

MLM-1391

phil  
324  
5-2-67

MASTER

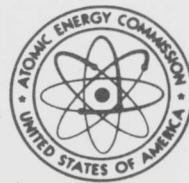
ENVIRONMENTAL MONITORING REPORT:  
JULY-DECEMBER, 1966 AND 1966 SUMMARY

H. F. Anderson and W. E. Sheehan

**AEC Research and Development REPORT**

**MONSANTO RESEARCH CORPORATION**

A S U B S I D I A R Y O F M O N S A N T O C O M P A N Y



**M O U N D L A B O R A T O R Y**

MIAMISBURG, OHIO

OPERATED FOR

**UNITED STATES ATOMIC ENERGY COMMISSION**

U. S. GOVERNMENT CONTRACT NO. AT-33-1-GEN-53

## **DISCLAIMER**

**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.**

---

## **DISCLAIMER**

**Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.**

Printed in the United States of America  
Available from  
Clearinghouse for Federal Scientific and Technical Information  
National Bureau of Standards, U. S. Department of Commerce  
Springfield, Virginia 22151  
Price: Printed Copy \$3.00; Microfiche \$0.65

## LEGAL NOTICE

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

A. Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights: or

B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission, or employee of such contractor, to the extent that such employee or contractor of the Commission, or employee of such contractor prepares, disseminates, or provides access to, any information pursuant to his employment or contract with the Commission, or his employment with such contractor.

H.C. 300; MN. 65

MLM-1391

TID-4500

UC-41 Health and Safety

**ENVIRONMENTAL MONITORING REPORT: JULY-DECEMBER, 1966  
AND 1966 SUMMARY**

Prepared by: H. F. Anderson  
W. E. Sheehan

Date: February 10, 1967

Issued: March 18, 1967

Approved by: H. E. Meyer

**LEGAL NOTICE**

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

A. Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or

B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission, or employee of such contractor, to the extent that such employee or contractor of the Commission, or employee of such contractor prepares, disseminates, or provides access to, any information pursuant to his employment or contract with the Commission, or his employment with such contractor.

**MONSANTO RESEARCH CORPORATION**

A Subsidiary of Monsanto Company

**MOUND LABORATORY**

Miamisburg, Ohio

operated for

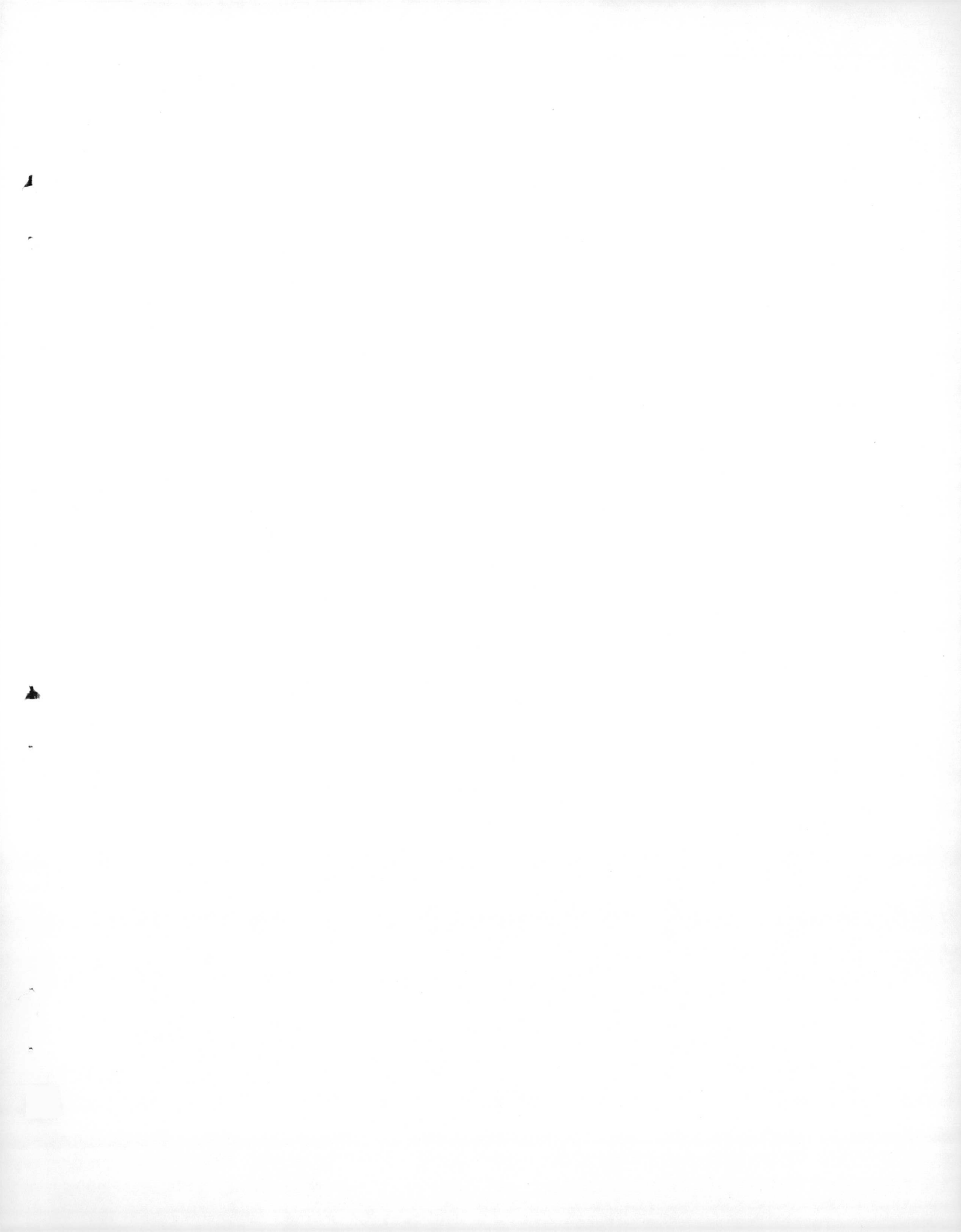
**UNITED STATES ATOMIC ENERGY COMMISSION**

