

M-409  
021258

---

Formerly Utilized Sites Remedial Action Program (FUSRAP)

---

# ADMINISTRATIVE RECORD

for Maywood, New Jersey

---



U.S. Department of Energy

# ornl

## OAK RIDGE NATIONAL LABORATORY

**MARTIN MARIETTA**

RESULTS OF THE RADIOLOGICAL SURVEY AT  
16 LONG VALLEY ROAD (LJ053), LODI, NEW JERSEY

Access to the information in this report is limited to those indicated on the distribution list and to Department of Energy and Department of Energy Contractors

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

HEALTH AND SAFETY RESEARCH DIVISION

Nuclear and Chemical Waste Programs  
(Activity No. AH 10 05 00 0; ONLWC01)

RESULTS OF THE RADIOLOGICAL SURVEY AT  
16 LONG VALLEY ROAD (LJ053), LODI, NEW JERSEY

R. W. Doane

Date of Issue - September 1986

Investigation Team

B. A. Berven - RASA Program Manager  
W. D. Cottrell - FUSRAP Project Director  
R. W. Doane - Field Survey Supervisor

Survey Team Members

B. S. Ellis  
D. W. Greene  
C. A. Muhr  
E. M. Pilz  
W. Winton

Work performed as part of the  
RADIOLOGICAL SURVEY ACTIVITIES PROGRAM

Prepared by the  
OAK RIDGE NATIONAL LABORATORY  
Oak Ridge, Tennessee 37831  
operated by  
MARTIN MARIETTA ENERGY SYSTEMS, INC.  
for the  
U.S. DEPARTMENT OF ENERGY  
under Contract No. DE-AC05-84OR21400

## CONTENTS

	<u>Page</u>
LIST OF FIGURES AND TABLES . . . . .	v
ACKNOWLEDGMENTS . . . . .	vii
INTRODUCTION . . . . .	1
SURVEY METHODS . . . . .	1
SURVEY RESULTS . . . . .	1
Systematic and Biased Soil Samples. . . . .	2
Gamma Radiation Levels. . . . .	2
SUMMARY. . . . .	2
REFERENCES . . . . .	3

LIST OF FIGURES AND TABLES

<u>Figure</u>		<u>Page</u>
1	Diagram showing locations of soil samples taken at 16 Long Valley Road, Lodi, New Jersey . . . . .	4
2	Gamma radiation levels measured at 16 Long Valley Road, Lodi, New Jersey. . . . .	5

<u>Table</u>		<u>Page</u>
1	Background radiation levels for the northern New Jersey area . . . . .	6
2	Concentrations of radionuclides in soil at 16 Long Valley Road, Lodi, New Jersey . . . . .	7

## ACKNOWLEDGMENTS

Research for this project was sponsored by the Division of Remedial Action Projects, U.S. Department of Energy. The author wishes to acknowledge the support of J. E. Baublitz, Deputy Director, Office of Remedial Action and Waste Technology, E. G. DeLaney, Director, Division of Facility & Site Decommissioning Projects, and members of their staff. In addition, the author appreciates the manuscript preparation by S. E. Huckaba, D. A. Roberts, and J. K. Williams, Biology Division.

RESULTS OF THE RADIOLOGICAL SURVEY AT  
16 LONG VALLEY ROAD, LODI, NEW JERSEY\*

INTRODUCTION

A radiological survey of 16 Long Valley Road, Lodi, New Jersey, was conducted by a survey team from Oak Ridge National Laboratory (ORNL) on October 24, 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.<sup>2</sup>

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 (LJ53S) and biased (LJ53B) 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  $^{232}\text{Th}$  was 2.1 pCi/g to 68 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  $^{232}\text{Th}$ -bearing material exists. Gamma exposure rates up to 75  $\mu\text{R/h}$  exist on the surface of the property.

### SUMMARY

Measurements taken at 16 Long Valley Road indicate that the property contains radioactive contamination primarily from the  $^{232}\text{Th}$  decay chain with some contamination from the  $^{238}\text{U}$  decay chain. These radionuclide distributions are typical of the type of material processed at the former Maywood Chemical site. The concentration and extent of  $^{232}\text{Th}$  on this property is in excess of the relevant DOE criteria.<sup>3</sup> 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).

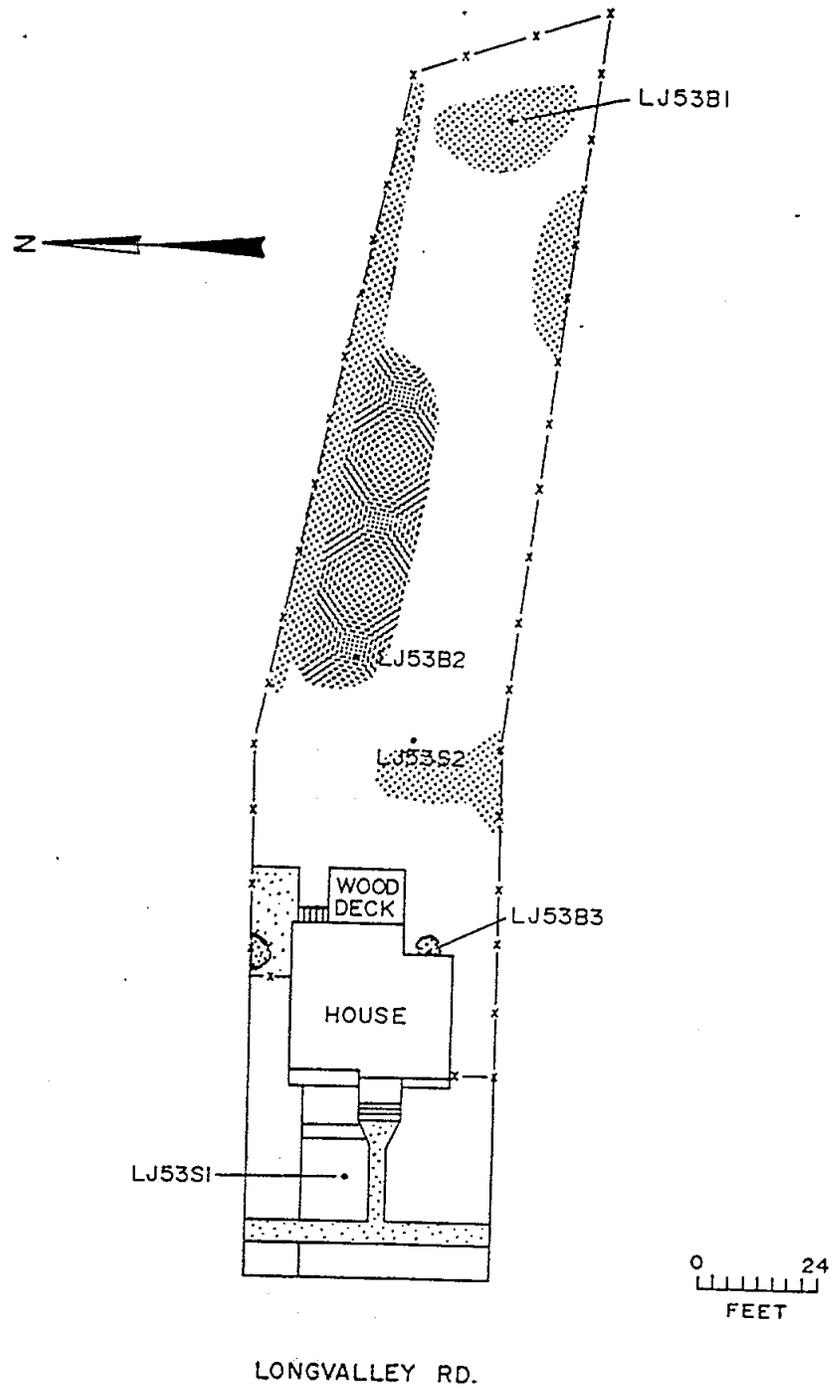


Fig. 1. Diagram showing locations of soil samples taken at 16 Long Valley Road, Lodi, New Jersey.

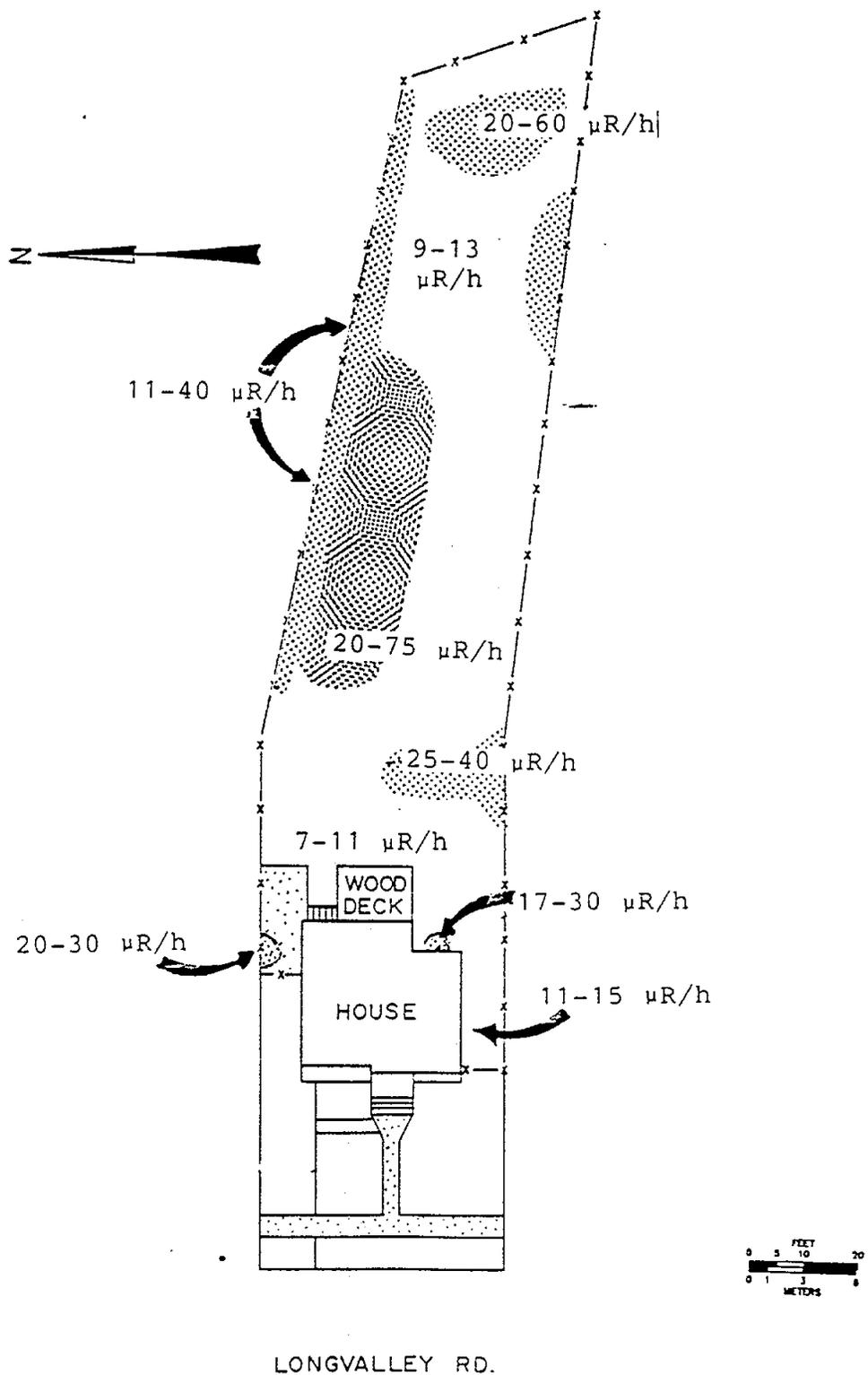


Fig. 2. Gamma radiation levels measured at 16 Long Valley Road, Lodi, New Jersey.

