2748

OCIT
NY.17

ORNL/RASA-85/41

ornl

OAK RIDGE NATIONAL LABORATORY

MARTIN MARIETTA

RESULTS OF RADIOLOGICAL MEASUREMENTS TAKEN NEAR JUNCTION OF BUFFALO AVENUE AND HYDE PARK BLVD. IN NIAGARA FALLS, NEW YORK

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

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

ORNL/RASA-85/41

HEALTH AND SAFETY RESEARCH DIVISION

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

RESULTS OF RADIOLOGICAL MEASUREMENTS TAKEN NEAR JUNCTION OF BUFFALO AVENUE AND HYDE PARK BLVD. IN NIAGARA FALLS, NEW YORK

B. A. Berven

Date of Issue - December 1985

Investigation Team

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

Survey Team Members

M. S. Blair
J. A. Roberts

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

	Page
LIST OF FIGURES AND TABLES	v
ACKNOWLEDGEMENTS	vii
INTRODUCTION	1
SURVEY METHODS	1
SURVEY RESULTS	2
Gamma Measurements	2
Soil Sample	2
SIGNIFICANCE OF FINDINGS	2
REFERENCES	4

LIST OF FIGURES AND TABLES

Figure		Page
1	Area surveyed near the junction of Buffalo Avenue and Hyde Park Blvd. in Niagara Falls, New York.	5

Table		Page
1	Background radiation levels in the Niagara Falls area.	6

ACKNOWLEDGEMENTS

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, Director, Division of Facility and Site Decommissioning Projects, E. G. DeLaney, Manager, FUSRAP/Surplus Facilities Group, and members of their staff. The author recognizes the valuable contributions of R. W. Doane, B. S. Ellis, and T. R. Stewart of the RASA group for participation in analysis, and reporting of data for this survey. Survey team members from Bechtel National, Inc. visited the site described in this report, and prepared sketches of the property which were the basis for the graphics used in this report. In addition, the author appreciates the manuscript preparation by S. E. Huckaba.

RESULTS OF RADIOLOGICAL MEASUREMENTS TAKEN NEAR JUNCTION OF BUFFALO AVENUE AND HYDE PARK BLVD. IN NIAGARA FALLS, NEW YORK*

INTRODUCTION

A mobile gamma scanning survey was conducted of some streets in Niagara Falls, New York, and the surrounding area by the Radiological Survey Activities (RASA) group of Oak Ridge National Laboratory (ORNL) during the period October 3-16, 1984.[1] The purpose of this mobile scanning survey was to identify all detectable gamma radiation anomalies which may be related to the transportation of radioactive waste material to the Lake Ontario Ordnance Works for storage. As a result of this activity, 100 properties in the Niagara Falls, New York area were identified as having elevated radiation levels and were recommended for onsite survey. The property at the northeast corner of the junction of Buffalo Avenue and Hyde Park Blvd. was one of the 100 properties identified by the mobile gamma scanning van.

A radiological survey of the property near the junction of Buffalo Avenue and Hyde Park Blvd. was conducted on July 15, 1985. The purpose of the radiological survey at this property was to determine if contaminated materials were present on this property, and, if so, determine if it were in excess of remedial action guidelines established for the Niagara Falls Storage Site (NFSS) in the Department of Energy's (DOE) Formerly Utilized Sites Remedial Action Project (FUSRAP). This report provides the results of that radiological survey.

SURVEY METHODS

The radiological survey of this property included a gamma scan of the entire ground surface of this area, and a soil sample from an area of elevated gamma radiation levels. A comprehensive description of the survey methods and instrumentation has been presented in another report.[2]

---

* 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.

SURVEY RESULTS

Typical background radiation levels for the Niagara Falls area are presented in Table 1. The data is provided for purposes of comparison with the survey results presented in this section.

All measurements presented in this report are gross readings; background radiation levels have not been subtracted. Similarly, background concentrations have not been subtracted from radionuclide concentrations in soil samples.