U. S. GOVERNMENT CONTRACT NO. AT 33-1-GEN-53



## SUMMARY

The concentration of radioactive materials detected in the environment surrounding Mound Laboratory, Miamisburg, Ohio is presented for the second half of 1966 and a summary is presented for the entire year. The concentration of radionuclides from Mound Laboratory in the Great Miami River and in the environmental air was within the standards specified by the Atomic Energy Commission.



## INTRODUCTION

This report is a summary of the Environmental Monitoring Program conducted by Monsanto Research Corporation, Mound Laboratory, Miamisburg, Ohio. The program considers all of the projects at Mound Laboratory, and all of the radioisotopes which could be released in the environment. The monitoring procedures and counting techniques are those best suited for the detection and measurement of these radioactive materials.

The Radioactivity Concentration Guide (RCG) values in air and in water for the radionuclides in use at Mound Laboratory are taken from the USAEC Manual, Chapter 0524. The Radioactivity Concentration Guides for environmental air and water for the materials used at Mound Laboratory are:

### Polonium

Air -  $2 \times 10^{-11}$  microcuries per cubic centimeter

Water-  $7 \times 10^{-7}$  microcuries per cubic centimeter

### Plutonium

Air -  $6 \times 10^{-14}$  microcuries per cubic centimeter

Water-  $5 \times 10^{-6}$  microcuries per cubic centimeter

### Tritium

Air -  $2 \times 10^{-7}$  microcuries per cubic centimeter

Water-  $3 \times 10^{-3}$  microcuries per cubic centimeter

## LIQUID CONTAMINATION

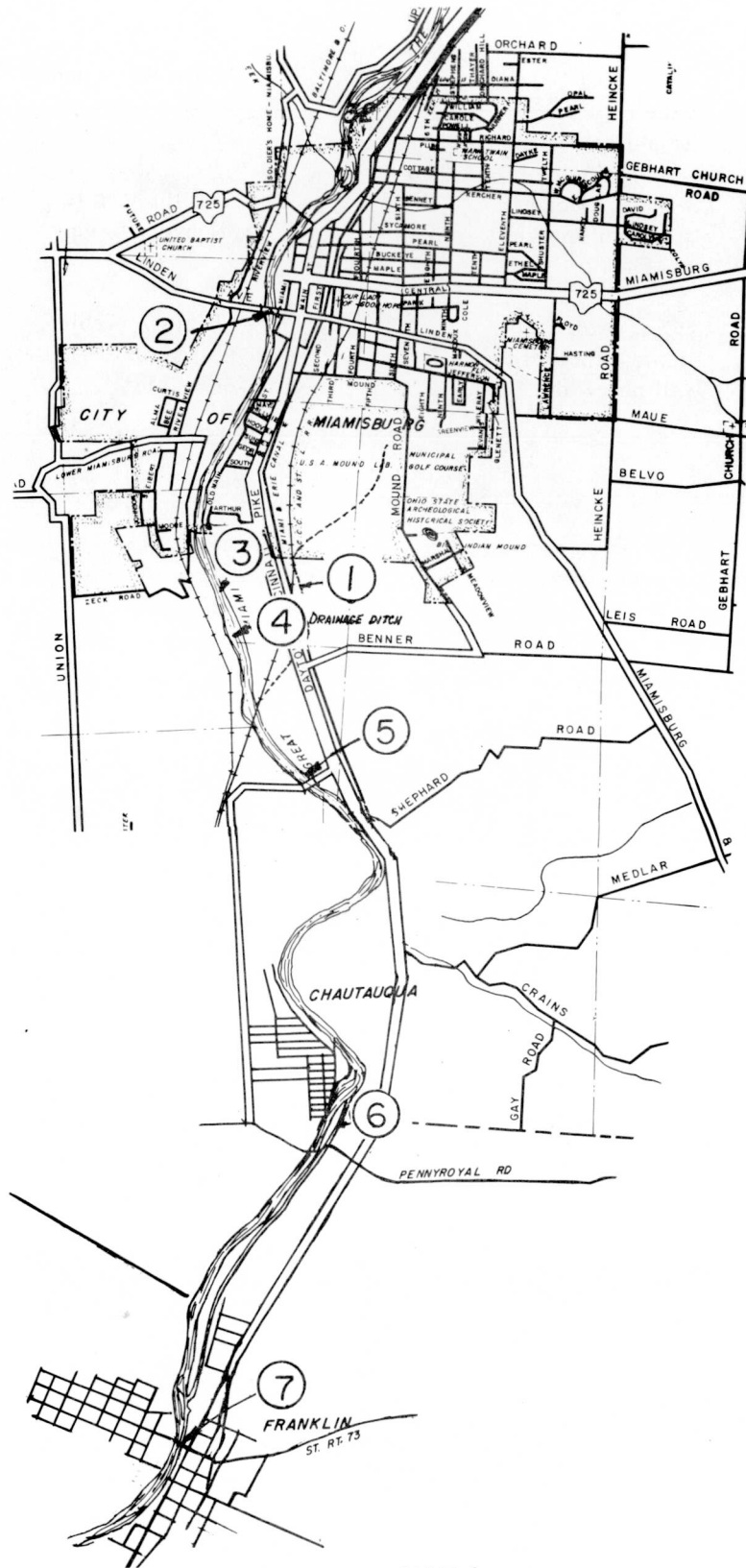
*Polonium-Plutonium* Liquid contaminated with radioactive material from polonium and plutonium work at the Laboratory are processed separately to reduce the concentration of the radionuclides to a level at which they may be discharged to the environment. The treated polonium liquid effluent is discharged directly to the Great Miami River via a closed sewer line which also carries the treated plant sewage. The treated plutonium liquid effluent is discharged to a drainage ditch which runs through the plant site and eventually reaches the river.

