f-04-9

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

JUN 1 2 1991

Mr. Arthur Kleinrath
U.S. Department of Energy
Dayton Area Office
P.O Box 66
Miamisburg, Ohio 45343

REPLY TO ATTENTION OF:
5HS-11

RE: U.S. DOE Mound Plant Site Scoping Report Review Comments

Dear Mr. Kleinrath:

The United States Environmental Protection Agency (U.S. EPA) has the following comment on the "Site Scoping Report - Volume 5, Topographic Map Series" for the Mound Plant site: the methodology used to estimate the volume of fill material, based on subtracting topographic surface maps of 1946 and 1986, may underestimate the total fill volume of cut and fill operations that were occurring during this period (Section 7, page 7). This issue should be addressed in any subsequent Remedial Investigation Report.

Please feel free to call me at (312) 353-6287 if you have any questions.

Sincerely,

Diana Mally

Diana Mally
Remedial Project Manager

cc: M. Hatcher, OEPA
D. Neff, EG&G Mound
T. Farmer, LANL ER-TSO
J. Price, Weston 9

29-01-01-07-05
9406140007

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1-00-9

ROY F. WESTON, INC.
6501 AMERICAS PARKWAY, N.E.
SUITE 800
ALBUQUERQUE, NM 87110
505-884-5050
FAX: 505-884-5388

January 28, 1992

University of California
Los Alamos National Laboratory
Attention: Dr. Kenneth Rea
EES-14 ER TSO
P.O. Box 1663, MS K-485
Los Alamos, NM 87545

RE: ER Program, Mound Plant
Site Scoping Reports - Approval Sheets
RFW WO # 2744-41-18

Dear Dr. Rea:

Enclosed are copies of the approval pages for Volumes 1, 4, 5, 6, and 8 of the Site Scoping Report. At her request, these pages are being supplied to Diana Mally, US EPA Remedial Project Manager, for signature. These reports are considered complete and will be placed in the administrative record.

If you have any questions, please contact Bill Criswell or John Price.

Sincerely,

ROY F. WESTON, INC.

for William M. Little

Michael P. Mauzy, P.E.
ER Program, TSO Subcontractor
Project Manager

CWC/
Enclosures
pc w/encl: D. Neff (EG&G-MAT)
D. Mally (US EPA)
T. Farmer (ER TSO)
pc w/o encl: ER TSO File
scopltr6.wp

29-01-01-07-05
9406140007

Signature Page

This report is Volume 5 of a multiple-volume Site Scoping Report providing the background information pertinent to the remedial investigation/feasibility study (RI/FS) of the Mound Plant. Under the terms of the Federal Facility Agreement between DOE and US EPA, this report is submitted to US EPA for approval.

This report is approved by US EPA only for the purposes of scoping the RI/FS, and approval does not imply concurrence with the interpretations presented herein. It is recognized that additional information will be collected during the RI/FS and may supersede information contained in this report.

APPROVED: Diana Mally
Remedial Project Manager
U.S. Environmental Protection Agency
Region V

_____

Department of Energy
Albuquerque Operations Office
Dayton Area Office
P.O. Box 66
Miamisburg, Ohio 45343-0066

MAY 1 1991

Martha Hatcher
Ohio Environmental Protection Agency
Southwest District
40 South Main Street
Dayton, Ohio 45402-2086

Dear Ms. Hatcher:

This letter is to confirm the April 25, 1991 conversation between you and Art Kleinrath of my staff. It was agreed with U. S. EPA that the Scoping Reports, Photo-History and Topographic Maps (Scoping Reports 5 and 6), will be delivered by May 20, 1991, and not May 1, 1991, as indicated in the schedule. The reason for this is the difficulty in achieving an adequate determination of the classified or unclassified status of these documents and maps. The change in schedule does not affect any other due dates.

If you have any questions, feel free to contact Mr. Kleinrath on FTS 774-3597.

Sincerely,

George R. Gartrell
Chief, Environmental Safety,
Health and Compliance Branch

cc:
Dave Meyer, ER, AL
Tom Farmer, TSO, LANL
Jose Mora, OCC, AL
John Sands, EM, HQ
John Price, Weston
Diana Mally, USEPA, Chicago
Dick Neff, EG&G Mound
Art Kleinrath, DAO

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9406140007

Department of Energy
Albuquerque Operations Office
Dayton Area Office
P.O. Box 66
Miamisburg, Ohio 45343-0066

CEDC

MAY 1 1991

Diana Mally
U. S. Environmental Protection Agency
5-HS-11
230 S. Dearborn
Chicago, IL 60604

Attention: Debbie Siebers

Dear Ms. Mally:

This letter is to confirm the April 25, 1991 conversation between you and Art Kleinrath of my staff. It was agreed with U. S. EPA that the Scoping Reports, Photo-History and Topographic Maps (Scoping Reports 5 and 6), will be delivered by May 20, 1991, and not May 1, 1991, as indicated in the schedule. The reason for this is the difficulty in achieving an adequate determination of the classified or unclassified status of these documents and maps. The change in schedule does not affect any other due dates.