Gamma Measurements

The area surveyed is shown in Fig. 1. All areas were within the background gamma exposure rate levels of 8 to 10 μR/h (microroentgen* per hour) with the exception of a small area averaging 5 ft wide (1.5 m) by 12 ft (3.7 m) in length on the north side of Buffalo Avenue (see shaded portion of Fig. 1). The gamma exposure rate in these areas ranged from 14 to 71 μR/h.

Soil Sample

A single soil sample (NF2B24) was taken from the surface (0-15 cm) of the area of elevated gamma radiation. The concentration of ^{226}Ra in this sample was 150 ± 4 pCi/g (picoCuries** per gram), and the concentration of ^{238}U was 2.3 ± 0.07 pCi/g.

SIGNIFICANCE OF FINDINGS

A 5 x 12-ft area (60 ft^2 or 5.6 m^2) with elevated gamma radiation levels ranging up to 71 μR/h on the ground surface was observed on the northeast corner of a property at the junction of Buffalo Avenue and Hyde Park Blvd. in Niagara Falls, New York. A soil sample taken from this

---

*The roentgen (R) is a unit which was defined for radiation protection purposes for people exposed to penetrating x-rays or gamma radiation. A microroentgen (μR) is one millionth of a roentgen.

**The curie is a unit used to define the radioactivity in a substance and equals that quantity of any radioactive isotope undergoing 2.2×10^{12} disintegrations per minute. The picocurie is one million-millionth of a curie or that amount yielding 2.2 disintegrations per minute.

this area had concentrations of ^{226}Ra in excess of 176 times average background levels, while the ^{238}U concentration was 2.4 times the average background levels.

The ratio of $^{226}Ra/^{238}U$ activity is consistent with contaminated material originating from the NFSS. The amount of material present on this property is believed to be in excess of relevant FUSRAP remedial action guidelines[3] (e.g. the weighted average in excess of 5 pCi/g of ^{226}Ra over 100 m^2 in the upper 15 cm of soil).

Based on the results of the radiological survey conducted at this property, it is recommended that this property be designated for a formal radiological characterization survey.

REFERENCES

1. W. H. Shinpaugh, B. A. Berven, and W. D. Cottrell, "Results of the Mobile Gamma Scanning Activities in Niagara Falls, New York Area," Oak Ridge National Laboratory, ORNL/RASA-85/1 (August 1985).

2. T. E. Myrick, B. A. Berven, W. D. Cottrell, W. A. Goldsmith, and F. F. Haywood, Procedures Manual for the Remedial Action Survey and Certification Activities (RASCA) Program, Oak Ridge National Laboratory, ORNL/TM-8600 (September 1982).

3. T. E. Myrick, B. A. Berven, and F. F. Haywood, State Background Radiation Levels: Results of Measurements Taken During 1975-1979, ORNL/TM-7343 (November 1981).