*Tritium* Helium-3 being purified at Mound Laboratory contains small quantities of tritium. Contaminated liquids from this work are treated (diluted with water when necessary) before discharge to the drainage ditch.

*Water Sampling* Water samples are collected weekly from the Great Miami River and from the drainage ditch. Samples collected from the river are analyzed for polonium and tritium. Samples collected from the drainage ditch are analyzed for plutonium and tritium.

Map I shows the location of weekly water sampling points. Not shown on the map is the location of the quarterly water samples which are collected from the Great Miami River every three months at several points downstream to a distance of a little over 40 miles.

The results of the water sampling program are presented in Table 1, Table 2, Table 3, and Table 4. The data presented in these tables indicate that the average concentration of polonium, plutonium, and tritium in environmental water was well below the Radioactivity Concentration Guides.



MAP I  
 GREAT MIAMI RIVER SAMPLE LOCATIONS

TABLE I

## SUMMARY OF OFF-SITE WATER MONITORING FOR POLONIUM

July Through December, 1966

<u>Sample Location (Great Miami River)</u>	<u>Number of Samples Collected</u>	<u>Maximum Concentration (<math>10^{-9}</math> <math>\mu\text{C}/\text{cc}</math>)</u>	<u>Average Concentration<sup>a</sup> (<math>10^{-9}</math> <math>\mu\text{C}/\text{cc}</math>)</u>	<u>Percent of RCG<sup>b</sup> for Average</u>
Linden Ave. Bridge, Miamisburg, Ohio (upstream-location No. 2 on map)	24	2.70	1.80	0.26
Mound Lab Effluent (location No. 3 on map)	24	1792.80	121.20	17.31
250 yards Downstream from Mound Lab Effluent (location No. 4 on map)	24	3.60	1.89	0.27
Chautauqua Road Bridge (location No. 5 on map)	24	2.70	1.80	0.26
Chautauqua Dam (location No. 6 on map)	23	1.80	1.80	0.26
Franklin, Ohio (location No. 7 on map)	24	3.60	1.89	0.27
Trenton, Ohio (approximately 15 miles S.W. of Miamisburg)	2	1.80	1.80	0.26
New Miami, Ohio (approximately 20 miles S. W. of Miamisburg)	2	1.80	1.80	0.26
7 miles North of New Baltimore, Ohio (approximately 26 miles S. W. of Miamisburg)	2	1.80	1.80	0.26
New Baltimore, Ohio (approximately 33 miles S. W. of Miamisburg)	2	1.80	1.80	0.26
Elizabethtown, Ohio (approximately 43 miles S. W. of Miamisburg)	2	1.80	1.80	0.26

<sup>a</sup>Lowest detectable limit for polonium in water is  $1.80 \times 10^{-9}$   $\mu\text{C}/\text{cc}$ . All samples which were not detectable were set equal to this value when average values were calculated.

<sup>b</sup>RCG - Radioactivity Concentration Guide

TABLE 2

## SUMMARY OF OFF-SITE WATER MONITORING FOR TRITIUM

July Through December, 1966

<u>Sample Location</u> (Great Miami River)	<u>Number of</u> <u>Samples</u> <u>Collected</u>	<u>Maximum</u> <u>Concentration</u> ( $10^{-3} \mu\text{C}/\text{cc}$ )	<u>Average</u> <u>Concentration</u> <sup>a</sup> ( $10^{-3} \mu\text{C}/\text{cc}$ )	<u>Percent of RCG</u> <sup>b</sup> <u>for Average</u>
Mound Lab Drainage Ditch (location No. 1 on map)	24	0.43	0.10	3.33
Linden Ave. Bridge, Miamisburg, Ohio (upstream-location No. 2 on map)	24	0.11	0.05	1.67
Mound Lab Effluent (location No. 3 on map)	24	0.58	0.14	4.67
Chautauqua Road Bridge (location No. 5 on map)	24	0.14	0.06	2.00

<sup>a</sup>Lowest detectable limit for tritium in water is  $0.05 \times 10^{-3} \mu\text{C}/\text{cc}$ . All samples which were not detectable were set equal to this value when average values were calculated.

