

**FMPC ENVIRONMENTAL MONITORING
QUARTERLY REPORT APRIL, MAY, JUNE 1960**

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**NLO/AEC
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REPORT**

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QUARTERLY REPORT

**APRIL, MAY, JUNE
1960**

August 8, 1960

**Atomic Energy Commission
Fernald Area
Feed Materials Production Center**

Prepared By

**Health & Safety Division
National Lead Company of Ohio
P.O. Box 158
Cincinnati 39, Ohio**

Contract No. AT(30-1)-1156

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ABSTRACT

The environmental monitoring program for the sampling of air and water during the second quarter of 1960 in the vicinity of the Feed Materials Production Center (FMPC), Fernald, Ohio is presented. The amount of material released to the environment was very low in comparison to the maximum permissible levels, as recommended by the National Committee on Radiation Protection and Measurements and the State of Ohio.

ENVIRONMENTAL MONITORING DATA

The following report concerns the environmental monitoring data performed in the Fernald Area by the Feed Materials Production Center (FMPC). The FMPC is operated by the National Lead Company of Ohio (NLO) for the Atomic Energy Commission (AEC). Feed material operations deal with the processing of high-grade uranium ores and ore concentrates to produce metallic uranium. The final product is used throughout the United States as a fuel for reactors.

During the many involved reactions and processes that lead to the reactor fuels, various liquid and airborne wastes are generated. Various in-plant methods are used to curtail their release into the environment surrounding the plant. Almost complete removal of the materials is accomplished by using dust collectors and waste treatment processes. Since it is impossible to obtain 100% removal, some of the material does reach the environs outside the plant. An environmental survey program has been established, which consists of water and air sampling of the environs and performing those analyses on the samples that are indicative of released material from the plant. The results from the second quarter sampling revealed that the control of material released to the environs at this site is well within the maximum permissible concentrations (MPC) as recommended by the National Committee on Radiation Protection and Measurements and the State of Ohio.

Water Sampling

Water samples are taken to determine the effect of the site's liquid wastes upon the Great Miami River, into which all of the plant's liquid effluents pass. The results of the monitoring of liquid effluent have been reported to the Ohio Department of Health on a monthly basis since 1954 and duplicate samples are often taken by a State Engineer and an NLO Industrial Hygienist. In some cases, samples are exchanged in order that each group can evaluate the other's sampling procedure and analytical results.

The locations of all of the water sampling points are shown on Map A. A continuous-type water sampler collects the plant

effluent at the outfall, (Point B). Since it is difficult to have this type of sampler in an upstream (Point A) and downstream location (Point C), spot samples are taken at these points. The collected samples are analyzed for uranium, total radioactivity, chlorides, fluorides, and nitrates. Table I indicates the high, average, and low concentrations of the above contaminants. The MPC and the percent of MPC are also indicated for comparison.