E-21258

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 ( $\mu\text{R/h}$ )	8 <sup>a</sup>
Concentration of radionuclides in soil (pCi/g)	
<sup>232</sup> Th	0.9 <sup>b</sup>
<sup>238</sup> U	0.9 <sup>b</sup>
<sup>226</sup> Ra	0.9 <sup>b</sup>

<sup>a</sup>Reference 4.<sup>b</sup>Reference 5.

Table 2. Concentrations of radionuclides in soil at 16 Long Valley Road, Lodi, New Jersey.

Sample <sup>a</sup>	Depth (cm)	Radionuclide concentration (pCi/g)		
		<sup>226</sup> Ra <sup>b</sup>	<sup>232</sup> Th <sup>b</sup>	<sup>238</sup> U <sup>c</sup>
<u>Systematic samples</u>				
LJ53S1	0-15	0.75 ± 0.3	0.98 ± 0.5	0.73
LJ53S2	15-30	0.89 ± 0.09	1.3 ± 0.5	0.97
<u>Biased samples<sup>d</sup></u>				
LJ53B1A	0-15	4.0 ± 0.4	40 ± 2	4.6
LJ53B1B	15-30	3.7 ± 0.3	32 ± 1	4.1
LJ53B1C	30-45	2.2 ± 0.2	8.9 ± 1	3.7
LJ53B2A	0-15	5.7 ± 0.6	68 ± 5	6.7
LJ53B2B	15-30	1.6 ± 0.2	10 ± 3	1.9
LJ53B2C	30-45	1.4 ± 0.1	9.1 ± 2	1.6
LJ53B3A	0-15	1.6 ± 0.2	11 ± 0.7	1.9
LJ53B3B	15-30	0.90 ± 0.1	3.0 ± 0.5	1.1
LJ53B3C	30-40	0.80 ± 0.2	2.1 ± 0.1	0.93

<sup>a</sup>Locations of soil samples are shown on Fig. 1.

<sup>b</sup>Indicated counting error is at the 95% confidence level ( $\pm 2 \sigma$ ).

<sup>c</sup>Total analytical error of measurement results is less than  $\pm 5\%$  (95% confidence level).

<sup>d</sup>Biased samples are taken from areas shown to have elevated gamma exposure rates.

## INTERNAL DISTRIBUTION

- |       |                |     |                          |
|-------|----------------|-----|--------------------------|
| 1-3.  | B. A. Berven   | 12. | P. T. Owen               |
| 4.    | R. O. Chester  | 13. | T. H. Row                |
| 5.    | W. D. Cottrell | 14. | IR&A Publications Office |
| 6-10. | R. W. Doane    | 15. | Laboratory Records - RC  |
| 11.   | S. V. Kaye     |     |                          |

## EXTERNAL DISTRIBUTION

- 16-18. S. W. Ahrends, U.S. Department of Energy, P. O. Box E,  
Oak Ridge, TN 37831
19. J. D. Berger, Oak Ridge Associated Universities, P. O. Box 117,  
Oak Ridge, TN 37831
- 20-22. Edward G. DeLaney, U.S. Department of Energy, 19901 Germantown  
Road, Germantown, MD 20874
- 23-25. J. F. Nemecek, Bechtel National, Inc., 800 Oak Ridge Turnpike,  
Oak Ridge, TN 37831
26. J. W. Wagoner, U.S. Department of Energy, 19901 Germantown  
Road, Germantown, MD 20874
27. Office of Assistant Manager, Energy Research and Development,  
Oak Ridge Operations Office, Oak Ridge, TN 37831
- 28-29. Office of Scientific and Technical Information, DOE, Oak Ridge,  
TN 37831

CCN: \_\_\_\_\_

**FUSRAP COMMUNICATIONS DISTRIBUTION  
DOE/ORO FORMER SITES RESTORATION DIVISION (EW-93)**

FSRD  COMM TYPE

SAIC SENSITIVE

DATE PROCESSED BY PDCC

COMM REF \_\_\_\_\_

ADMIN RCD \_\_\_\_\_

SUBJECT ORNL RESULTS OF RADL SURVEY @ 18 LONG VALLEY RD. LODI, NJ

FROM JOYNER TO FILE COMM DATE  / /

ADDR CODE  / / CLOSING CCN WBS 138

SUBJECT CODE \_\_\_\_\_ AFFECTED DOCUMENT \_\_\_\_\_

**RESPONSE TRACKING INFORMATION**

<b>ACTION DESCRIPTION:</b>	
<b>PRIMARY:</b> OWED TO: _____ (ORG) _____ TARGET DATE <u> / /</u>	<b>PRIMARY:</b> OWED BY: _____ (ORG) _____ CLOSING CCN _____ COMPL. DATE <u> / /</u> CLOSING REF _____
<b>SECONDARY:</b>	
OWED TO: _____ (ORG) <u>4.174 6830.1</u> TARGET DATE <u> / /</u>	OWED BY: _____ (ORG) _____ CLOSING CCN _____ COMPL. DATE <u> / /</u> CLOSING REF _____

MESSAGE:

W/A			W/O			W/A			W/O		
DIRECTOR, FSRD:	L. Pnce	FSRD	PROGRAM MANAGER:	J. Waddell	SAIC	PROGRAM MANAGER:	R. Harbert	BPM			
DEP. DIRECTOR, FSRD:	W. Seay	FSRD	DEPUTY PROGRAM MGR:	T. Patterson	SAIC	DEPUTY PROGRAM MGR.:	W. Futrell	BPM			
	J. Hart	FSRD	MGMT./SYSTEMS:	K. Renfro	SAIC		A. Boos	BPM			
	D. Adler	FSRD	SECRETARY:	S. Heptinstall	SAIC		M. Redmon	BPM			
	B. Atkin	FSRD	ORISE:		ORISE		G. Palau	BPM			
	S. Cange	FSRD	ORNL:		ORNL		P. Huber	BPM			
	J. Darby	FSRD					S. Priest	BPM			
	E. Green	FSRD				COMMUNITY RELATIONS		BCR			
	G. Hartman	FSRD				CONSTRUCTION		BFC			
	J. Japp	FSRD				ENGINEERING & TECHNOLOGY		BET			
	R. Kirk	FSRD				ENGINEERING		BET			
	J. Kopotic	FSRD				ENVIR TECH/DATA		BET			
	L. Marz	FSRD				GEOTECH		BET			
	M. Noe	FSRD				ENVIRON SAFETY & HEALTH		BEH			
	S. Oldham	FSRD				SAFETY & HEALTH		BEH			
	S. Williams	FSRD				ENVIR COMPLIANCE		BEH			
PRGM ANALYST:	K. Houser	FSRD				WASTE MGMT		BWM			
SECRETARY:	M. Seiber/M. Dyke/ T. Patterson	FSRD				WASTE TREATMENT		BWT			
FSRD CHRON FILE			TMA		BET	PROCUREMENT		BPO			
FSRD NOTEBOOKS			SITES: 158 NFSS			PROJECT ADMINISTRATION		BPA			
READING FILE			TONAWANDA INFO CTR.			PROJECT AUTOMATION		BAU			
DOE/P&CD:	French	DCO	137 WISS			PROJECT CONTROLS		BPC			
DOE/HQ:	J. Wagoner	DHQ	138 MISS/INFO CTR			TECHNICAL REPORTS		BTR			
ANL:	A. Geisler	ANL	139 COLONIE (CISS)			QUALITY ASSURANCE		BOA			
	G. Maraman	ANL	140 / 153 LATTY AVE/SLAPS			ADMIN RCD/INFO REPOSITORY					
	D. Dunning	ANL				PDCC READ FILE TO/FROM DOE					
						PDCC: SENSITIVE/CHRON FILE					

# ornl

**OAK RIDGE  
NATIONAL  
LABORATORY**

**MARTIN MARIETTA**

RESULTS OF THE RADIOLOGICAL SURVEY AT  
18 LONG VALLEY ROAD (LJ052), LODI, NEW JERSEY

Access to the information in this report is limited to those indicated on the distribution list and to Department of Energy and Department of Energy Contractors

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

HEALTH AND SAFETY RESEARCH DIVISION

Nuclear and Chemical Waste Programs  
(Activity No. AH 10 05 00 0; ONLWC01)

RESULTS OF THE RADIOLOGICAL SURVEY AT  
18 LONG VALLEY ROAD (LJ052), LODI, NEW JERSEY

R. W. Doane

Date of Issue - September 1986

Investigation Team

B. A. Berven - RASA Program Manager  
W. D. Cottrell - FUSRAP Project Director  
R. W. Doane - Field Survey Supervisor

Survey Team Members

B. S. Ellis  
D. W. Greene  
C. A. Muhr  
E. M. Pilz  
W. Winton

Work performed as part of the  
RADIOLOGICAL SURVEY ACTIVITIES PROGRAM

Prepared by the  
OAK RIDGE NATIONAL LABORATORY  
Oak Ridge, Tennessee 37831  
operated by  
MARTIN MARIETTA ENERGY SYSTEMS, INC.  
for the  
U.S. DEPARTMENT OF ENERGY  
under Contract No. DE-AC05-84OR21400

CONTENTS

	<u>Page</u>
LIST OF FIGURES AND TABLES . . . . .	v
ACKNOWLEDGMENTS . . . . .	vii
INTRODUCTION . . . . .	1
SURVEY METHODS . . . . .	1
SURVEY RESULTS . . . . .	1
Systematic and Biased Soil Samples. . . . .	2
Gamma Radiation Levels. . . . .	2
SUMMARY. . . . .	2
REFERENCES . . . . .	3

LIST OF FIGURES AND TABLES

<u>Figure</u>		<u>Page</u>
1	Diagram showing locations of soil samples taken at 18 Long Valley Road, Lodi, New Jersey . . . . .	4
2	Gamma radiation levels measured at 18 Long Valley Road, Lodi, New Jersey. . . . .	5

<u>Table</u>		<u>Page</u>
1	Background radiation levels for the northern New Jersey area . . . . .	6
2	Concentrations of radionuclides in soil at 18 Long Valley Road, Lodi, New Jersey . . . . .	7

## ACKNOWLEDGMENTS

Research for this project was sponsored by the Division of Remedial Action Projects, U.S. Department of Energy. The author wishes to acknowledge the support of J. E. Baublitz, Deputy Director, Office of Remedial Action and Waste Technology, E. G. DeLaney, Director, Division of Facility & Site Decommissioning Projects, and members of their staff. In addition, the author appreciates the manuscript preparation by S. E. Huckaba, D. A. Roberts, and J. K. Williams, Biology Division.