<sup>b</sup>RCG - Radioactivity Concentration Guide

TABLE 3

## SUMMARY OF OFF-SITE WATER MONITORING FOR PLUTONIUM

July Through December, 1966

<u>Sample Location</u>	<u>Number of</u> <u>Samples</u> <u>Collected</u>	<u>Maximum</u> <u>Concentration</u> ( $10^{-6} \mu\text{C}/\text{cc}$ )	<u>Average</u> <u>Concentration</u> <sup>a</sup> ( $10^{-6} \mu\text{C}/\text{cc}$ )	<u>Percent of RCG</u> <sup>b</sup> <u>for Average</u>
Mound Lab Drainage Ditch (location No. 1 on map)	22	1.42	0.11	2.20

<sup>a</sup>Lowest detectable limit for plutonium in water is  $0.09 \times 10^{-9} \mu\text{C}/\text{cc}$ . All samples which were not detectable were set equal to this value when average values were calculated.

<sup>b</sup>RCG - Radioactivity Concentration Guide

TABLE 4

## 1966 YEARLY SUMMARY OF OFF-SITE WATER MONITORING FOR RADIOACTIVITY

## I. Polonium (River Samples)

<u>Period</u>	<u>Number of Samples</u>	<u>Maximum Concentration (<math>10^{-7}</math> <math>\mu\text{C}/\text{CC}</math>)</u>	<u>Average Concentration<sup>a</sup> (<math>10^{-7}</math> <math>\mu\text{C}/\text{CC}</math>)</u>	<u>Percent of RCG<sup>d</sup> for Average</u>
Jan.-June	166	16.80	0.18	2.57
July-Dec.	153	17.93	0.21	3.00
Jan.-Dec.	319	17.93	0.19	2.71

## II. Tritium (River and Drainage Ditch Samples)

<u>Period</u>	<u>Number of Samples</u>	<u>Maximum Concentration (<math>10^{-3}</math> <math>\mu\text{C}/\text{CC}</math>)</u>	<u>Average Concentration<sup>b</sup> (<math>10^{-3}</math> <math>\mu\text{C}/\text{CC}</math>)</u>	<u>Percent of RCG<sup>d</sup> for Average</u>
Jan.-June	99	7.10	0.23	7.67
July-Dec.	96	0.58	0.09	3.00
Jan.-Dec.	195	7.10	0.16	5.33

## III. Plutonium (Drainage Ditch Samples)

<u>Period</u>	<u>Number of Samples</u>	<u>Maximum Concentration (<math>10^{-6}</math> <math>\mu\text{C}/\text{CC}</math>)</u>	<u>Average Concentration<sup>c</sup> (<math>10^{-6}</math> <math>\mu\text{C}/\text{CC}</math>)</u>	<u>Percent of RCG<sup>d</sup> for Average</u>
Jan.-June	25	0.10	0.03	0.60
July-Dec.	22	1.42	0.11	2.20
Jan.-Dec.	47	1.42	0.07	1.35

<sup>a</sup>Lowest detectable limit for polonium in water is  $1.80 \times 10^{-9}$   $\mu\text{C}/\text{CC}$ . All samples which were not detectable were set equal to this value when average values were calculated.

<sup>b</sup>Lowest detectable limit for tritium in water is  $0.05 \times 10^{-3}$   $\mu\text{C}/\text{CC}$ . All samples which were not detectable were set equal to this value when average values were calculated.

<sup>c</sup>Lowest detectable limit for plutonium in water is  $0.09 \times 10^{-9}$   $\mu\text{C}/\text{CC}$ . All samples which were not detectable were set equal to this value when average values were calculated.

<sup>d</sup>RCG - Radioactivity Concentration Guide

## AIRBORNE CONTAMINATION

*Polonium - Plutonium* Air which is contaminated with polonium and plutonium particulates is treated by passing it through absolute filters before it is discharged to the environment via several building stacks.

*Tritium* Air which is contaminated with gaseous tritium is discharged to the environment via stacks.

*Stack Monitoring* The results of routine stack monitoring for polonium, plutonium, and tritium considered with standard meteorological dilution factors indicated that the average concentration of the radionuclides in the environmental air discharged from Mound Laboratory stacks was well below the Radioactivity Concentration Guides.

*Off-Site Air Sampling* Possible airborne polonium and plutonium in the environment is monitored by particulate air sampling equipment mounted in a one-ton panel truck. Samples are collected weekly to a distance of 20 miles.

The results of the monitoring program for airborne polonium and plutonium are summarized in Tables 5 and 6. As may be seen from the tables, the average concentration of long-lived alpha activity in the environmental air is below the RCG for polonium and plutonium.

Samples are collected upwind and downwind from the plant according to routes drawn for the different wind directions. The selection of the air sampling zone depends on the wind direction on the days that samples are collected. Since the sampling zone is dependent on the wind direction, it is possible that air samples from all zones will not be collected during the reporting period. Maps 2 and 3 show the zones routinely sampled. Table 7 lists the specific location of sampling sites by zone.

Monitoring of the environmental air for tritium, by means of an air monitor mounted in the panel truck mentioned above, was performed weekly to a distance of 20 miles. The locations sampled for tritium are the same ones sampled for polonium and plutonium. To date no tritium has been detected in the environmental air.