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Sincerely,

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Chief, Environmental Safety,
Health and Compliance Branch

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John Sands, EM, HQ
John Price, Weston
Martha Hatcher, OEPA, Dayton
Dick Neff, EG&G Mound
Art Kleinrath, DAO

29-01-01-07-05
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Environmental Restoration Program

OPERABLE UNIT 9, SITE SCOPING REPORT VOLUME 5 - TOPOGRAPHIC MAP SERIES

MOUND PLANT
MIAMISBURG, OHIO

February 1992

FINAL

Department of Energy
Albuquerque Field Office

Environmental Restoration Program
Technical Support Office
Los Alamos National Laboratory

REFERENCE USE ONLY

ENVIRONMENTAL RESTORATION PROGRAM

OPERABLE UNIT 9,
SITE SCOPING REPORT
VOLUME 5 - TOPOGRAPHIC MAP SERIES

MOUND PLANT
MIAMISBURG, OHIO

February 1992

DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE

ENVIRONMENTAL RESTORATION PROGRAM
TECHNICAL SUPPORT OFFICE
LOS ALAMOS NATIONAL LABORATORY

FINAL

Note: Although this document is an approved Final document, some text may be marked as "Draft" in the footer. This indicates that no changes have been necessary between submission of the Draft, revision, and regulatory agency approval.

Signature Page

This report is Volume 5 of a multiple-volume Site Scoping Report providing the background information pertinent to the remedial investigation/feasibility study (RI/FS) of the Mound Plant. Under the terms of the Federal Facility Agreement between DOE and US EPA, this report is submitted to US EPA for approval.

This report is approved by US EPA only for the purposes of scoping the RI/FS, and approval does not imply concurrence with the interpretations presented herein. It is recognized that additional information will be collected during the RI/FS and may supersede information contained in this report.

APPROVED: Diana Mally
Remedial Project Manager
U.S. Environmental Protection Agency
Region V

Diana Mally

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ACRONYMS

DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
NPDES	National Pollutant Discharge Elimination System
SM/PP	Special Metallurgical/Plutonium Processing

ACKNOWLEDGEMENTS

This report was prepared by Roy F. Weston, Inc., Albuquerque, New Mexico, under subcontract number 9-X58-0146R-1, to the University of California, Los Alamos National Laboratory. The manuscript was prepared by William Criswell. The graphics and report were assembled, edited, and produced by WESTON's Albuquerque Office production staff.

1. INTRODUCTION

The U.S. Department of Energy (DOE) Mound Plant, Miamisburg, Ohio, was placed on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA - also known as Superfund) National Priorities List (NPL) on November 21, 1989 (54 Federal Register 48184). Pursuant to its NPL status, DOE signed a CERCLA Section 120 Federal Facilities Agreement (FFA) with the U.S. Environmental Protection Agency (EPA) that became effective October 11, 1990. The DOE and Ohio EPA have discussed amending the agreement to include Ohio as a participant. The terms of the FFA require that DOE develop and implement Remedial Investigations and Feasibility Studies (RI/FS) and conduct Interim Remedial Actions in order to ensure that environmental impacts associated with past and present activities at the site are thoroughly investigated and appropriate action is taken to protect the public health and welfare and the environment.

The Albuquerque Operations Office of the DOE established the Environmental Restoration Program in 1984 to collect and assess environmental data in order to develop a conceptual site model to assess both the nature and extent of contamination and to identify potential exposure pathways and potential human and environmental receptors. These activities have been conducted under DOE policy for all facilities to comply with applicable environmental regulations. In order to provide EPA with sufficient information and data gathered during these previous investigations, a multi-volume scoping report providing background information is in preparation. The Site Scoping Report will provide descriptions and summaries of the current conditions and characteristics of Mound Plant and will consist of at least the following volumes:

1. Groundwater Data: February 1987 - July 1990
2. Geologic Log and Well Information Report
3. Radiologic Survey Report
4. Engineering Map Series
5. Topographic Map Series
6. Photo History Report
7. Waste Management Report
8. Summary of Environmental Monitoring
9. Bibliography

2. SCOPE OF TOPOGRAPHIC MAP SERIES

This report presents a series of topographic maps that presently exist for Mound Plant and the surrounding region. The series consists of four large-scale maps (1:2,400) compiled from the existing digital database that provide detailed site coverage. These are included as plates. Three smaller scale maps (1:24,000 and 1:250,000) published by the U.S. Geological Survey that provide regional coverage are included as Appendix B. The four large-scale maps were produced from the existing 1986 digital database and include a topographic map with all available topographic data (2-foot contours) displayed; a topographic map with 10-foot contours highlighting the surface water features on and adjacent to the plant; a digitized topographic map of the northern part of Mound Plant from 1946, before the plant was constructed; and a contour map with 10-foot contours that estimates the amounts of cut and fill done from 1946 to 1986, principally along the plant drainage ditch.

Additional mapping information concerning well locations, utilities, property owners, sampling locations and results are included in other volumes of the Site Scoping Report, as listed above.

3. DIGITAL MAP DATA ORIGINS

The digital map database Roy F. Weston, Inc. (WESTON) uses to produce the maps for the Mound Plant ER Program was purchased from Woolpert Consultants in Dayton, Ohio. This database is an exact copy of the photogrammetric mapping database Woolpert Consultants produced for Monsanto Research Corporation then under contract to the DOE Dayton Area Office. This database was produced from aerial photography taken on December 8, 1985, and was compiled by standard photogrammetric mapping methodology. Photogrammetric mapping is the technology of obtaining reliable geographic information about physical objects and the environment through processes of recording, measuring and interpreting images and patterns from stereo images obtained through aerial photography. By using standard photogrammetric methods, this map database meets the National Map Accuracy Standards as published by the U.S. Bureau of Budget on June 17, 1947, for vertical and horizontal locations. As stated in the National Map Accuracy Standards, vertical accuracy "shall be such that not more than 10 percent of the elevations tested shall be in error more than one-half the contour interval." Standards of horizontal accuracy shall be such that "not more than 10 percent of the points tested shall be in error by more than 1/30 inch measured on the publication scale." These standards are adopted to ensure levels of map accuracy that provide a consistent and defensible foundation for subsequent display of all types of environmental data.

The data was delivered to WESTON in INTERGRAPH IGDS format design files. They were loaded on a 386 personal computer running the computer aided design package MICROSTATION-PC, a product of the

INTERGRAPH company. Twenty-one individual sheet files were delivered. The original files were in Mound Plant coordinates. In order to comply with regulatory requests, the Mound Plant coordinates were transformed to Ohio State Plane coordinates using an algorithm created by Oak Ridge National Laboratory, Grand Junction Project Office. A copy of this algorithm is provided in Appendix A.

A declination diagram was derived for the WESTON maps from the USGS topographic maps (see Appendix B), with assistance from Mr. Bill Stone, New Mexico State Geodesist. The Mound Plant facility falls on two USGS 7.5-minute quadrangles, Miamisburg and Franklin, Ohio. Two other 7.5-minute maps, Dayton South and Springboro, Ohio, encompass the entire area of study. The Miamisburg, Ohio quadrangle had a magnetic declination of 3.5 degrees west of true north; the other three maps had a magnetic declination of 3 degrees west of true north based on a 1981 calculation for the location of magnetic north. The magnetic declination of 3 degrees west of true north was selected to be the declination for the WESTON maps because of the necessity of maintaining a consistent declination over the entire study area. Accepting this magnetic declination implies that the data is based on the following assumptions:

1. The geodetic control datum is NAD 1927. This datum is used to calculate the shape of the earth and the coordinate systems used to describe locations on the surface of the earth.

2. The magnetic declination of 3 degrees west of true north is only valid for the center of the USGS quadrangles; however, the variation from this declination that would occur for the area covered by the Mound Plant would not be measurable on the maps enclosed.

3. The date for the calculation of the location of magnetic north is 1981.

The declination for Grid North (State Plane North) was derived by Mr. Bill Stone, New Mexico State Geodesist. By providing the longitude and latitude of the center of the Mound Plant (39 degrees 37 minutes 42 seconds North Latitude and 84 degrees 17 minutes and 15 seconds West Longitude), Mr. Stone calculated the grid north declination for the center of the Mound Plant to be 1.13 degrees west of true north. This declination is only valid for the center of the plant; however, the variation that would occur across the Mound Plant site would not be measurable on the maps enclosed.