RESULTS OF THE RADIOLOGICAL SURVEY AT  
18 LONG VALLEY ROAD, LODI, NEW JERSEY\*

INTRODUCTION

A radiological survey of 18 Long Valley Road, Lodi, New Jersey, was conducted by a survey team from Oak Ridge National Laboratory (ORNL) on October 24, 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.<sup>2</sup>

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 (LJ52S) and biased (LJ52B) 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  $^{232}\text{Th}$  was 1.3 pCi/g to 26 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  $^{232}\text{Th}$ -bearing material exists. Gamma exposure rates up to 50  $\mu\text{R/h}$  exist on the surface of the property.

### SUMMARY

Measurements taken at 18 Long Valley Road indicate that the property contains radioactive contamination primarily from the  $^{232}\text{Th}$  decay chain with some contamination from the  $^{238}\text{U}$  decay chain. These radionuclide distributions are typical of the type of material processed at the former Maywood Chemical site. The concentration and extent of  $^{232}\text{Th}$  on this property is in excess of the relevant DOE criteria.<sup>3</sup> 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).

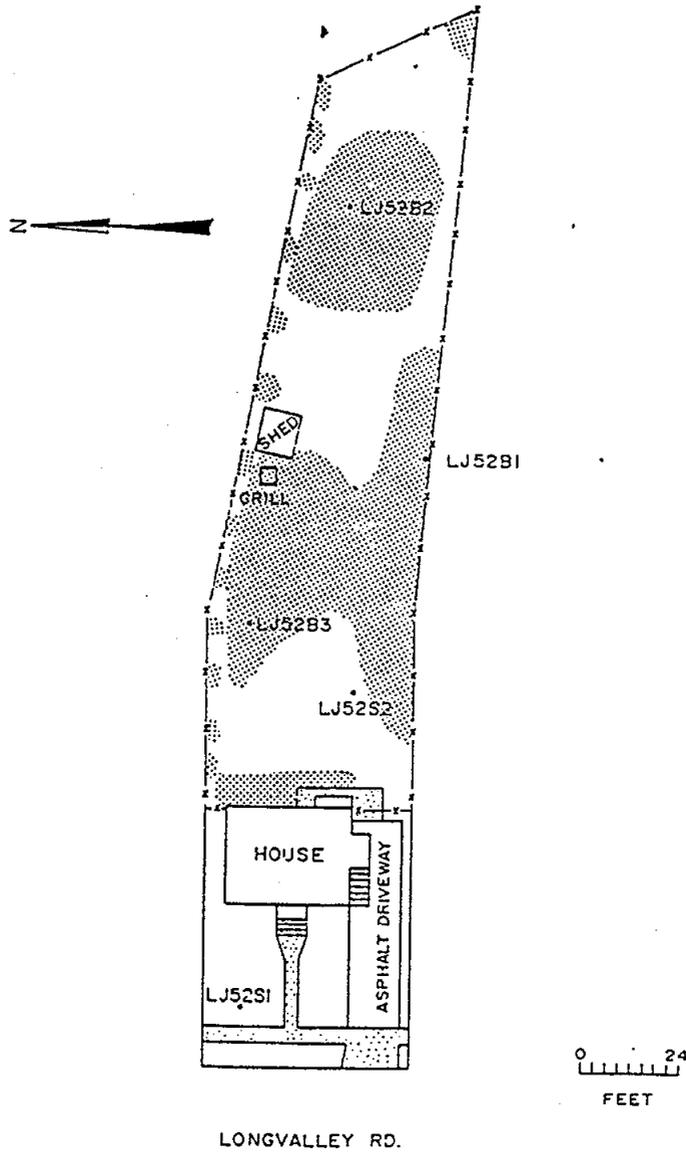


Fig. 1. Diagram showing locations of soil samples taken at 18 Long Valley Road, Lodi, New Jersey.

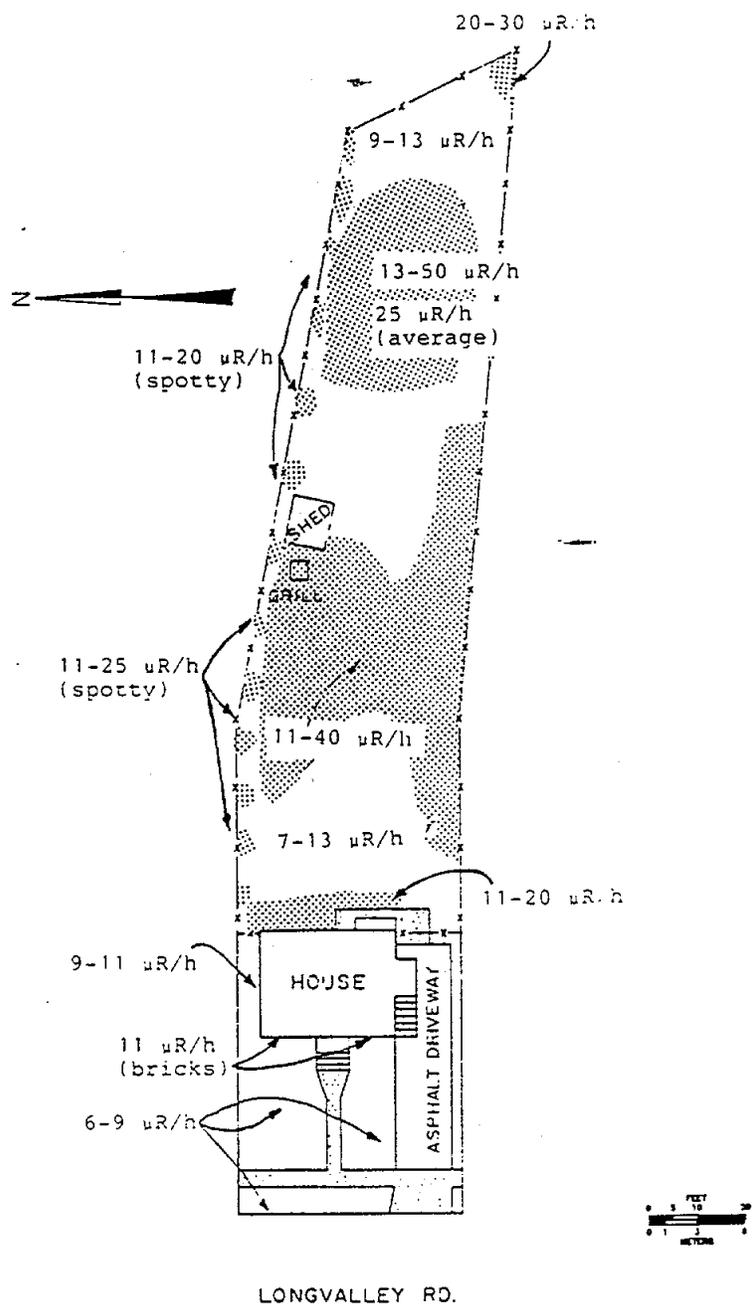


Fig. 2. Gamma radiation levels measured at 18 Long Valley Road, Lodi, New Jersey.

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 ( $\mu\text{R/h}$ )	ga
Concentration of radionuclides in soil (pCi/g)	
232Th	0.9b
238U	0.9b
226Ra	0.9b

<sup>a</sup>Reference 4.

<sup>b</sup>Reference 5.

Table 2. Concentrations of radionuclides in soil at 18 Long Valley Road, Lodi, New Jersey.

Sample <sup>a</sup>	Depth (cm)	Radionuclide concentration (pCi/g)		
		<sup>226</sup> Ra <sup>b</sup>	<sup>232</sup> Th <sup>b</sup>	<sup>238</sup> U <sup>c</sup>
<u>Systematic samples</u>				
LJ52S1	0-15	0.66 ± 0.07	0.68 ± 0.5	0.80
LJ52S2	15-30	0.67 ± 0.2	1.0 ± 0.6	0.77
<u>Biased samples<sup>d</sup></u>				
LJ52B1A	0-15	3.8 ± 0.3	26 ± 4	5.9
LJ52B1B	15-30	2.4 ± 0.3	8.3 ± 0.9	3.8
LJ52B1C	30-45	1.2 ± 0.1	1.3 ± 0.2	1.1
LJ52B2A	0-15	2.4 ± 0.3	16 ± 2	2.7
LJ52B2B	15-30	1.1 ± 0.1	4.4 ± 1	1.4
LJ52B3A	0-15	1.5 ± 0.2	7.9 ± 0.7	1.6
LJ52B3B	15-30	1.2 ± 0.1	3.0 ± 0.7	1.5

<sup>a</sup>Locations of soil samples are shown on Fig. 1.

<sup>b</sup>Indicated counting error is at the 95% confidence level ( $\pm 2 \sigma$ ).

<sup>c</sup>Total analytical error of measurement results is less than  $\pm 5\%$  (95% confidence level).

<sup>d</sup>Biased samples are taken from areas shown to have elevated gamma exposure rates.