TABLE 5

## SUMMARY OF OFF-SITE AIR MONITORING FOR POLONIUM-PLUTONIUM

July Through December, 1966

<u>North Zone</u>					
<u>Range (miles)</u>	<u>Number of Samples Collected</u>	<u>Maximum Concentration (<math>10^{-14}</math> <math>\mu\text{C}/\text{cc}</math>)</u>	<u>Average Concentration<sup>a</sup> (<math>10^{-14}</math> <math>\mu\text{C}/\text{cc}</math>)</u>	<u>Percent of Polonium RCG<sup>b</sup> for Average</u>	<u>Percent of Plutonium RCG<sup>b</sup> for Average</u>
0-3 (upwind)	10	0.35	0.35	0.02	5.85
0-3 (downwind)	15	0.89	0.47	0.02	7.85
3-5 (downwind)	10	0.64	0.38	0.02	6.35
5-10 (downwind)	10	0.35	0.35	0.02	5.85
10-15 (downwind)	10	1.41	0.48	0.02	8.02
15-20 (downwind)	15	1.00	0.41	0.02	6.85
<u>Northeast Zone</u>					
0-3 (upwind)	18	1.68	0.42	0.02	7.01
0-3 (downwind)	27	1.86	0.55	0.03	9.19
3-5 (downwind)	18	1.32	0.46	0.02	7.68
5-10 (downwind)	18	0.73	0.46	0.02	7.68
10-15 (downwind)	18	2.21	0.40	0.02	6.68
15-20 (downwind)	27	1.09	0.49	0.02	8.18
<u>East Zone</u>					
0-3 (upwind)	4	0.35	0.35	0.02	5.85
0-3 (downwind)	6	0.35	0.35	0.02	5.85
3-5 (downwind)	4	0.71	0.44	0.02	7.35
5-10 (downwind)	4	0.35	0.35	0.02	5.85
10-15 (downwind)	4	1.13	0.54	0.03	9.02
15-20 (downwind)	6	0.67	0.45	0.02	7.52

TABLE 5 (Continued)

<u>Southeast Zone</u>					
<u>Range (miles)</u>	<u>Number of Samples Collected</u>	<u>Maximum Concentration (10<sup>-14</sup> <math>\mu</math>C/cc)</u>	<u>Average Concentration<sup>a</sup> (10<sup>-14</sup> <math>\mu</math>C/cc)</u>	<u>Percent of Polonium RCG<sup>b</sup> for Average</u>	<u>Percent of Plutonium RCG<sup>b</sup> for Average</u>
0-3 (upwind)	6	0.35	0.35	0.02	5.85
0-3 (downwind)	8	53.42	10.26	0.51	171.34
3-5 (downwind)	7	0.35	0.35	0.02	5.85
5-10 (downwind)	7	5.46	1.23	0.06	20.54
10-15 (downwind)	7	1.40	0.62	0.03	10.35
15-20 (downwind)	9	2.75	0.66	0.03	11.02
<u>South Zone</u>					
0-3 (upwind)	2	0.35	0.35	0.02	5.85
0-3 (downwind)	3	0.43	0.38	0.02	6.35
3-5 (downwind)	2	0.35	0.35	0.02	5.85
5-10 (downwind)	2	0.67	0.51	0.03	8.52
10-15 (downwind)	2	0.35	0.35	0.02	5.85
15-20 (downwind)	3	0.35	0.35	0.02	5.85
<u>Southwest Zone</u>					
0-3 (upwind)	4	0.86	0.48	0.02	8.02
0-3 (downwind)	6	1.03	0.46	0.02	7.68
3-5 (downwind)	4	1.29	0.78	0.04	13.03
5-10 (downwind)	4	0.35	0.35	0.02	5.85
10-15 (downwind)	4	0.35	0.35	0.02	5.85
15-20 (downwind)	6	0.62	0.40	0.02	6.68

TABLE 5 (Continued)

<u>West Zone</u>					
<u>Range (miles)</u>	<u>Number of Samples Collected</u>	<u>Maximum Concentration (<math>10^{-14}</math> <math>\mu\text{C}/\text{cc}</math>)</u>	<u>Average Concentration<sup>a</sup> (<math>10^{-14}</math> <math>\mu\text{C}/\text{cc}</math>)</u>	<u>Percent of Polonium RCG<sup>b</sup> for Average</u>	<u>Percent of Plutonium RCG<sup>b</sup> for Average</u>
0-3 (upwind)	4	1.09	0.66	0.03	11.02
0-3 (downwind)	6	0.35	0.35	0.02	5.85
3-5 (downwind)	4	0.35	0.35	0.02	5.85
5-10 (downwind)	4	2.49	0.89	0.04	14.86
10-15 (downwind)	4	0.76	0.45	0.02	7.52
15-20 (downwind)	6	2.30	0.73	0.04	12.19
<u>Northwest Zone</u>					
0-3 (upwind)	4	0.35	0.35	0.02	5.85
0-3 (downwind)	6	0.35	0.35	0.02	5.85
3-5 (downwind)	4	0.35	0.35	0.02	5.85
5-10 (downwind)	4	0.95	0.50	0.03	8.35
10-15 (downwind)	4	1.59	0.66	0.03	11.02
15-20 (downwind)	6	0.35	0.35	0.02	5.85

<sup>a</sup>Lowest detectable limit for long lived alpha activity in air is  $0.35 \times 10^{-14} \mu\text{C}/\text{cc}$ . All values which were not detectable were set equal to this value when average values were calculated.

