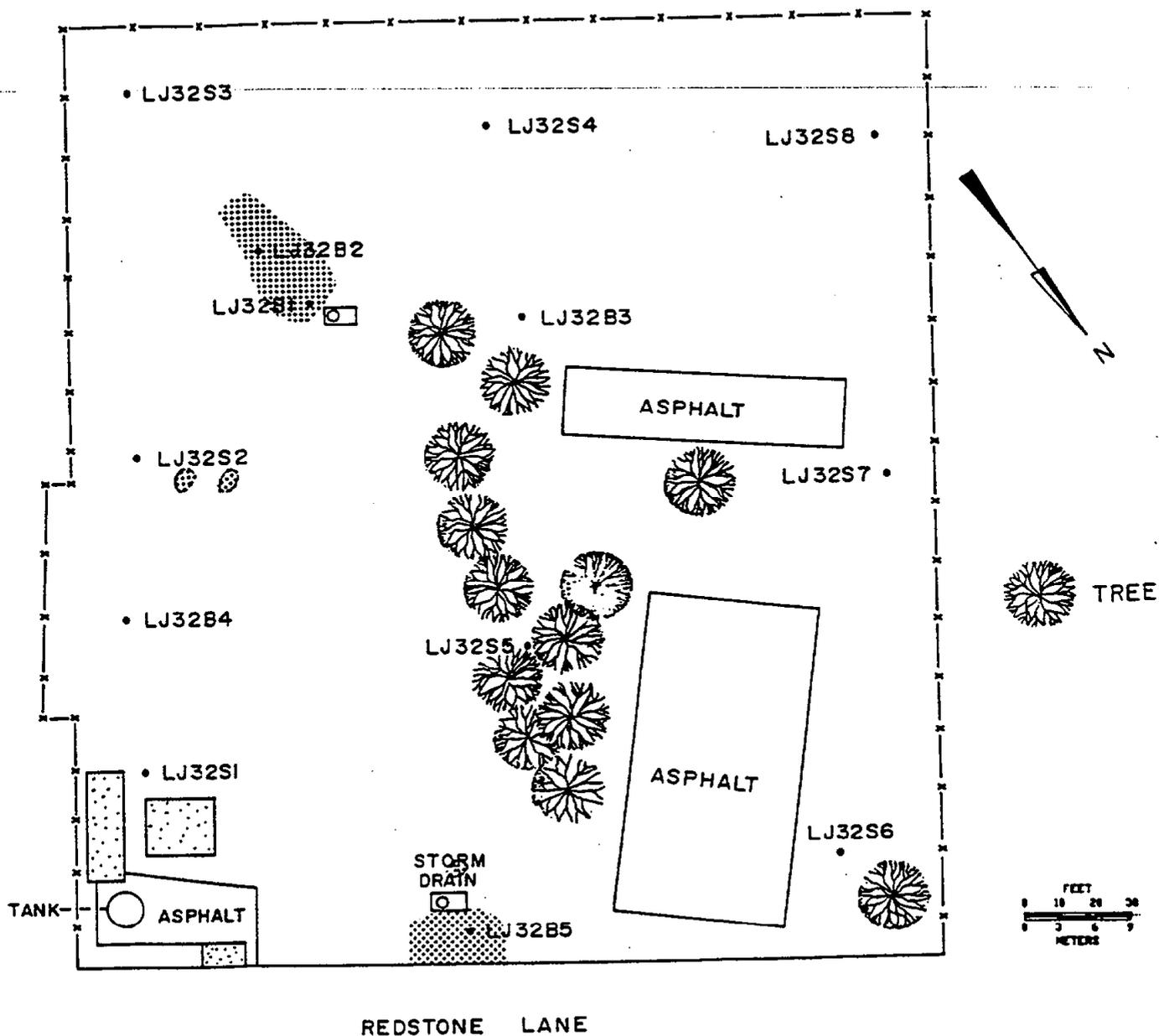


Fig. 1. Diagram showing locations of soil samples taken at Lodi Municipal Park, Redstone Lane, Lodi, New Jersey.