## INTERNAL DISTRIBUTION

- |       |                |     |                          |
|-------|----------------|-----|--------------------------|
| 1-3.  | B. A. Berven   | 12. | P. T. Owen               |
| 4.    | R. O. Chester  | 13. | T. H. Row                |
| 5.    | W. D. Cottrell | 14. | IR&A Publications Office |
| 6-10. | R. W. Doane    | 15. | Laboratory Records - RC  |
| 11.   | S. V. Kaye     |     |                          |

## EXTERNAL DISTRIBUTION.

- 16-18. S. W. Ahrends, U.S. Department of Energy, P. O. Box E,  
Oak Ridge, TN 37831
19. J. D. Berger, Oak Ridge Associated Universities, P. O. Box 117,  
Oak Ridge, TN 37831
- 20-22. Edward G. DeLaney, U.S. Department of Energy, 19901 Germantown  
Road, Germantown, MD 20874
- 23-25. J. F. Nemec, Bechtel National, Inc., 800 Oak Ridge Turnpike,  
Oak Ridge, TN 37831
26. J. W. Wagoner, U.S. Department of Energy, 19901 Germantown  
Road, Germantown, MD 20874
27. Office of Assistant Manager, Energy Research and Development,  
Oak Ridge Operations Office, Oak Ridge, TN 37831
- 28-29. Office of Scientific and Technical Information, DOE, Oak Ridge,  
TN 37831



CCN:

FUSRAP COMMUNICATIONS DISTRIBUTION  
DOE/ORO FORMER SITES RESTORATION DIVISION (EW-93)

DATE PROCESSED BY PDCC

FSRD  COMM TYPE

SAIC SENSITIVE

COMM REF \_\_\_\_\_

ADMIN RCD \_\_\_\_\_

SUBJECT ORNL RESULTS OF RADL SURVEY @ 20 LONG VALLEY RD. LODI, NJ

FROM JOYNER TO FILE COMM DATE  / /

ADDR CODE  / / CLOSURES CCN \_\_\_\_\_ WBS 138

SUBJECT CODE \_\_\_\_\_ AFFECTED DOCUMENT \_\_\_\_\_

RESPONSE TRACKING INFORMATION

ACTION DESCRIPTION: _____	
PRIMARY:	PRIMARY:
OWED TO: _____	OWED BY: _____ (ORG) _____
(ORG) _____ TARGET DATE <u> / /</u>	CLOSING CCN _____ COMPL. DATE <u> / /</u> CLOSING REF _____
SECONDARY:	SECONDARY:
OWED TO: _____	OWED BY: _____ (ORG) _____
(ORG) <u>4.174 6830.1</u> TARGET DATE <u> / /</u>	CLOSING CCN _____ COMPL. DATE <u> / /</u> CLOSING REF _____

MESSAGE:

W/A W/O			W/A W/O			W/A W/O		
DIRECTOR, FSRD:	L. Price	FSRD	PROGRAM MANAGER:	J. Waddell	SAIC	PROGRAM MANAGER:	R. Harbert	BPM
DEP. DIRECTOR, FSRD:	W. Seay	FSRD	DEPUTY PROGRAM MGR:	T. Patterson	SAIC	DEPUTY PROGRAM MGR.:	W. Futrell	BPM
	J. Hart	FSRD	MGMT. SYSTEMS:	K. Renfro	SAIC		A. Boos	BPM
	D. Adler	FSRD	SECRETARY:	S. Heptinstall	SAIC		M. Redmon	BPM
	B. Atkin	FSRD	ORISE:		ORISE		G. Palau	BPM
	S. Cange	FSRD	ORNL:		ORNL		P. Huber	BPM
	J. Darby	FSRD					S. Priest	BPM
	E. Green	FSRD				COMMUNITY RELATIONS		BCR
	G. Hartman	FSRD				CONSTRUCTION		BFC
	J. Japp	FSRD				ENGINEERING & TECHNOLOGY		BET
	R. Kirk	FSRD				ENGINEERING		BET
	J. Kopotic	FSRD				ENVIR TECH/DATA		BET
	L. Marz	FSRD				GEOTECH		BET
	M. Noe	FSRD				ENVIRON SAFETY & HEALTH		BEH
	S. Oldham	FSRD				SAFETY & HEALTH		BEH
	S. Williams	FSRD				ENVIR COMPLIANCE		BEH
PRGM ANALYST:	K. Houser	FSRD				WASTE MGMT		BWM
SECRETARY:	M. Seiber/M. Dyke/ T. Patterson	FSRD				WASTE TREATMENT		BWT
FSRD CHRON FILE			TMA		BET	PROCUREMENT		BPO
FSRD NOTEBOOKS			SITES: 158 NFSS			PROJECT ADMINISTRATION		BPA
READING FILE			TONAWANDA INFO CTR.			PROJECT AUTOMATION		BAU
DOE/P&CD:	French	DCO	137 WISS			PROJECT CONTROLS		BPC
DOE/HQ:	J. Wagoner	DHQ	138 MISS/INFO CTR			TECHNICAL REPORTS		BTR
ANL:	A. Geisler	ANL	139 COLONIE (CISS)			QUALITY ASSURANCE		BOA
	G. Maraman	ANL	140 / 153 LATTY AVE/SLAPS			ADMIN RCD/INFO REPOSITORY		
	D. Dunning	ANL				PDCC READ FILE TO/FROM DOE		
						PDCC: SENSITIVE/CHRON FILE		

# NATIONAL LABORATORY

RESULTS OF THE RADIOLOGICAL SURVEY AT  
20 LONG VALLEY ROAD (LJ051), LODI, NEW JERSEY

**MARTIN MARIETTA**

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

Access to the information in this report is limited to those  
indicated on the distribution list and to Department of Energy  
and Department of Energy Contractors

HEALTH AND SAFETY RESEARCH DIVISION

Nuclear and Chemical Waste Programs  
(Activity No. AH 10 05 00 0; ONLWC01)

RESULTS OF THE RADIOLOGICAL SURVEY AT  
20 LONG VALLEY ROAD (LJ051), LODI, NEW JERSEY

R. W. Doane

Date of Issue - September 1986

Investigation Team

B. A. Berven - RASA Program Manager  
W. D. Cottrell - FUSRAP Project Director  
R. W. Doane - Field Survey Supervisor

Survey Team Members

B. S. Ellis  
D. W. Greene  
C. A. Muhr  
E. M. Pilz  
W. Winton

Work performed as part of the  
RADIOLOGICAL SURVEY ACTIVITIES PROGRAM

Prepared by the  
OAK RIDGE NATIONAL LABORATORY  
Oak Ridge, Tennessee 37831  
operated by  
MARTIN MARIETTA ENERGY SYSTEMS, INC.  
for the  
U.S. DEPARTMENT OF ENERGY  
under Contract No. DE-AC05-84OR21400

## CONTENTS

	<u>Page</u>
LIST OF FIGURES AND TABLES . . . . .	v
ACKNOWLEDGMENTS . . . . .	vii
INTRODUCTION . . . . .	1
SURVEY METHODS . . . . .	1
SURVEY RESULTS . . . . .	1
Systematic and Biased Soil Samples . . . . .	2
Gamma Radiation Levels . . . . .	2
SUMMARY . . . . .	2
REFERENCES . . . . .	3

LIST OF FIGURES AND TABLES

<u>Figure</u>		<u>Page</u>
1	Diagram showing locations of soil samples taken at 20 Long Valley Road, Lodi, New Jersey . . . . .	4
2	Gamma radiation levels measured at 20 Long Valley Road, Lodi, New Jersey. . . . .	5

<u>Table</u>		<u>Page</u>
1	Background radiation levels for the northern New Jersey area . . . . .	6
2	Concentrations of radionuclides in soil at 20 Long Valley Road, Lodi, New Jersey . . . . .	7

## ACKNOWLEDGMENTS

Research for this project was sponsored by the Division of Remedial Action Projects, U.S. Department of Energy. The author wishes to acknowledge the support of J. E. Baublitz, Deputy Director, Office of Remedial Action and Waste Technology, E. G. DeLaney, Director, Division of Facility & Site Decommissioning Projects, and members of their staff. In addition, the author appreciates the manuscript preparation by S. E. Huckaba, D. A. Roberts, and J. K. Williams, Biology Division.

# RESULTS OF THE RADIOLOGICAL SURVEY AT 20 LONG VALLEY ROAD, LODI, NEW JERSEY\*

## INTRODUCTION

A radiological survey of 20 Long Valley Road, Lodi, New Jersey, was conducted by a survey team from Oak Ridge National Laboratory (ORNL) on October 24, 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.<sup>2</sup>

## 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 (LJ51S) and biased (LJ51B) 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  $^{232}\text{Th}$  was 2.4 pCi/g to 47 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  $^{232}\text{Th}$ -bearing material exists. Gamma exposure rates up to 60  $\mu\text{R}/\text{h}$  exist on the surface of the property.

### SUMMARY

Measurements taken at 20 Long Valley Road indicate that the property contains radioactive contamination primarily from the  $^{232}\text{Th}$  decay chain with some contamination from the  $^{238}\text{U}$  decay chain. These radionuclide distributions are typical of the type of material processed at the former Maywood Chemical site. The concentration and extent of  $^{232}\text{Th}$  on this property is in excess of the relevant DOE criteria.<sup>3</sup> 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).