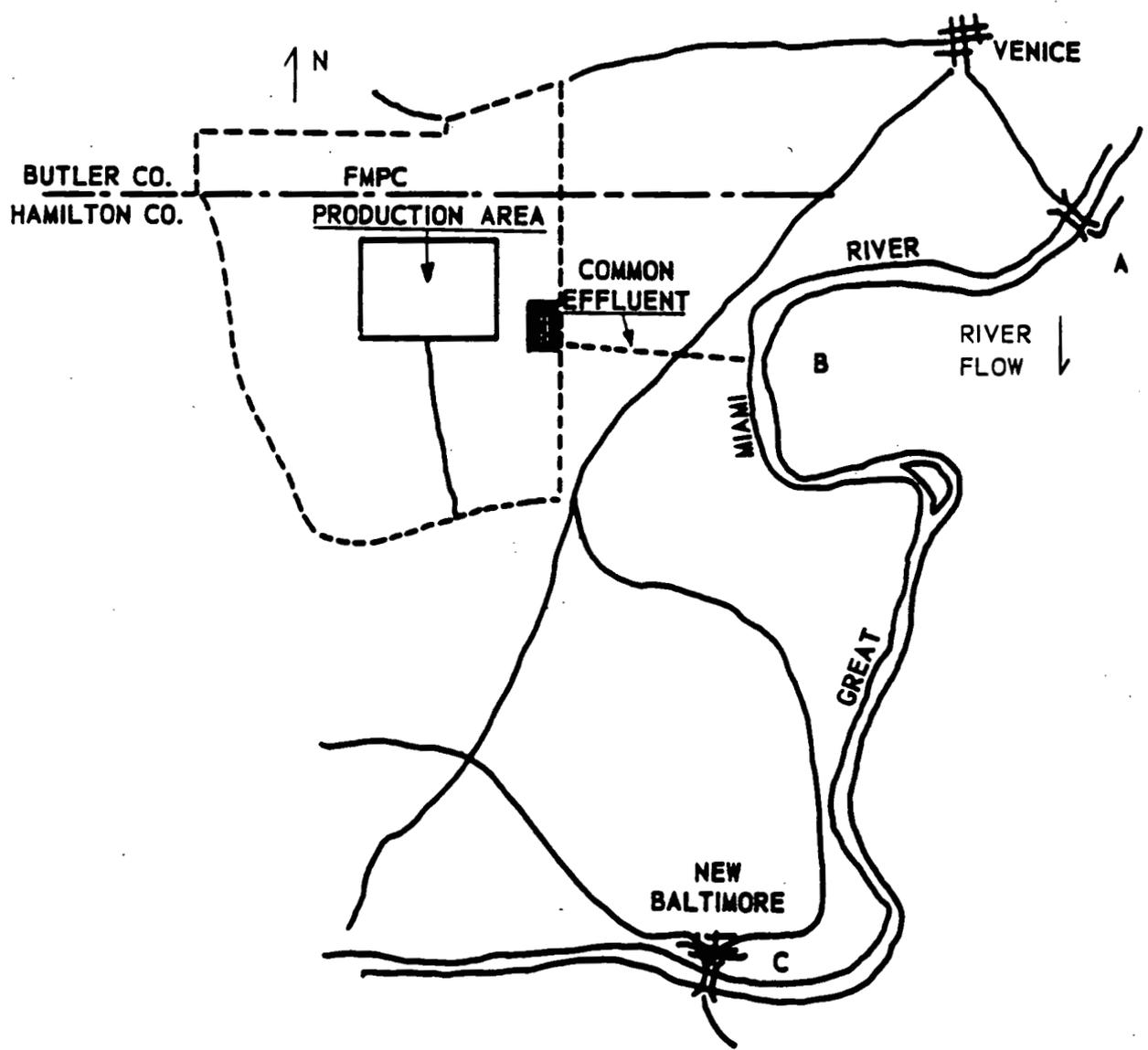
The results in Table I indicate that the liquid wastes discharged by this plant during the second quarter were small in relation to the MPC's. Results C-A (the difference in upstream and downstream concentrations) indicate that the FMPC effluent produced little or no change in the river's quality.