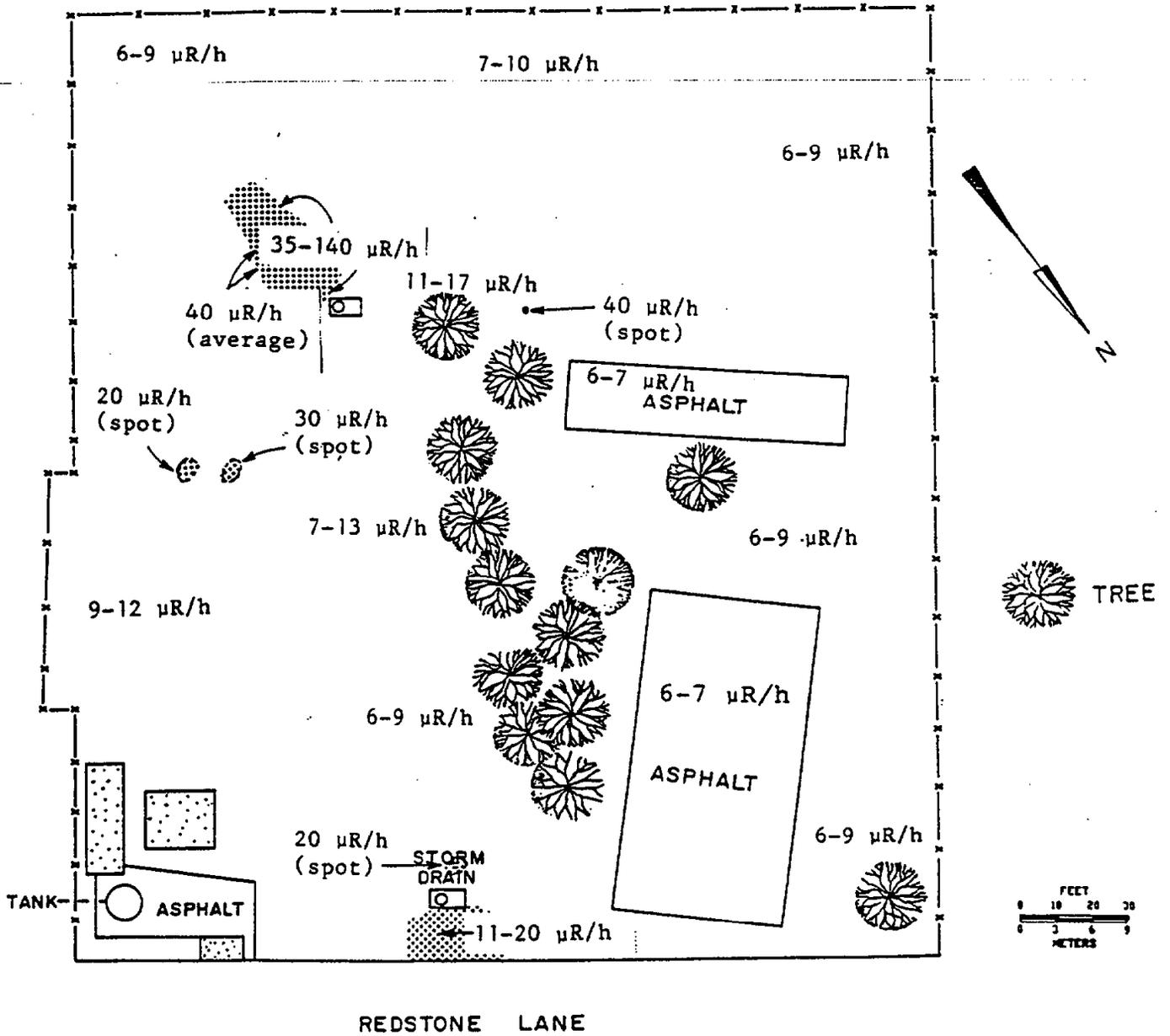


Fig. 2. Gamma radiation levels measured at Lodi Municipal Park, Redstone Lane, Lodi, New Jersey.

Table 1. Background radiation levels for the northern New Jersey area.

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

^aReference 4.

^bReference 5.

Table 2. Concentrations of radionuclides in soil at Lodi Municipal Park, Redstone Lane, Lodi, New Jersey

Sample ^a	Depth (cm)	Radionuclide concentration (pCi/g)		
		²²⁶ Ra ^b	²³² Th ^b	²³⁸ Uc
<u>Systematic samples</u>				
LJ32S1	0-15	0.55 ± 0.09	0.65 ± 0.2	0.69
LJ32S2	0-15	1.1 ± 0.1	1.2 ± 0.3	1.2
LJ32S3	0-15	0.72 ± 0.2	0.87 ± 0.3	0.77
LJ32S4	0-15	1.1 ± 0.05	1.3 ± 0.1	0.90
LJ32S5	0-15	0.88 ± 0.3	0.95 ± 0.3	0.82
LJ32S6	0-15	0.56 ± 0.1	0.65 ± 0.2	0.76
LJ32S7	0-15	0.61 ± 0.03	0.82 ± 0.2	0.67
LJ32S8	0-15	0.86 ± 0.04	0.90 ± 0.1	0.97
<u>Biased samples^d</u>				
LJ32B1A	0-15	12 ± 1	150 ± 5	13
LJ32B1B	15-30	8.3 ± 1	80 ± 8	8.7
LJ32B1C	30-45	3.7 ± 1	15 ± 1	10
LJ32B1D	45-60	2.9 ± 0.5	7.5 ± 0.8	10
LJ32B1E	60-75	2.3 ± 0.06	3.8 ± 0.4	6.9
LJ32B2A	0-15	8.1 ± 0.4	46 ± 2	9.1
LJ32B2B	15-30	26 ± 0.8	110 ± 4	22
LJ32B2C	30-45	12 ± 1	93 ± 3	13
LJ32B2D	45-60	2.8 ± 0.3	6.7 ± 1	6.3
LJ32B3A	0-15	1.6 ± 0.5	11 ± 0.8	2.9
LJ32B3B	15-30	4.9 ± 0.5	44 ± 2	6.2
LJ32B3C	30-45	2.8 ± 0.3	18 ± 1	4.7
LJ32B4A	0-15	1.7 ± 0.2	1.4 ± 0.1	1.8
LJ32B4B	15-30	1.6 ± 0.2	1.4 ± 0.3	1.6
LJ32B4C	30-45	1.8 ± 0.2	1.6 ± 0.2	1.8

Table 2 (continued)

Sample ^a	Depth (cm)	Radionuclide concentration (pCi/g)		
		²²⁶ Ra ^b	²³² Th ^b	²³⁸ U ^c
<u>Biased samples (continued)</u>				
LJ32B5A	0-15	1.0 ± 0.09	5.6 ± 0.7	1.4
LJ32B5B	15-30	1.7 ± 0.2	13 ± 2	2.6
LJ32B5C	30-45	1.4 ± 0.09	9.0 ± 0.5	1.9

^aLocations of soil samples are shown on Fig. 1.

^bIndicated counting error is at the 95% confidence level

(± 2 σ).

^cTotal analytical error of measurement results is less than ± 5% (95% confidence level).

^dBiased samples are taken from areas shown to have elevated gamma exposure rates.

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