E-21261

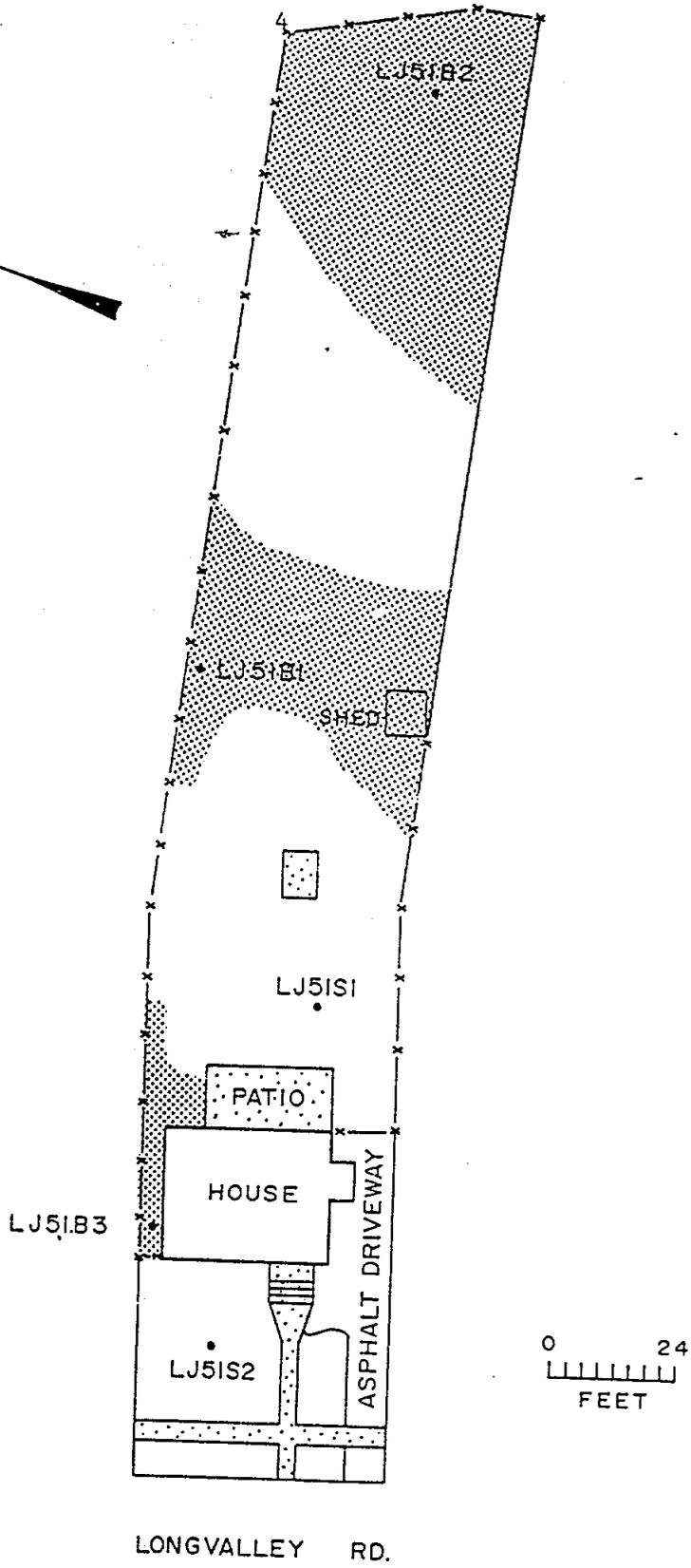
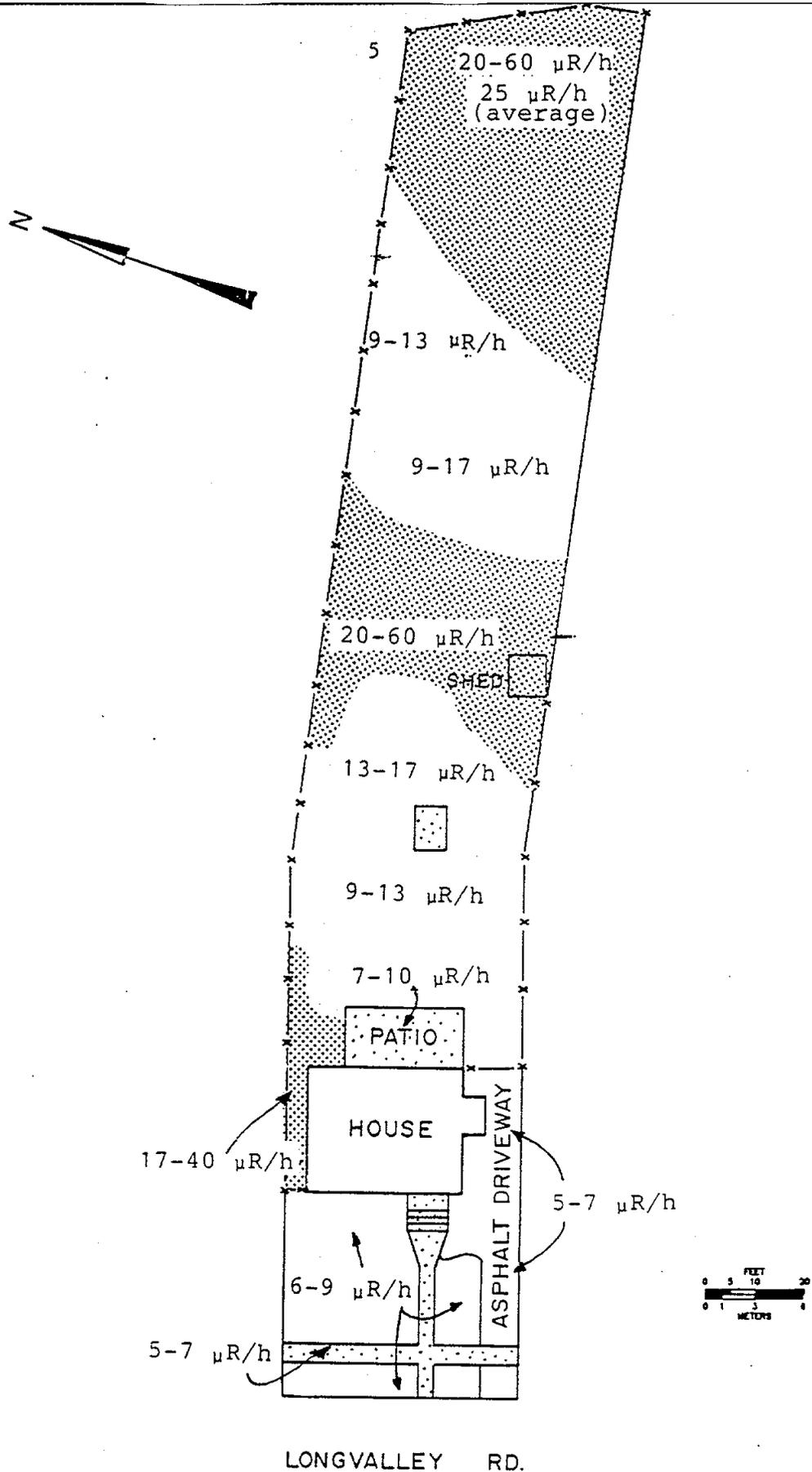


Fig. 1. Diagram showing locations of soil samples taken at 20 Long Valley Road, Lodi, New Jersey.



LONGVALLEY RD.

Fig. 2. Gamma radiation levels measured at 20 Long Valley Road, Lodi, New Jersey.

E-21261

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 ( $\mu\text{R/h}$ )	8 <sup>a</sup>
Concentration of radionuclides in soil (pCi/g)	
<sup>232</sup> Th	0.9 <sup>b</sup>
<sup>238</sup> U	0.9 <sup>b</sup>
<sup>226</sup> Ra	0.9 <sup>b</sup>

<sup>a</sup>Reference 4.<sup>b</sup>Reference 5.

Table 2. Concentrations of radionuclides in soil at 20 Long Valley Road, Lodi, New Jersey.

Sample <sup>a</sup>	Depth (cm)	Radionuclide concentration (pCi/g)		
		<sup>226</sup> Ra <sup>b</sup>	<sup>232</sup> Th <sup>b</sup>	<sup>238</sup> Uc
<u>Systematic samples</u>				
LJ51S1	0-15	0.55 ± 0.05	0.71 ± 0.5	0.67
LJ51S2	0-15	0.63 ± 0.1	1.3 ± 1	0.90
<u>Biased samples<sup>d</sup></u>				
LJ51B1A	0-15	5.0 ± 0.7	47 ± 2	8.8
LJ51B1B	15-30	4.7 ± 0.3	22 ± 0.9	12
LJ51B1C	30-45	2.4 ± 0.08	6.3 ± 0.4	6.0
LJ51B2A	0-15	2.4 ± 0.1	12 ± 3	7.1
LJ51B2B	15-30	1.5 ± 0.2	4.6 ± 1	4.4
LJ51B2C	30-45	1.1 ± 0.1	2.4 ± 0.3	3.0
LJ51B3A	0-15	4.0 ± 0.2	24 ± 4	5.0
LJ51B3B	15-30	1.2 ± 0.07	5.4 ± 0.9	1.6
LJ51B3C	30-45	0.91 ± 0.2	3.3 ± 1	1.1

<sup>a</sup>Locations of soil samples are shown on Fig. 1.

<sup>b</sup>Indicated counting error is at the 95% confidence level ( $\pm 2 \sigma$ ).

<sup>c</sup>Total analytical error of measurement results is less than  $\pm 5\%$  (95% confidence level).

<sup>d</sup>Biased samples are taken from areas shown to have elevated gamma exposure rates.

## INTERNAL DISTRIBUTION

- |       |                |     |                          |
|-------|----------------|-----|--------------------------|
| 1-3.  | B. A. Berven   | 12. | P. T. Owen               |
| 4.    | R. O. Chester  | 13. | T. H. Row                |
| 5.    | W. D. Cottrell | 14. | IR&A Publications Office |
| 6-10. | R. W. Doane    | 15. | Laboratory Records - RC  |
| 11.   | S. V. Kaye     |     |                          |

## EXTERNAL DISTRIBUTION

- 16-18. S. W. Ahrends, U.S. Department of Energy, P. O. Box E,  
Oak Ridge, TN 37831
19. J. D. Berger, Oak Ridge Associated Universities, P. O. Box 117,  
Oak Ridge, TN 37831
- 20-22. Edward G. DeLaney, U.S. Department of Energy, 19901 Germantown  
Road, Germantown, MD 20874
- 23-25. J. F. Nemec, Bechtel National, Inc., 800 Oak Ridge Turnpike,  
Oak Ridge, TN 37831
26. J. W. Wagoner, U.S. Department of Energy, 19901 Germantown  
Road, Germantown, MD 20874
27. Office of Assistant Manager, Energy Research and Development,  
Oak Ridge Operations Office, Oak Ridge, TN 37831
- 28-29. Office of Scientific and Technical Information, DOE, Oak Ridge,  
TN 37831

CCN: \_\_\_\_\_

**FUSRAP COMMUNICATIONS DISTRIBUTION  
DOE/ORO FORMER SITES RESTORATION DIVISION (EW-93)**

FSRD  COMM TYPE

DATE PROCESSED BY PDCC

SAIC SENSITIVE

COMM REF \_\_\_\_\_

ADMIN RCD \_\_\_\_\_

SUBJECT ORNL RESULTS OF RADL. SURVEY @ 22 LONG VALLEY RD. LODI, NJ

FROM JOYNER TO FILE COMM DATE  / /

ADDR CODE  / / CLOSING CCN \_\_\_\_\_ WBS 138

SUBJECT CODE \_\_\_\_\_ AFFECTED DOCUMENT \_\_\_\_\_

### RESPONSE TRACKING INFORMATION

<b>ACTION DESCRIPTION:</b>	
<b>PRIMARY:</b> OWED TO: _____ (ORG) _____ TARGET DATE <u> / /</u>	<b>PRIMARY:</b> OWED BY: _____ (ORG) _____ CLOSING CCN _____ COMPL. DATE <u> / /</u> CLOSING REF _____
<b>SECONDARY:</b> OWED TO: _____ (ORG) <u>4.174 6830.1</u> TARGET DATE <u> / /</u>	<b>SECONDARY:</b> OWED BY: _____ (ORG) _____ CLOSING CCN _____ COMPL. DATE <u> / /</u> CLOSING REF _____

