

M-676

Formerly Utilized Sites Remedial Action Program (FUSRAP)

ADMINISTRATIVE RECORD

for the Maywood Site, New Jersey



**US Army Corps
of Engineers®**

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SEP 07 1988

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133 Maywood Avenue
Maywood, New Jersey 07607

NE-23
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Wallo

09/6/88

Dear ██████████

NE-23

As you know, the Department of Energy has completed a radiological survey of your property at 133 Maywood Avenue, Maywood, New Jersey. The purpose of the survey was to determine if your property warrants consideration for remedial action. We are pleased to inform you that the preliminary results from that survey indicate that radiological conditions on your property comply with Guidelines applicable to the Department's Maywood, New Jersey, remedial action project. As a result, no remedial action is required at your property.

Fiore
09/17/88

A copy of the final survey report will be sent to you in the next few months by our radiological contractor, Oak Ridge National Laboratory. The file number for this survey is MJ025. If you have any questions on this survey or the letter or on the report when your receive it, please call Mr. Andrew Wallo of my staff at 301-353-5439.

Sincerely,

151

James J. Fiore, Director
Division of Facility and Site
Decommissioning Projects
Office of Nuclear Energy

bcc:
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ORNL/RASA-88/30

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**RESULTS OF THE
RADIOLOGICAL SURVEY
AT 133 MAYWOOD AVENUE,
MAYWOOD, NEW JERSEY
(MJ025)**

**R. D. Foley
R. F. Carrier
L. M. Floyd
J. W. Crutcher**

**OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY**

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HEALTH AND SAFETY RESEARCH DIVISION

**Waste Management Research and Development Programs
(Activity No. AH 10 05 00 0; NEAH001)**

**RESULTS OF THE RADIOLOGICAL
SURVEY AT 133 MAYWOOD AVENUE,
MAYWOOD, NEW JERSEY (MJ025)**

R. D. Foley, R. F. Carrier, L. M. Floyd, and J. W. Crutcher

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CONTENTS

LIST OF FIGURES	v
LIST OF TABLES	vii
ACKNOWLEDGMENTS	ix
ABSTRACT	xi
INTRODUCTION	1
SURVEY METHODS	2
SURVEY RESULTS	2
Surface Gamma Radiation Levels	2
Systematic Soil Samples	2
SIGNIFICANCE OF FINDINGS	3
REFERENCES	4

LIST OF FIGURES

- 1 Gamma radiation levels ($\mu\text{R/h}$) measured on the surface at
133 Maywood Avenue, Maywood, New Jersey (MJ025) 5
- 2 Diagram showing locations of soil samples taken at
133 Maywood Avenue, Maywood, New Jersey (MJ025) 6

LIST OF TABLES

1	Applicable guidelines for protection against radiation	7
2	Background radiation levels for the northern New Jersey area	7
3	Concentrations of selected radionuclides in soil at 133 Maywood Avenue, Maywood, New Jersey (MJ025)	8

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ABSTRACT

Maywood Chemical Works (MCW) of Maywood, New Jersey, generated process wastes and residues associated with the production and refining of thorium and thorium compounds from monazite ores from 1916 to 1956. MCW supplied rare earth metals and thorium compounds to the Atomic Energy Commission and various other government agencies from the late 1940s to the mid-1950s. Area residents used the sandlike waste from this thorium extraction process mixed with tea and cocoa leaves as mulch in their yards. Some of these contaminated wastes were also eroded from the site into Lodi Brook. At the request of the U.S. Department of Energy (DOE), a group from Oak Ridge National Laboratory conducts investigative radiological surveys of properties in the vicinity of MCW to determine whether a property is contaminated with radioactive residues, principally ^{232}Th , derived from the MCW site. The survey typically includes direct measurement of gamma radiation levels and soil sampling for radionuclide analyses. The survey of this site, 133 Maywood Avenue, Maywood, New Jersey (MJ025), was conducted during 1987.

The survey results demonstrate that all radionuclide concentrations and measurements conform to DOE remedial action criteria. All values are at or below typical background values found in northern New Jersey.

RESULTS OF THE RADIOLOGICAL SURVEY AT 133 MAYWOOD AVENUE, MAYWOOD, NEW JERSEY (MJ025)*

INTRODUCTION

From 1916 to 1956, process wastes and residues associated with the production and refining of thorium and thorium compounds from monazite ores were generated by the Maywood Chemical Works (MCW), Maywood, New Jersey. During the latter part of this period, MCW supplied rare earth metals and thorium compounds to various government agencies. In the 1940s and 1950s, MCW produced thorium and lithium, under contract, for the Atomic Energy Commission (AEC). These activities ceased in 1956, and approximately three years later, the 30-acre real estate was purchased by the Stepan Company. The property is located at 100 Hunter Avenue in a highly developed area in Maywood and Rochelle Park, Bergen County, New Jersey.