TABLE I

WATER SAMPLING RESULTS FOR SECOND QUARTER OF 1960

| Location (Shown on Map A) | No. of Samples | Uranium ($\times 10^{-6}$ $\mu\text{c}/\text{cc}$) | | Total Activity ($\times 10^{-6}$ $\mu\text{c}/\text{cc}$) | | | |
|------------------------------|-------------------|--|------|---|------|------|--|
| | | High | Low | High | Low | | |
| B (FMPC Outfall) | 91 | .035 | .001 | .072 | .001 | .009 | .30 |
| A (Upstream) | 15 | .029 | .005 | .53 | N.D. | .070 | 2.33 |
| C (Downstream) | 15 | .100 | .008 | .42 | N.D. | .090 | 3.00 |
| C-A | NA | NA | NA | NA | NA | .020 | .67 |
| (1) MPC | | 20×10^{-6} $\mu\text{c}/\text{cc}$ | | 3×10^{-6} $\mu\text{c}/\text{cc}$ | | | |
| | | Nitrate (ppm) | | Chloride (ppm) | | | |
| B | 91 | 4.4 | .22 | 1.8 | 4.1 | 3.38 | 1.69 |
| A | 15 | 16.0 | .30 | 8.0 | 18.2 | 33 | 23 |
| C | 15 | 20.0 | .30 | 10.0 | 22.7 | 33 | 24 |
| C-A | NA | NA | NA | 2.0 | 4.5 | NA | 1 |
| (2) MPC | | 44 ppm | | 250 ppm | | | |
| | | Fluoride (ppm) | | | | | |
| B | 91 | .17 | .01 | .04 | 3.3 | NA | Not Applicable |
| A | 15 | 1.0 | N.D. | .4 | 33 | ND | Non-Detectable |
| C | 15 | .5 | N.D. | .3 | 25 | | $\mu\text{c}/\text{cc}$ - microcuries per cubic centimeter |
| C-A | NA | NA | NA | .1 | 8.1 | | ppm - parts per million |
| (2) MPC | | 1.2 ppm | | | | | (1) - U.S. Dept. of Commerce, National Bureau of Standards Handbook 69 |
| | | | | | | | (2) - NLO-State |

**MAP A - WATER SAMPLING LOCATIONS
FERNALD FMPC AND SURROUNDINGS**



Air Sampling

Air samples and gumpapers from fallout stations are collected around the 1000-acre plant site and at points as far away as 15 miles. The sampling of airborne particulate matter provides a good indication of the amount of material released into the atmosphere by the plant. The amount of particulates in the air is calculated by drawing a known quantity of air through a filter paper and the samples are analyzed for uranium and total activity. The air sampling locations in the production area are shown on Map B. Table II indicates the high, average, and low concentrations of the above. The MPC and the percent of the MPC are also listed for comparison.

Due to construction work being carried out at the FMPC, it was not possible to operate all of the air sampling stations during this period. It should be pointed out that the two stations that were in operation are predominantly downwind, since the wind usually comes from the southwest. The results of the sampling indicate that even well within the project (from 1200 to 3400 feet) area owned and controlled by the AEC, the concentrations averaged only 8.75% of the MPC for uranium and 0.40% of the MPC for total radioactivity.