MESSAGE:

W/A			W/O			W/A			W/O		
DIRECTOR, FSRD:	L. Price	FSRD	PROGRAM MANAGER:	J. Waddell	SAIC	PROGRAM MANAGER:	R. Harbert	BPM			
DEP. DIRECTOR, FSRD:	W. Seay	FSRD	DEPUTY PROGRAM MGR:	T. Patterson	SAIC	DEPUTY PROGRAM MGR.:	W. Futrell	BPM			
	J. Hart	FSRD	MGMT. SYSTEMS:	K. Renfro	SAIC		A. Boos	BPM			
	D. Adler	FSRD	SECRETARY:	S. Heptinstall	SAIC		M. Redmon	BPM			
	B. Atkin	FSRD	ORISE:		ORISE		G. Palau	BPM			
	S. Cange	FSRD	ORNL:		ORNL		P. Huber	BPM			
	J. Darby	FSRD					S. Priest	BPM			
	E. Green	FSRD				COMMUNITY RELATIONS		BCR			
	G. Hartman	FSRD				CONSTRUCTION		BFC			
	J. Japp	FSRD				ENGINEERING & TECHNOLOGY		BET			
	R. Kirk	FSRD				ENGINEERING		BET			
	J. Kopotic	FSRD				ENVIR TECH/DATA		BET			
	L. Marz	FSRD				GEOTECH		BET			
	M. Noe	FSRD				ENVIRON SAFETY & HEALTH		BEH			
	S. Oldham	FSRD				SAFETY & HEALTH		BEH			
	S. Williams	FSRD				ENVIR COMPLIANCE		BEH			
PRGM ANALYST:	K. Houser	FSRD				WASTE MGMT		BWM			
SECRETARY:	M. Seiber/M. Dyke/ T. Patterson	FSRD				WASTE TREATMENT		BWT			
						PROCUREMENT		BPO			
FSRD CHRON FILE			TMA		BET	PROJECT ADMINISTRATION		BPA			
FSRD NOTEBOOKS			SITES: 158 NFSS			PROJECT AUTOMATION		BAU			
READING FILE			TONAWANDA INFO CTR.			PROJECT CONTROLS		BPC			
DOE/P&CD:	French	DCO	137 WISS			TECHNICAL REPORTS		BTR			
DOE/HQ:	J. Wagoner	DHO	138 MISS/INFO CTR			QUALITY ASSURANCE		BOA			
ANL:	A. Geisler	ANL	139 COLONIE (CISS)			ADMIN RCD/INFO REPOSITORY					
	G. Maraman	ANL	140 / 153 LATTY AVE/SLAPS			PDCC READ FILE TO/FROM DOE					
	D. Dunning	ANL				PDCC. SENSITIVE/CHRON FILE					

# ornl

**OAK RIDGE  
NATIONAL  
LABORATORY**

**MARTIN MARIETTA**

RESULTS OF THE RADIOLOGICAL SURVEY AT  
22 LONG VALLEY ROAD (LJ050), LODI, NEW JERSEY

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

Access to the information in this report is limited to those indicated on the distribution list and to Department of Energy and Department of Energy Contractors

HEALTH AND SAFETY RESEARCH DIVISION

Nuclear and Chemical Waste Programs  
(Activity No. AH 10 05 00 0; ONLWC01)

RESULTS OF THE RADIOLOGICAL SURVEY AT  
22 LONG VALLEY ROAD (LJ050), LODI, NEW JERSEY

R. W. Doane

Date of Issue - September 1986

Investigation Team

B. A. Berven - RASA Program Manager  
W. D. Cottrell - FUSRAP Project Director  
R. W. Doane - Field Survey Supervisor

Survey Team Members

B. S. Ellis  
D. W. Greene  
C. A. Muhr  
E. M. Pilz  
W. Winton

Work performed as part of the  
RADIOLOGICAL SURVEY ACTIVITIES PROGRAM

Prepared by the  
OAK RIDGE NATIONAL LABORATORY  
Oak Ridge, Tennessee 37831  
operated by  
MARTIN MARIETTA ENERGY SYSTEMS, INC.  
for the  
U.S. DEPARTMENT OF ENERGY  
under Contract No. DE-AC05-84OR21400

HEALTH AND SAFETY RESEARCH DIVISION

Nuclear and Chemical Waste Programs  
(Activity No. AH 10 05 00 0; ONLWC01)

RESULTS OF THE RADIOLOGICAL SURVEY AT  
22 LONG VALLEY ROAD (LJ050), LODI, NEW JERSEY

R. W. Doane

Date of Issue - September 1986

Investigation Team

B. A. Berven - RASA Program Manager  
W. D. Cottrell - FUSRAP Project Director  
R. W. Doane - Field Survey Supervisor

Survey Team Members

B. S. Ellis  
D. W. Greene  
C. A. Muhr  
E. M. Pilz  
W. Winton

Work performed as part of the  
RADIOLOGICAL SURVEY ACTIVITIES PROGRAM

Prepared by the  
OAK RIDGE NATIONAL LABORATORY  
Oak Ridge, Tennessee 37831  
operated by  
MARTIN MARIETTA ENERGY SYSTEMS, INC.  
for the  
U.S. DEPARTMENT OF ENERGY  
under Contract No. DE-AC05-84OR21400

CONTENTS

	<u>Page</u>
LIST OF FIGURES AND TABLES . . . . .	v
ACKNOWLEDGMENTS . . . . .	vii
INTRODUCTION . . . . .	1
SURVEY METHODS . . . . .	1
SURVEY RESULTS . . . . .	1
Systematic and Biased Soil Samples . . . . .	2
Gamma Radiation Levels . . . . .	2
SUMMARY . . . . .	2
REFERENCES . . . . .	3

LIST OF FIGURES AND TABLES

<u>Figure</u>		<u>Page</u>
1	Diagram showing locations of soil samples taken at 22 Long Valley Road, Lodi, New Jersey . . . . .	4
2	Gamma radiation levels measured at 22 Long Valley Road, Lodi, New Jersey. . . . .	5

<u>Table</u>		<u>Page</u>
1	Background radiation levels for the northern New Jersey area . . . . .	6
2	Concentrations of radionuclides in soil at 22 Long Valley Road, Lodi, New Jersey . . . . .	76

## ACKNOWLEDGMENTS

Research for this project was sponsored by the Division of Remedial Action Projects, U.S. Department of Energy. The author wishes to acknowledge the support of J. E. Baublitz, Deputy Director, Office of Remedial Action and Waste Technology, E. G. DeLaney, Director, Division of Facility & Site Decommissioning Projects, and members of their staff. In addition, the author appreciates the manuscript preparation by S. E. Huckaba, D. A. Roberts, and J. K. Williams, Biology Division.

RESULTS OF THE RADIOLOGICAL SURVEY AT  
22 LONG VALLEY ROAD, LODI, NEW JERSEY\*

INTRODUCTION

A radiological survey of 22 Long Valley Road, Lodi, New Jersey, was conducted by a survey team from Oak Ridge National Laboratory (ORNL) on October 24, 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.<sup>2</sup>

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 (LJ50S) and biased (LJ50B) 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  $^{232}\text{Th}$  was 1.9 pCi/g to 120 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  $^{232}\text{Th}$ -bearing material exists. Gamma exposure rates up to 130  $\mu\text{R}/\text{h}$  exist on the surface of the property.

### SUMMARY

Measurements taken at 22 Long Valley Road indicate that the property contains radioactive contamination primarily from the  $^{232}\text{Th}$  decay chain with some contamination from the  $^{238}\text{U}$  decay chain. This material was found in the locations shown in Fig. 2. On the areal extent of the contamination, 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).

Table 1. Concentrations of radionuclides in soil at 22 Long Valley Road, Lodi, New Jersey.

Sample <sup>a</sup>	Depth (cm)	Radionuclide concentration (pCi/g)		
		<sup>226</sup> Ra <sup>b</sup>	<sup>232</sup> Th <sup>b</sup>	<sup>238</sup> U <sup>c</sup>
<u>Systematic samples</u>				
LJ50S1	0-15	0.63 ± 0.03	0.58 ± 0.5	0.70
LJ50S2	0-15	0.70 ± 0.1	1.0 ± 0.4	0.90
<u>Biased samples<sup>d</sup></u>				
LJ50B1A	0-15	7.9 ± 1	120 ± 7	9.3
LJ50B1B	15-30	5.7 ± 0.4	60 ± 9	9.8
LJ50B1C	30-45	2.5 ± 0.4	14 ± 1	5.3
LJ50B2A	0-15	6.3 ± 0.5	55 ± 3	16
LJ50B2B	15-30	3.3 ± 0.1	7.8 ± 1	14
LJ50B2C	30-45	2.8 ± 0.1	5.9 ± 1	10
LJ50B3A	0-15	1.1 ± 0.2	7.5 ± 1	1.3
LJ50B3B	15-30	0.67 ± 0.2	1.9 ± 0.2	0.83

<sup>a</sup>Locations of soil samples are shown on Fig. 1.

<sup>b</sup>Indicated counting error is at the 95% confidence level ( $\pm 2 \sigma$ ).

<sup>c</sup>Total analytical error of measurement results is less than  $\pm 5\%$  (95% confidence level).

<sup>d</sup>Biased samples are taken from areas shown to have elevated gamma exposure rates.

Table 2. Concentrations of radionuclides in soil at 22 Long Valley Road, Lodi, New Jersey.