During the early years of operation, MCW stored wastes and residues in low-lying areas west of the processing facilities. In the early 1930s, these areas were separated from the rest of the property by the construction of New Jersey State Highway 17. The Stepan property, the interim storage facility, and several vicinity properties have been designated for remedial action by the Department of Energy (DOE).

The waste produced by the thorium extraction process was a sandlike material containing residual amounts of thorium and its decay products, with smaller quantities of uranium and its decay products. During the years 1928 and 1944 to 1946, area residents used these process wastes mixed with tea and cocoa leaves as mulch in their lawns and gardens. In addition, some of the contaminated wastes were apparently eroded from the site into Lodi Brook and carried downstream.

As a result of the Energy and Water Appropriations Act of Fiscal Year 1984, the property discussed in this report and properties in its vicinity contaminated with residues from the former MCW, were included as a decontamination research and development project under the DOE Formerly Utilized Sites Remedial Action Program. As part of this project, DOE is conducting radiological surveys in the vicinity of the site to identify properties contaminated with residues derived from the MCW. The principal radionuclide of concern is thorium-232. The radiological survey discussed in this report is part of that effort and was conducted, at the request of DOE, by members of the Measurement Applications and Development Group of the Oak Ridge National Laboratory.

*The survey was performed by members of the Measurement Applications and Development group of the Health and Safety Research Division at Oak Ridge National Laboratory under U. S. DOE contract DE-AC05-84OR21400 with Martin Marietta Energy Systems, Inc.

A radiological survey of the private property at 133 Maywood Avenue, Maywood, New Jersey, was conducted on April 24, 1987.

SURVEY METHODS

The radiological survey included a gamma scan of the entire property outdoors, and collection of surface and subsurface soil samples. No indoor survey measurements were performed.

Using a portable gamma scintillation meter, ranges of measurements were recorded for areas of the property surface. In addition, systematic soil samples were obtained at randomly selected locations irrespective of gamma exposure rates. The 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

Applicable federal guidelines are summarized in Table 1.³ The normal background radiation levels for the northern New Jersey area are presented in Table 2. These data are provided for comparison with survey results presented in this section. All direct measurement results presented in this report are gross readings; background radiation levels have not been subtracted. Similarly, background concentrations have not been subtracted from radionuclide concentrations measured in environmental samples.

Surface Gamma Radiation Levels

A scan of the surface of the property showed gamma exposure rates ranging from 5 to 11 $\mu\text{R/h}$ as shown on Fig. 1. No regions of elevated gamma levels were detected.

Systematic Soil Samples

Four systematic (S) soil samples were taken from two different locations on the property for radionuclide analyses. Locations of the samples are shown in Fig. 2 with results of laboratory analyses provided in Table 3. Concentrations of radium and thorium in these samples ranged from 0.50 to 0.72 pCi/g and 0.51 to 0.75 pCi/g, respectively. All sample results were below typical background values encountered in the northern New Jersey area (Table 2).

SIGNIFICANCE OF FINDINGS

Surface measurements taken at 133 Maywood Avenue provide evidence that the property contains no radiation levels nor radionuclide concentrations in excess of the typical background values found in northern New Jersey. Based on the results of this radiological assessment, it is recommended that this site be eliminated from consideration for inclusion in the DOE remedial action program.

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. T. E. Myrick, B. A. Berven, W. D. Cottrell, W. A. Goldsmith, and F. F. Haywood, *Procedures Manual for the ORNL Radiological Survey Activities (RASA) Program*, Oak Ridge National Laboratory, ORNL/TM-8600 (April 1987).
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. 2, March 1987).
4. U. S. Department of Energy, *Radiological Survey of the Middlesex Landfill, Middlesex, New Jersey*, DOE/EV-00005/20 (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).