<sup>b</sup>RCG - Radioactivity Concentration Guide

TABLE 6

## 1966 YEARLY SUMMARY OF OFF-SITE AIR MONITORING FOR POLONIUM-PLUTONIUM

## I. First Half of 1966, Jan.-June, All Zones

Range (miles)	Number of Samples	Maximum Concentration ( $10^{-14}$ $\mu\text{C}/\text{cc}$ )	Average Concentration <sup>a</sup> ( $10^{-14}$ $\mu\text{C}/\text{cc}$ )	Percent of Polonium RCG <sup>b</sup> for Average	Percent of Plutonium RCG <sup>b</sup> for Average
0-3 (upwind)	25	0.35	0.35	0.02	5.85
0-3 (downwind)	50	2.46	0.54	0.03	9.02
3-5 (downwind)	29	1.03	0.43	0.02	7.18
5-10 (downwind)	29	1.34	0.40	0.02	6.68
10-15 (downwind)	34	2.32	0.55	0.03	9.19
15-20 (downwind)	45	11.12	0.69	0.03	11.52

## II. Second Half of 1966, July-Dec., All Zones

0-3 (upwind)	52	1.68	0.41	0.02	6.85
0-3 (downwind)	77	53.42	1.48	0.07	24.72
3-5 (downwind)	53	1.29	0.43	0.02	7.18
5-10 (downwind)	53	5.46	0.56	0.03	9.35
10-15 (downwind)	53	2.21	0.47	0.02	7.85
15-20 (downwind)	78	2.75	0.49	0.02	8.18

## III. Entire Year 1966, Jan.-Dec., All Zones

0-3 (upwind)	77	1.68	0.39	0.02	6.51
0-3 (downwind)	127	53.42	1.11	0.06	18.54
3-5 (downwind)	82	1.29	0.43	0.02	7.18
5-10 (downwind)	82	5.46	0.50	0.03	8.35
10-15 (downwind)	87	2.32	0.50	0.03	8.35
15-20 (downwind)	123	11.12	0.56	0.03	9.35

<sup>a</sup>Lowest detectable limit for long lived alpha activity in air is  $0.35 \times 10^{-14}$   $\mu\text{C}/\text{cc}$ . All values which were not detectable were set equal to this value when average values were calculated.

<sup>b</sup>RCG - Radioactivity Concentration Guide

TABLE 7

SUMMARY OF AIR SAMPLING LOCATIONS

North Zone

<u>Location</u>	<u>Range</u>
1. Cincinnati - Dayton Pike and Crains Run Rd. (Miamisburg, Ohio)	0-3 miles upwind
2. Mound Rd. and Benner Rd. (Miamisburg, Ohio)	0-3 miles upwind
3. Fifth St. and Central Ave. (Miamisburg, Ohio)	0-3 miles downwind
4. Upper River Rd. and Soldiers Home-Miamisburg Rd.	0-3 miles downwind
5. One mile north on Upper River Rd. from previous sample (No. 4)	0-3 miles downwind
6. Farmersville-West Carrollton Rd. and Soldiers Home-West Carrollton Rd.	3-5 miles downwind
7. Union Rd. and Bear Creek Rd.	3-5 miles downwind
8. Dayton Speedway (near intersection of State Route 4 and Liberty Dayton Rd.)	5-10 miles downwind
9. Union Rd. and Liberty Dayton Rd.	5-10 miles downwind
10. Siebenthaler Ave. and North Dixie Dr. (Dayton, Ohio)	10-15 miles downwind
11. Trotwood, Ohio	10-15 miles downwind
12. Murlin Heights on North Dixie Dr. (Dayton, Ohio)	15-20 miles downwind
13. Meeker St. and Heathcliffe Rd. (Dayton, Ohio)	15-20 miles downwind
14. State Route 49 at Clayton, Ohio	15-20 miles downwind

South Zone

1. West off State Route 725 between river bridge and railroad (Miamisburg, Ohio)	0-3 miles upwind
2. First St. and Central Ave. (Miamisburg, Ohio)	0-3 miles upwind
3. Crains Run Rd. and Medlar Rd.	0-3 miles downwind
4. Chautauqua, Ohio	0-3 miles downwind
5. Cincinnati-Dayton Pike at south city limits of Miamisburg, Ohio	0-3 miles downwind
6. State Route 73 and Interstate 75	3-5 miles downwind
7. State Route 123 and Dayton-Oxford Rd.	3-5 miles downwind
8. Red Lion, Ohio	5-10 miles downwind
9. Blue Ball, Ohio	5-10 miles downwind
10. Lebanon, Ohio	10-15 miles downwind

TABLE 7 (continued)