Sample <sup>a</sup>	Depth (cm)	Radionuclide concentration (pCi/g)		
		<sup>226</sup> Ra <sup>b</sup>	<sup>232</sup> Th <sup>b</sup>	<sup>238</sup> U <sup>c</sup>
<u>Systematic samples</u>				
LJ50S1	0-15	0.63 ± 0.03	0.58 ± 0.5	0.70
LJ50S2	0-15	0.70 ± 0.1	1.0 ± 0.4	0.90
<u>Biased samples<sup>d</sup></u>				
LJ50B1A	0-15	7.9 ± 1	120 ± 7	9.3
LJ50B1B	15-30	5.7 ± 0.4	60 ± 9	9.8
LJ50B1C	30-45	2.5 ± 0.4	14 ± 1	5.3
LJ50B2A	0-15	6.3 ± 0.5	55 ± 3	16
LJ50B2B	15-30	3.3 ± 0.1	7.8 ± 1	14
LJ50B2C	30-45	2.8 ± 0.1	5.9 ± 1	10
LJ50B3A	0-15	1.1 ± 0.2	7.5 ± 1	1.3
LJ50B3B	15-30	0.67 ± 0.2	1.9 ± 0.2	0.83

<sup>a</sup>Locations of soil samples are shown on Fig. 1.

<sup>b</sup>Indicated counting error is at the 95% confidence level ( $\pm 2 \sigma$ ).

<sup>c</sup>Total analytical error of measurement results is less than  $\pm 5\%$  (95% confidence level).

<sup>d</sup>Biased samples are taken from areas shown to have elevated gamma exposure rates.

## INTERNAL DISTRIBUTION

- |       |                |     |                          |
|-------|----------------|-----|--------------------------|
| 1-3.  | B. A. Berven   | 12. | P. T. Owen               |
| 4.    | R. O. Chester  | 13. | T. H. Row                |
| 5.    | W. D. Cottrell | 14. | IR&A Publications Office |
| 6-10. | R. W. Doane    | 15. | Laboratory Records - RC  |
| 11.   | S. V. Kaye     |     |                          |

## EXTERNAL DISTRIBUTION

- 16-18. S. W. Ahrends, U.S. Department of Energy, P. O. Box E,  
Oak Ridge, TN 37831
19. J. D. Berger, Oak Ridge Associated Universities, P. O. Box 117,  
Oak Ridge, TN 37831
- 20-22. Edward G. DeLaney, U.S. Department of Energy, 19901 Germantown  
Road, Germantown, MD 20874
- 23-25. J. F. Nemeč, Bechtel National, Inc., 800 Oak Ridge Turnpike,  
Oak Ridge, TN 37831
26. J. W. Wagoner, U.S. Department of Energy, 19901 Germantown  
Road, Germantown, MD 20874
27. Office of Assistant Manager, Energy Research and Development,  
Oak Ridge Operations Office, Oak Ridge, TN 37831
- 28-29. Office of Scientific and Technical Information, DOE, Oak Ridge,  
TN 37831

# FUSRAP

CCN:

## FUSRAP COMMUNICATIONS DISTRIBUTION DOE/ORO FORMER SITES RESTORATION DIVISION (EW-93)

FSRD  COMM TYPE

DATE PROCESSED BY PDCC

SAIC SENSITIVE

COMM REF \_\_\_\_\_

ADMIN RCD \_\_\_\_\_

SUBJECT ORNL RESULTS OF RADL SURVEY @ 26 LONG VALLEY RD. LODI, NJ

FROM JOYNER TO FILE COMM DATE  / /

ADDR CODE   CLOSING CCN \_\_\_\_\_ WBS 138

SUBJECT CODE \_\_\_\_\_ AFFECTED DOCUMENT \_\_\_\_\_

### RESPONSE TRACKING INFORMATION

<b>ACTION DESCRIPTION:</b>	
<b>PRIMARY:</b> OWED TO: _____ (ORG) _____ TARGET DATE: ____ / ____ / ____	<b>PRIMARY:</b> OWED BY: _____ (ORG) _____ CLOSING CCN _____ COMPL. DATE ____ / ____ / ____ CLOSING REF _____
<b>SECONDARY:</b>	
OWED TO: _____ (ORG) _____ TARGET DATE: ____ / ____ / ____	OWED BY: _____ (ORG) _____ CLOSING CCN _____ COMPL. DATE ____ / ____ / ____ CLOSING REF _____

MESSAGE:

WIA			W/O			WIA			W/O		
DIRECTOR, FSRD:	L. Price	FSRD	PROGRAM MANAGER:	J. Waddell	SAIC	PROGRAM MANAGER:	R. Harbert	BPM			
DEP. DIRECTOR, FSRD:	W. Seay	FSRD	DEPUTY PROGRAM MGR.:	T. Patterson	SAIC	DEPUTY PROGRAM MGR.:	W. Futrell	BPM			
	J. Hart	FSRD	MGMT. SYSTEMS:	K. Renfro	SAIC		A. Boos	BPM			
	D. Adler	FSRD	SECRETARY:	S. Heptinstall	SAIC		M. Redmon	BPM			
	B. Atkin	FSRD	ORISE:		ORISE		G. Palau	BPM			
	S. Cange	FSRD	ORNL:		ORNL		P. Huber	BPM			
	J. Darby	FSRD					S. Priest	BPM			
	E. Green	FSRD				COMMUNITY RELATIONS		BCR			
	G. Hartman	FSRD				CONSTRUCTION		BFC			
	J. Japp	FSRD				ENGINEERING & TECHNOLOGY		BET			
	R. Kirk	FSRD				ENGINEERING		BET			
	J. Kopotic	FSRD				ENVIR TECH/DATA		BET			
	L. Marz	FSRD				GEOTECH		BET			
	M. Noe	FSRD				ENVIRON SAFETY & HEALTH		BEH			
	S. Oldham	FSRD				SAFETY & HEALTH		BEH			
	S. Williams	FSRD				ENVIR COMPLIANCE		BEH			
PRGM ANALYST:	K. Houser	FSRD				WASTE MGMT		BWM			
SECRETARY:	M. Seiber/M. Dyke/ T. Patterson	FSRD				WASTE TREATMENT		BWT			
FSRD CHRON FILE			TMA		BET	PROJECT ADMINISTRATION		BPA			
FSRD NOTEBOOKS			SITES: 158 NFSS			PROJECT AUTOMATION		BAU			
READING FILE			TONAWANDA INFO CTR.			PROJECT CONTROLS		BPC			
DOE/P&CD:	French	DCO	137 WISS			TECHNICAL REPORTS		BTR			
DOE/HQ:	J. Wagoner	DHQ	138 MISS/INFO CTR			QUALITY ASSURANCE		BOA			
ANL:	A. Geisler	ANL	139 COLONIE (CISS)			ADMIN RCD/INFO REPOSITORY					
	G. Maraman	ANL	140 / 153 LATTY AVE/SLAPS			PDCC READ FILE TO/FROM DOE					
	D. Dunning	ANL				PDCC: SENSITIVE/CHRON FILE					

**ornl**

**OAK RIDGE  
NATIONAL  
LABORATORY**

RESULTS OF THE RADIOLOGICAL SURVEY AT  
26 LONG VALLEY ROAD (LJ049), LODI, NEW JERSEY

**MARTIN MARIETTA**

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

Access to the information in this report is limited to those  
indicated on the distribution list and to Department of Energy  
and Department of Energy Contractors

HEALTH AND SAFETY RESEARCH DIVISION

Nuclear and Chemical Waste Programs  
(Activity No. AH 10'05 00 0; ONLWC01)

RESULTS OF THE RADIOLOGICAL SURVEY AT  
26 LONG VALLEY ROAD (LJ049), LODI, NEW JERSEY

R. W. Doane

Date of Issue - September 1986

Investigation Team

B. A. Berven - RASA Program Manager  
W. D. Cottrell - FUSRAP Project Director  
R. W. Doane - Field Survey Supervisor

Survey Team Members

B. S. Ellis  
D. W. Greene  
C. A. Muhr  
E. M. Pilz  
W. Winton

Work performed as part of the  
RADIOLOGICAL SURVEY ACTIVITIES PROGRAM

Prepared by the  
OAK RIDGE NATIONAL LABORATORY  
Oak Ridge, Tennessee 37831  
operated by  
MARTIN MARIETTA ENERGY SYSTEMS, INC.  
for the  
U.S. DEPARTMENT OF ENERGY  
under Contract No. DE-AC05-84OR21400

CONTENTS

	<u>Page</u>
LIST OF FIGURES AND TABLES . . . . .	v
ACKNOWLEDGMENTS . . . . .	vii
INTRODUCTION . . . . .	1
SURVEY METHODS . . . . .	1
SURVEY RESULTS . . . . .	1
Systematic and Biased Soil Samples . . . . .	2
Gamma Radiation Levels . . . . .	2
SUMMARY . . . . .	2
REFERENCES . . . . .	3

LIST OF FIGURES AND TABLES

<u>Figure</u>		<u>Page</u>
1	Diagram showing locations of soil samples taken at 26 Long Valley Road, Lodi, New Jersey . . . . .	4
2	Gamma radiation levels measured at 26 Long Valley Road, Lodi, New Jersey. . . . .	5

<u>Table</u>		<u>Page</u>
1	Background radiation levels for the northern New Jersey area . . . . .	6
2	Concentrations of radionuclides in soil at 26 Long Valley Road, Lodi, New Jersey . . . . .	7

## ACKNOWLEDGMENTS

Research for this project was sponsored by the Division of Remedial Action Projects, U.S. Department of Energy. The author wishes to acknowledge the support of J. E. Baublitz, Deputy Director, Office of Remedial Action and Waste Technology, E. G. DeLaney, Director, Division of Facility & Site Decommissioning Projects, and members of their staff. In addition, the author appreciates the manuscript preparation by S. E. Huckaba, D. A. Roberts, and J. K. Williams, Biology Division.

RESULTS OF THE RADIOLOGICAL SURVEY AT  
26 LONG VALLEY ROAD, LODI, NEW JERSEY\*

INTRODUCTION

A radiological survey of 26 Long Valley Road, Lodi, New Jersey, was conducted by a survey team from Oak Ridge National Laboratory (ORNL) on October 24, 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.<sup>2</sup>

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 (LJ49S) and biased (LJ49B) 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  $^{232}\text{Th}$  was 0.63 pCi/g to 46 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  $^{232}\text{Th}$ -bearing material exists. Gamma exposure rates up to 30  $\mu\text{R/h}$  exist on the surface of the property.

### SUMMARY

Measurements taken at 26 Long Valley Road indicate that the property contains radioactive contamination primarily from the  $^{232}\text{Th}$  decay chain with some contamination from the  $^{238}\text{U}$  decay chain. These radionuclide distributions are typical of the type of material processed at the former Maywood Chemical site. The concentration and extent of  $^{232}\text{Th}$  on this property is in excess of the relevant DOE criteria.<sup>3</sup> 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).