4. U.S. Department of Energy, "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).

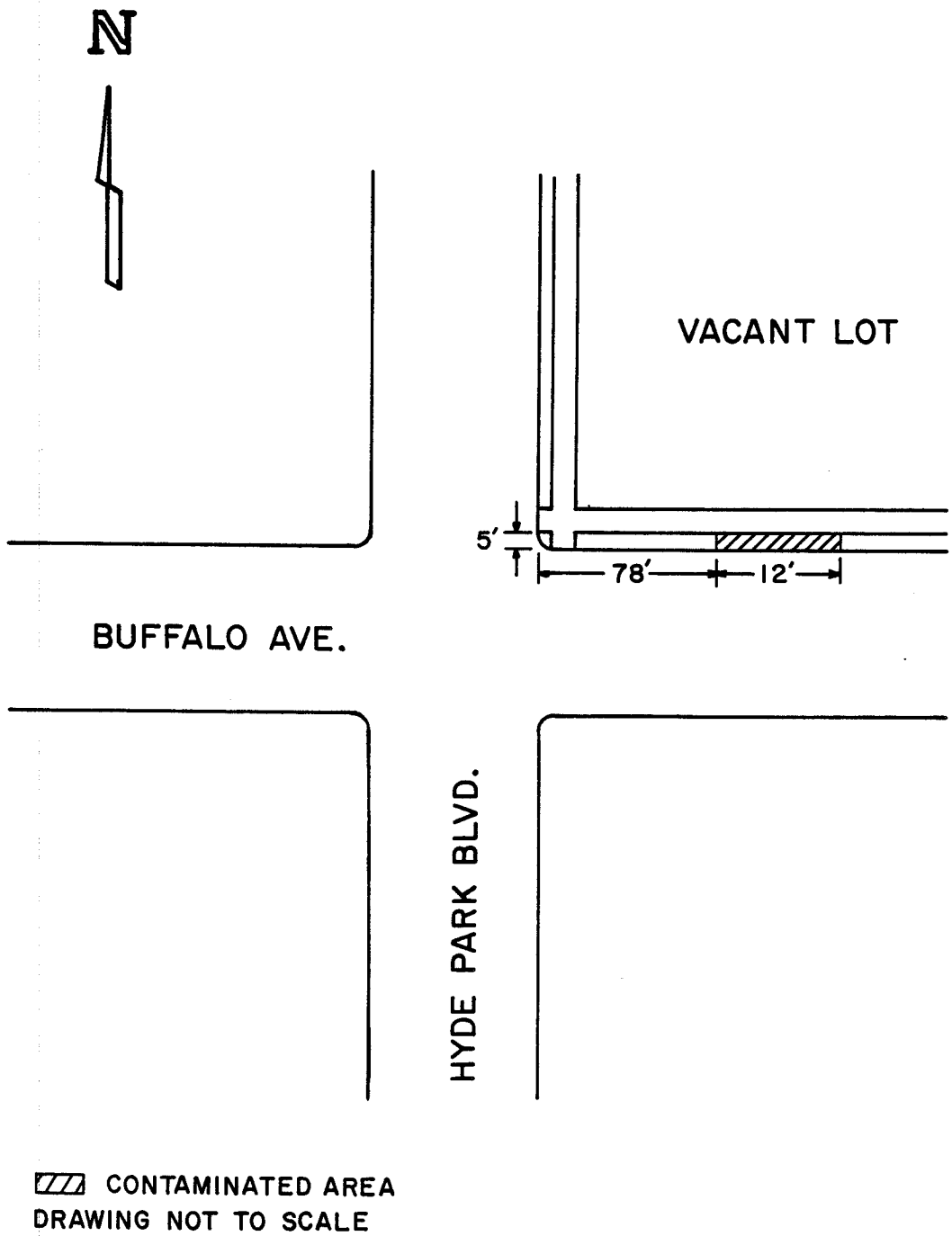

Fig. 1. Area surveyed near the junction of Buffalo Avenue and Hyde Park Blvd. in Niagara Falls, New York.

Table 1. Background radiation levels in the Niagara Falls area.

Type of radiation measurement or sample	Radiation level or radionuclide concentration	
	Range	Average
Gamma exposure rate at 1 m above floor or ground surface (μR/h)[a]	8-10	9
Concentration of radionuclides in soil (pCi/g)[b]		
^{238}U	0.76-1.2	0.96
^{226}Ra	0.48-1.2	0.85

[a]Values obtained from four locations in the New York area.

[b]Soil samples obtained from six locations around the Niagara Falls area.

INTERNAL DISTRIBUTION

1-5. B. A. Berven
6. R. O. Chester
7. W. D. Cottrell
8. S. V. Kaye
9. J. L. Marley
10. P. T. Owen
11. T. H. Row
12. IR&A Publications Office
13. Laboratory Records - RC

EXTERNAL DISTRIBUTION

14. J. D. Berger, Oak Ridge Associated Universities, P. O. Box 117, Oak Ridge, TN 37831

15-24. Edward DeLaney, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874

25-27. E. L. Keller, U.S. Department of Energy, P. O. Box E, Oak Ridge, TN 37831

28-30. J. F. Nemec, Bechtel National, Inc., 800 Oak Ridge Turnpike, Oak Ridge, TN 37831

31. Office of Assistant Manager, Energy Research and Development, Oak Ridge Operations Office, Oak Ridge, TN 37831

32-33. Office of Scientific and Technical Information, DOE, Oak Ridge, TN 37831