<u>South Zone</u>		
<u>Location</u>		<u>Range</u>
11.	Monroe, Ohio	10-15 miles downwind
12.	South Lebanon, Ohio	15-20 miles downwind
13.	Bethany Rd. and Mason Montgomery Rd.	15-20 miles downwind
14.	Bethany, Ohio	15-20 miles downwind
<u>East Zone</u>		
1.	Riverview Ave. and Lower Miamisburg Rd. (Miamisburg, Ohio)	0-3 miles upwind
2.	Lower Miamisburg Rd. and Union Rd.	0-3 miles upwind
3.	Maue Rd. and Linden Ave. (Miamisburg, Ohio)	0-3 miles downwind
4.	Byers Rd. and Belvo Rd.	0-3 miles downwind
5.	State Route 725 and Interstate 75	0-3 miles downwind
6.	Yankee St. and State Route 725	3-5 miles downwind
7.	Waldruhe Park on Springboro Pike	3-5 miles downwind
8.	Clyo Rd. and Franklin St. (Centerville, Ohio)	5-10 miles downwind
9.	State Route 48 and Social Row Rd.	5-10 miles downwind
10.	Bellbrook, Ohio	10-15 miles downwind
11.	State Route 725 and U.S. 42	10-15 miles downwind
12.	Xenia, Ohio	15-20 miles downwind
13.	Spring Valley Rd. and Paintersville Rd.	15-20 miles downwind
14.	Mt. Holly, Ohio	15-20 miles downwind
<u>West Zone</u>		
1.	Belvo Rd. and Gebhart Church Rd.	0-3 miles upwind
2.	Maue Rd. and Miamisburg-Springboro Rd.	0-3 miles upwind
3.	Cincinnati-Dayton Pike at south city limits of Miamisburg	0-3 miles downwind
4.	Lower Miamisburg Rd. and Union Rd.	0-3 miles downwind
5.	Lower Miamisburg Rd. and Jamaica Rd.	0-3 miles downwind
6.	State Route 725 and State Route 4	3-5 miles downwind
7.	Germantown, Ohio	3-5 miles downwind
8.	Manning Rd. and Farmersville-Johnsville Rd.	5-10 miles downwind
9.	Oxford Rd. and Browns Run Rd.	5-10 miles downwind
10.	Gratis, Ohio	10-15 miles downwind

**TABLE 7 (continued)**

West Zone

<u>Location</u>	<u>Range</u>
11. Greenbush Rd. and State Route 122	10-15 miles downwind
12. Eaton, Ohio	15-20 miles downwind
13. Camden, Ohio	15-20 miles downwind
14. Somerville, Ohio	15-20 miles downwind

Northeast Zone

1. Cincinnati-Dayton Pike and Benner Rd.	0-3 miles upwind
2. Miami Drive-In Theater on Cincinnati-Dayton Pike (Miamisburg, Ohio)	0-3 miles upwind
3. Harmon Field (Miamisburg, Ohio)	0-3 miles downwind
4. State Route 725 and Heincke Rd. (Miamisburg, Ohio)	0-3 miles downwind
5. Elm St. and Cincinnati-Dayton Pike (West Carrollton, Ohio)	0-3 miles downwind
6. Woody's Market on Cincinnati-Dayton Pike (West Carrollton, Ohio)	3-5 miles downwind
7. Yankee St. and Mad River Rd.	3-5 miles downwind
8. Springboro Pike and Dryden Rd. (Village of Moraine, Ohio)	5-10 miles downwind
9. State Route 48 and Stroop Rd.- Town and Country Shopping Center- (Kettering, Ohio)	5-10 miles downwind
10. Interstate 75 and Wagner - Ford Rd.	10-15 miles downwind
11. Belmont Auto Theater-Patterson Rd. and County Line Rd. (Kettering, Ohio)	10-15 miles downwind
12. State Route 201 and Chambersburg Rd.	15-20 miles downwind
13. State Route 235 (Fairborn, Ohio)	15-20 miles downwind
14. Germany Trebein Rd. and Fairground Rd.-approximately 3 miles south of previous sample No. 13	15-20 miles downwind

Northwest Zone

1. Mound Ave. and Benner Rd.	0-3 miles upwind
2. Medlar Rd. and Miamisburg-Springboro Pike	0-3 miles upwind
3. Cincinnati-Dayton Pike and Mound Ave. (Miamisburg, Ohio)	0-3 miles downwind
4. Union Rd. and State Route 725	0-3 miles downwind
5. Union Rd. and Manning Rd.	0-3 miles downwind
6. State Route 4 Manning Rd.	3-5 miles downwind
7. State Route 4 and Farmersville-West Carrollton Pike	3-5 miles downwind
8. Diamond Mill Rd. and Mile Rd.	5-10 miles downwind

TABLE 7 (continued)

Northwest Zone

<u>Location</u>	<u>Range</u>
9. Farmersville, Ohio	5-10 miles downwind
10. Clayton Rd. and Amity Rd.	10-15 miles downwind
11. Farmersville-West Alexandria Pike and DeChant Rd.	10-15 miles downwind
12. Brookville, Ohio	15-20 miles downwind
13. Lexington Salem Rd. and Preble County Line Rd.	15-20 miles downwind
14. Lexington Salem Rd. and Engle Rd.	15-20 miles downwind

Southeast Zone

1. Fifth St. and Central Ave. (Miamisburg, Ohio)	0-3 miles upwind
2. Union Rd. and State Route 725	0-3 miles upwind
3. Mound Ave. and Benner Rd.	0-3 miles downwind
4. Medlar Rd. and Miamisburg-Springboro Pike	0-3 miles downwind
5. Wood Rd. and Pennyroyal Rd.	3-5 miles downwind
6. South Montgomery County Airport on State Route 741 at Austin Pike	3-5 miles downwind
7. Springboro, Ohio	5-10 miles downwind
8. At T.V. Tower on Lytle-Five Points Rd.	5-10 miles downwind
9. State Route 122 and Utica Rd.	10-15 miles downwind
10. Waynesville, Ohio	10-15 miles downwind
11. Oregonia, Ohio	15-20 miles downwind
12. Wilmington Rd. and Corwin Rd.	15-20 miles downwind
13. Harveysburg, Ohio	15-20 miles downwind