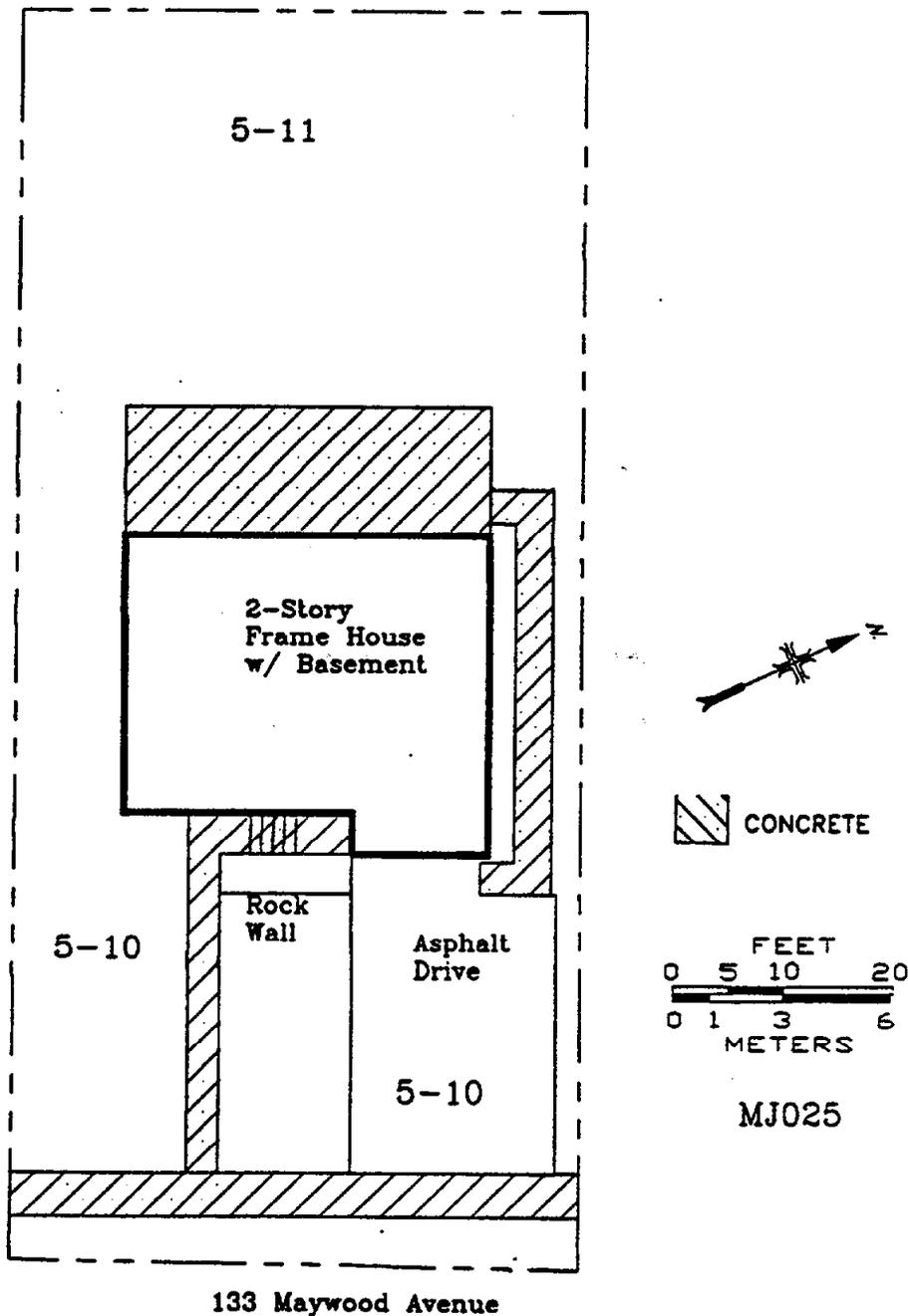


Fig. 1. Gamma radiation levels ($\mu\text{R}/\text{h}$) measured on the surface at 133 Maywood Avenue, Maywood, New Jersey (MJ025).