TABLE II

AIR SAMPLING RESULTS FOR SECOND QUARTER OF 1960

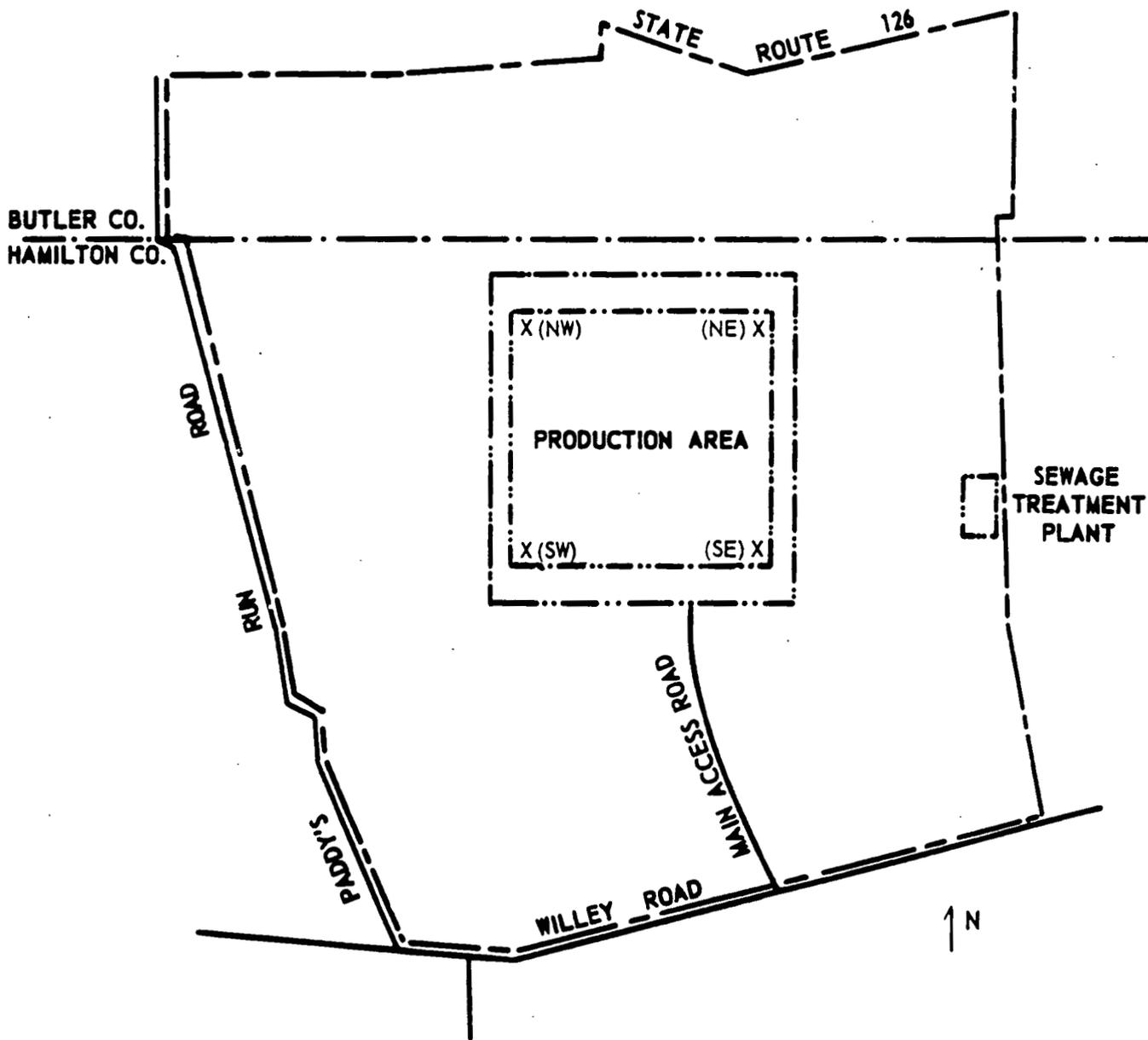
| Location (Shown on Map B) | No. of Samples | Uranium (X 10 ⁻¹² μc/cc) | | | Total Activity (X 10 ⁻¹² μc/cc) | | | | |
|------------------------------|-------------------|-------------------------------------|-----|---------|--|------|-----|---------|------|
| | | High | Low | Average | %MPC | High | Low | Average | %MPC |
| NW | 10 | 1.09 | .02 | .20 | 10.0 | 1.78 | .05 | .43 | .43 |
| NE | 10 | .34 | .01 | .15 | 7.5 | .82 | .03 | .37 | .37 |
| Average Concentration | | NA | NA | .175 | 8.75 | NA | NA | .40 | .40 |
| (1) MPC | | 2 X 10 ⁻¹² μc/cc | | | 100 X 10 ⁻¹² μc/cc | | | | |

NA - Not Applicable

μc/cc - microcuries per cubic centimeter

(1) - U. S. Department of Commerce, National Bureau of Standards Handbook 69

**MAP B - AIR SAMPLING LOCATIONS
FERNALD FMPC AND SURROUNDINGS**



X - AIR SAMPLING STATIONS

CONCLUSIONS

During the second quarter, the amount of airborne and water activity remained at the low level that it had during the first quarter of 1960. The results for the first half of the year are of the same magnitude as they have been in past years. The concentrations of these materials present in the air and water in the environ surrounding the plant were well below the respective MPC's. It therefore may be concluded from the above that FMPC operations added insignificant amounts of materials to the surrounding community environment.