Southwest Zone

1. State Route 725 and Alexanderville Rd.	0-3 miles upwind
2. State Route 725 and Heincke Rd. (Miamisburg, Ohio)	0-3 miles upwind
3. Miami Drive-In Theater on Cincinnati-Dayton Pike (Miamisburg, Ohio)	0-3 miles downwind
4. Farmington Rd. and Chautauqua Rd.	0-3 miles downwind
5. Farmington Rd. and Union Rd.	0-3 miles downwind
6. Farmington Rd. and Butler St.	3-5 miles downwind
7. Carlisle, Ohio	3-5 miles downwind
8. Miami River Park on State Route 73 (Middletown, Ohio)	5-10 miles downwind
9. Hetzler Rd. and Hinkle Rd.	5-10 miles downwind
10. State Route 4 and State Route 73	10-15 miles downwind

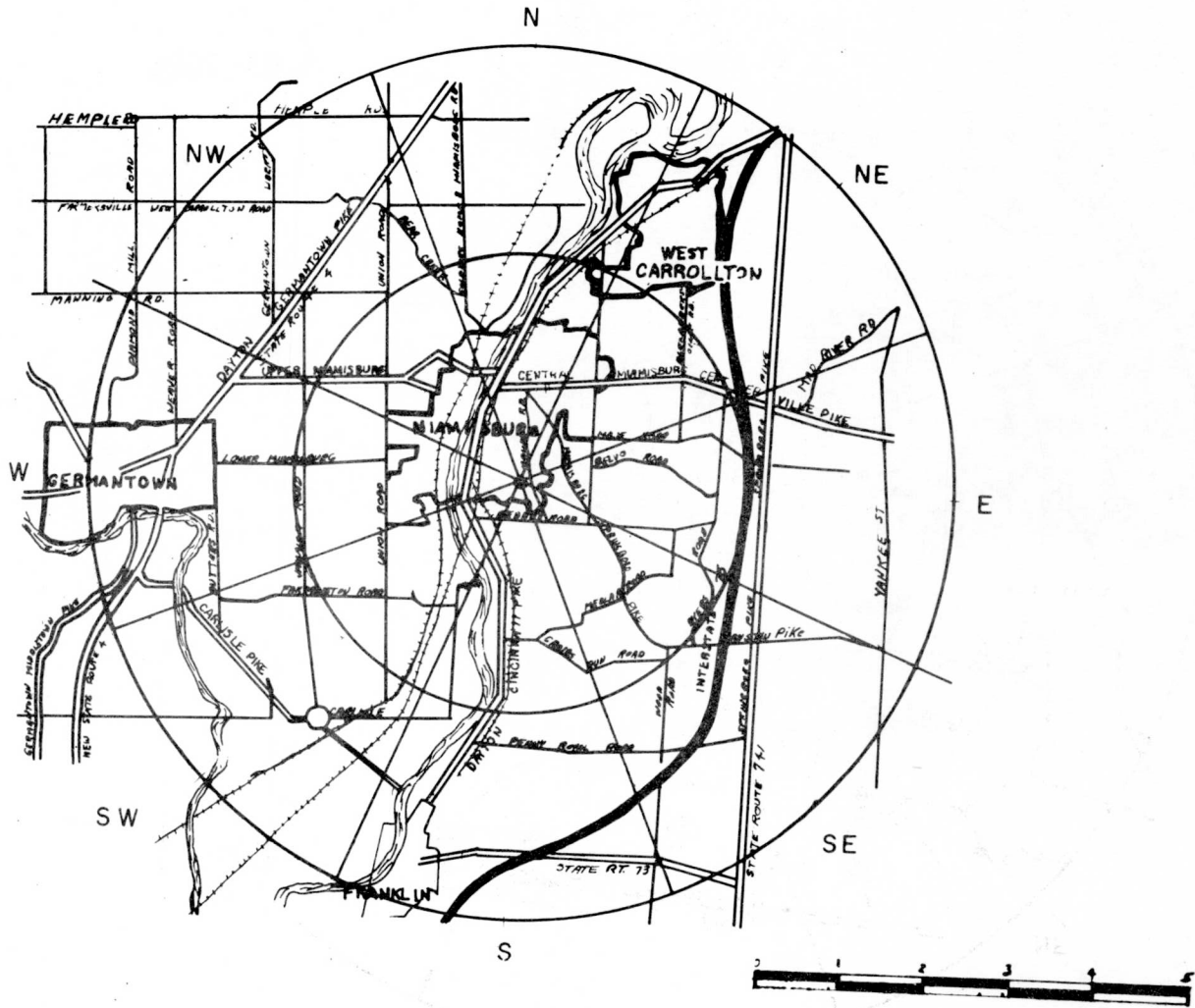
TABLE 7 (continued)

Southwest Zone

<u>Location</u>	<u>Range</u>
11. Jacksonburg, Ohio	10-15 miles downwind
12. State Route 4 and State Route 747	15-20 miles downwind
13. New Maimi, Ohio	15-20 miles downwind
14. West Elkton Rd. and Tolbert Rd.	15-20 miles downwind

PROXIMITY AIR SAMPLE ZONES

MAP 2



MAP 3  
DISTANT AIR SAMPLE ZONES