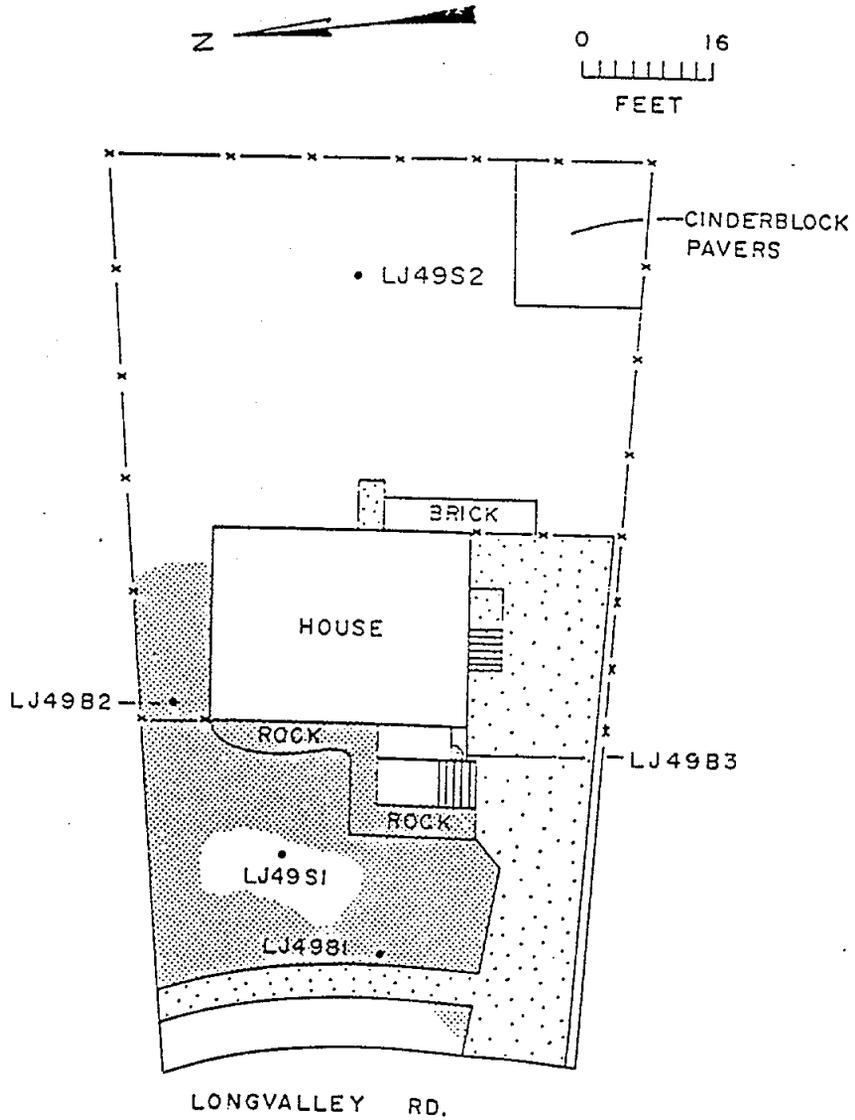


Fig. 1. Diagram showing locations of soil samples taken at 26 Long Valley Road, Lodi, New Jersey.

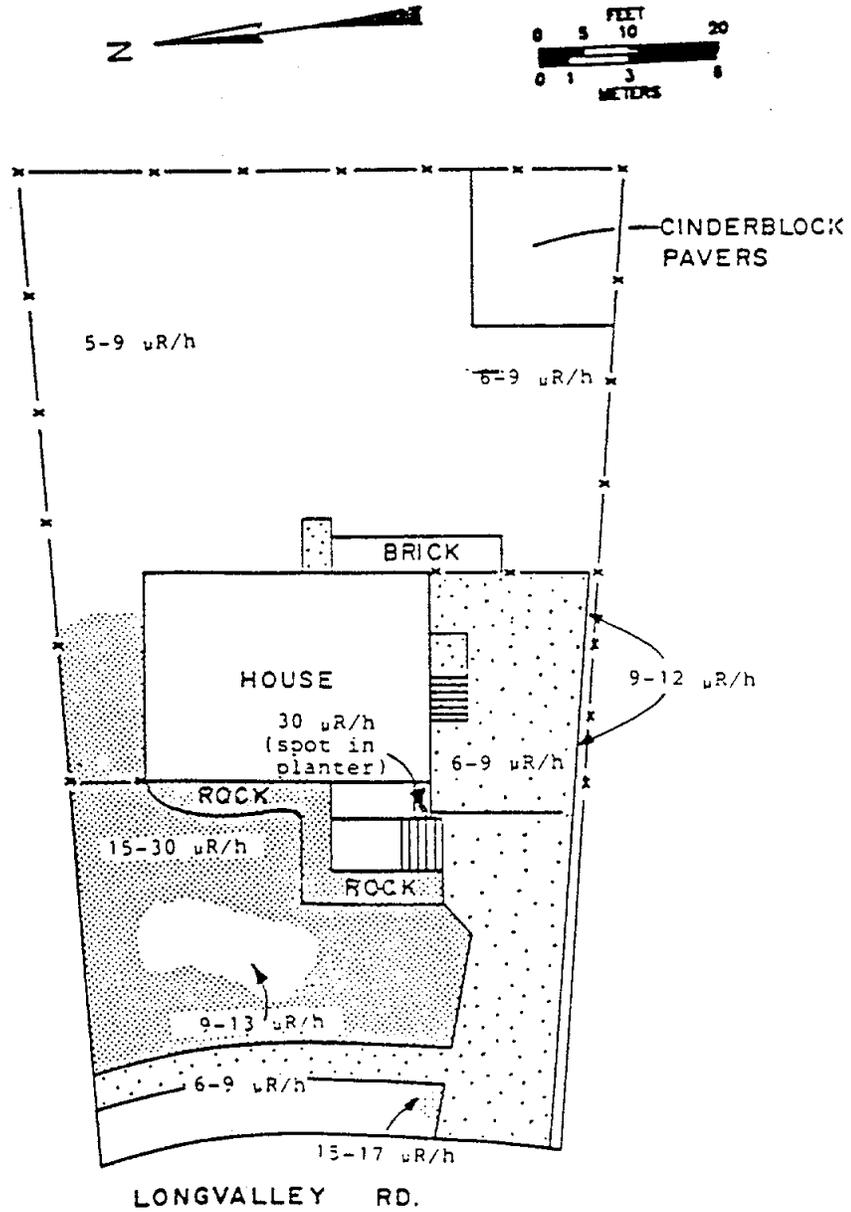


Fig. 2. Gamma radiation levels measured at 26 Long Valley Road, Lodi, New Jersey.

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)	
$^{232}\text{Th}$	0.9b
$^{238}\text{U}$	0.9b
$^{226}\text{Ra}$	0.9b

<sup>a</sup>Reference 4.

<sup>b</sup>Reference 5.

Table 2. Concentrations of radionuclides in soil at 26 Long Valley Road, Lodi, New Jersey.

Sample <sup>a</sup>	Depth (cm)	Radionuclide concentration (pCi/g)		
		<sup>226</sup> Ra <sup>b</sup>	<sup>232</sup> Th <sup>b</sup>	<sup>238</sup> U <sup>c</sup>
<u>Systematic samples</u>				
LJ49S1	0-15	0.76 ± 0.1	1.4 ± 0.3	0.87
LJ49S2	0-15	0.41 ± 0.07	0.51 ± 0.2	0.50
<u>Biased samples<sup>d</sup></u>				
LJ49B1A	0-15	2.1 ± 0.2	16 ± 4	3.9
LJ49B1B	15-30	1.2 ± 0.09	6.7 ± 0.9	1.9
LJ49B1C	30-45	0.92 ± 0.06	3.5 ± 0.3	1.3
LJ49B2A	0-15	1.5 ± 0.07	11 ± 3	2.2
LJ49B2B	15-30	4.6 ± 0.7	42 ± 2	6.2
LJ49B2C	30-45	5.0 ± 0.5	46 ± 6	6.0
LJ49B3A	0-15	1.6 ± 0.1	11 ± 0.7	5.0
LJ49B3B	15-30	2.7 ± 0.2	17 ± 0.7	7.1
LJ49B4A	0-15	0.55 ± 0.2	0.68 ± 0.3	0.67
LJ49B4B	15-30	0.52 ± 0.1	0.63 ± 0.2	0.53
LJ49B4C	30-45	0.58 ± 0.09	0.77 ± 0.2	0.67
LJ49B4D	45-60	0.58 ± 0.1	0.83 ± 0.3	0.70
LJ49B4E	60-75	0.60 ± 0.08	0.91 ± 0.2	0.67
LJ49B4F	75-90	0.85 ± 0.2	1.6 ± 0.2	1.7

<sup>a</sup>Locations of soil samples are shown on Fig. 1.

<sup>b</sup>Indicated counting error is at the 95% confidence level ( $\pm 2 \sigma$ ).

<sup>c</sup>Total analytical error of measurement results is less than  $\pm 5\%$  (95% confidence level).

<sup>d</sup>Biased samples are taken from areas shown to have elevated gamma exposure rates.

## INTERNAL DISTRIBUTION

- |       |                |     |                          |
|-------|----------------|-----|--------------------------|
| 1-3.  | B. A. Berven   | 12. | P. T. Owen               |
| 4.    | R. O. Chester  | 13. | T. H. Row                |
| 5.    | W. D. Cottrell | 14. | IR&A Publications Office |
| 6-10. | R. W. Doane    | 15. | Laboratory Records - RC  |
| 11.   | S. V. Kaye     |     |                          |

## EXTERNAL DISTRIBUTION

- 16-18. S. W. Ahrends, U.S. Department of Energy, P. O. Box E,  
Oak Ridge, TN 37831
19. J. D. Berger, Oak Ridge Associated Universities, P. O. Box 117,  
Oak Ridge, TN 37831
- 20-22. Edward G. DeLaney, U.S. Department of Energy, 19901 Germantown  
Road, Germantown, MD 20874
- 23-25. J. F. Nemecek, Bechtel National, Inc., 800 Oak Ridge Turnpike,  
Oak Ridge, TN 37831
26. J. W. Wagoner, U.S. Department of Energy, 19901 Germantown  
Road, Germantown, MD 20874
27. Office of Assistant Manager, Energy Research and Development,  
Oak Ridge Operations Office, Oak Ridge, TN 37831
- 28-29. Office of Scientific and Technical Information, DOE, Oak Ridge,  
TN 37831