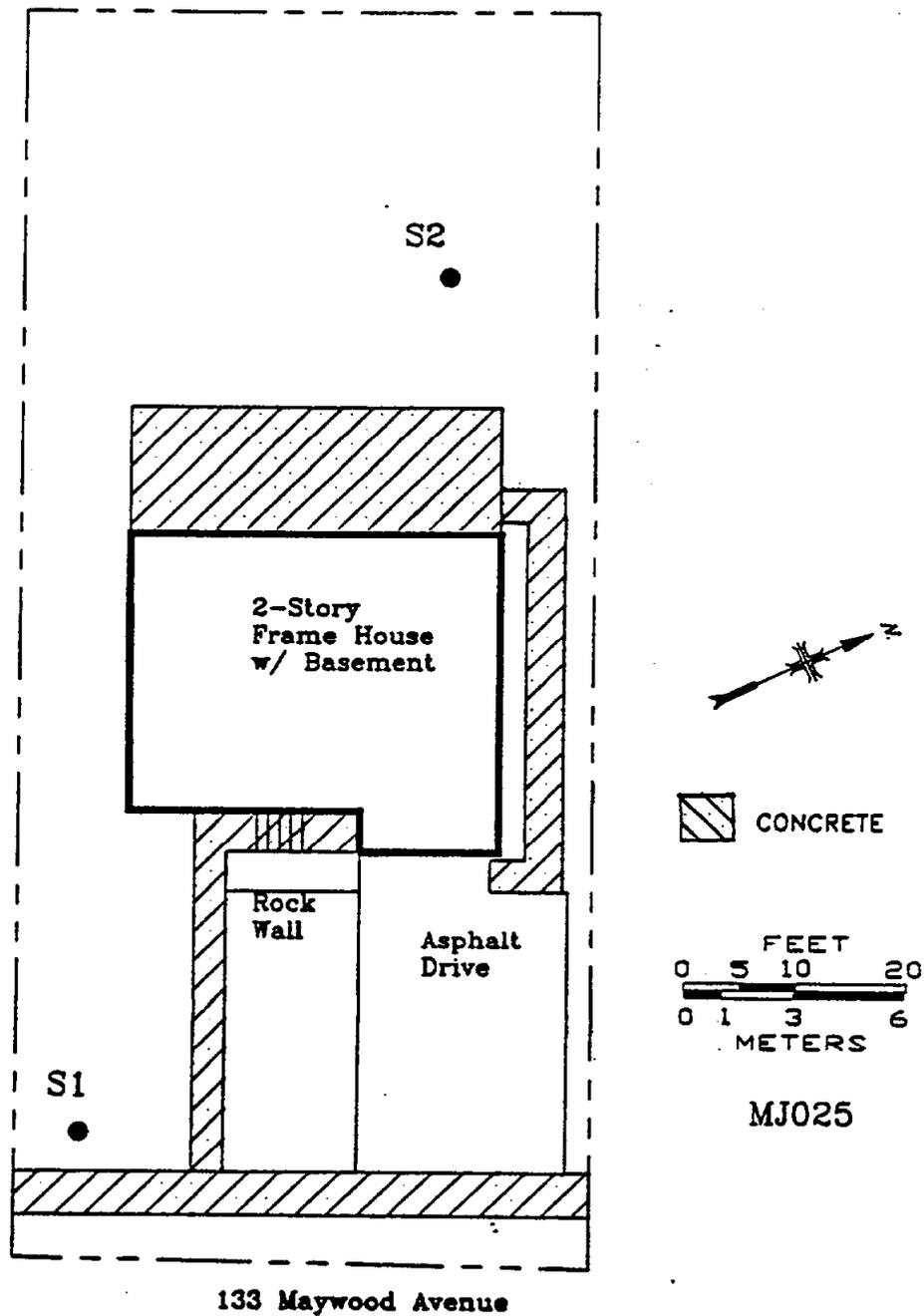


Fig. 2. Diagram showing locations of soil samples taken at 133 Maywood Avenue, Maywood, New Jersey (MJ025).

Table 1. Applicable guidelines for protection against radiation^a

Mode of exposure	Exposure conditions	Guideline value
Radionuclide concentrations in soil	Maximum permissible concentration of the following radionuclides in soil above background levels averaged over a 100 m ² area ²³² Th ²³⁰ Th ²²⁸ Ra ²²⁶ Ra	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

^aU. S. Department of Energy, *Guidelines for Residual Radioactivity at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites* (Rev. 2, March 1987).

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

Type of sample or measurement	Radionuclide level or radionuclide concentration
Gamma exposure rate at 1 m above ground surface (μ R/h) ^a	8
Concentration of radionuclides in soil (pCi/g) ^b	
²³² Th	0.9
²³⁸ U	0.9
²²⁶ Ra	0.9

^aReference 4.

^bReference 5.

**Table 3. Concentrations of radionuclides in soil at
133 Maywood Avenue, Maywood, New Jersey (MJ025)**

Sample ^a	Depth (cm)	Radionuclide concentration (pCi/g)	
		²²⁶ Ra ^b	²³² Th ^b
<i>Systematic samples</i>			
S1A	0-15	0.72 ± 0.02	0.75 ± 0.03
S1B	15-30	0.50 ± 0.06	0.62 ± 0.09
S2A	0-15	0.71 ± 0.05	0.62 ± 0.2
S2B	15-30	0.52 ± 0.04	0.51 ± 0.06

^aLocations of soil samples are shown on Fig. 2.

^bIndicated counting error is at the 95% confidence level ($\pm 2\sigma$).

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