4. PLATE 1 - TOPOGRAPHIC MAP OF MOUND PLANT

The topographic map provided as Plate 1 contains all the current topographic data for Mound Plant. The contour interval is 2 ft; 10-ft contours are routinely extracted from this file for use in producing figures and plates for ER Program work plans, technical memoranda, and other reports. The buildings and structures depicted in Plate 1 were edited from the original file. All buildings and structures with dimensions smaller

than 10 ft were removed from this file in order to produce readable text at the scale provided. The buildings removed were typically trailers or other small or generally temporary buildings or sheds. These can be reinserted as necessary to produce larger scale figures for use in site specific plans or reports. The scale (1" = 200') is generally deemed adequate to depict site-wide maps, and all attempts have been made to utilize this scale in companion volumes of the Site Scoping Report.

5. PLATE 2 - SURFACE WATER FEATURES

The surface water features map provided as Plate 2 uses a 10-ft contour interval to highlight the site topography. This map depicts the watersheds, drainage patterns, and containment ponds within and adjacent to the plant, as well as the principal course of the Great Miami River and the approximate position of its 100-year flood plain. The flood plain was obtained from the Federal Emergency Management Agency (FEMA) flood insurance rate map of 1983, Miamisburg, Ohio. The latter is relatively general and does not depict the flood plain at the scale or detail contained in Plate 2. The position of the flood plain depicted was chosen within the 710-ft contour line, but for simplicity was not depicted to fill this contour, although it is realized that a flood of this magnitude would infill all portions of the terrain within the contour.

The surface water containment ponds within the plant are manmade and were engineered to control sediment and surface water runoff through the NPDES-permitted Outfall 002. A weir installed below the retention basins automatically monitors and samples discharges. The NPDES Outfall 001, west of the plant on the Great Miami River, is discharged through a closed pipeline from the plant sanitary treatment plant. The South Pond is a small fishing pond maintained by the City of Miamisburg and is recharged by the municipal water supply. No known natural recharge for the south pond is known. The North Pond is now defunct. Before 1968, it served as a cooling water pond for a city power plant located nearby, but was converted to brine-filled solar heating pond for the municipal swimming pool. In 1990, the North Pond was abandoned and infilled with earth for other uses.

Drainage Patterns

The natural surface drainage patterns on much of the Mound Plant site have been altered by roads and structural modifications as the Mound facility expanded with time. Predevelopment drainage patterns consisted of overland flow to several small creeks tributary to the Great Miami River. Prior to the development of the Mound Facility, construction of the Miami Erie Canal and the Conrail Railroad interrupted this flow path. As the Mound facility developed, the plant drainage ditch, the only perennial stream within the Mound plant boundary, was engineered to control surface water storage and discharge. Storm drainage in the developed areas of the Main and SM/PP Hills is controlled through concrete-lined open culverts and closed pipes that focally drain to a system of storm basins. The system of sediment

settling basins along the plant drainage ditch includes the asphalt-lined pond, overflow pond retention basins, and a weir to monitor discharge.

Most of the surface water generated at the Mound Plant, which includes rainfall runoff and some wastewater, is routed through the pond and basin system. The asphalt-lined pond is an open impoundment located west of Building 61 in the northeast corner of the Mound facility. The pond receives non-contact cooling water and rainfall runoff from the hillside slope northwest of the SM Building. The pond provides temporary storage, flow equalization, and retention time for removing suspended solids before discharging the effluent to the retention basins through a closed culvert to the plant drainage ditch. The drainage ditch is the natural rainfall runoff channel for the Mound Plant. It begins at the asphalt-lined pond, continues in a westerly direction, and terminates at the retention basins on the western border of the plant. In addition to receiving effluent from the asphalt-lined pond, the drainage ditch receives rainfall runoff from the Main Hill and the SM/PP Hill and effluent from various Mound Plant process facilities. The three retention basins are open impoundments located on the western edge of the Mound Plant, just north of the overflow pond. The basins receive rainfall runoff in addition to approximately 410,000 gallons per day of single pass cooling water, cooling tower blowdown, and water softener backwash from the plant drainage ditch. The basins regulate the rate of runoff discharge from rainfall events and effluent from various Mound Plant process facilities and provide settling for suspended solids in the runoff. Effluent is released from the retention basins to a connected weir basin (NPDES Outfall 002). The overflow pond is located near the southwestern corner of the developed portion of Mound Plant, just south of the retention basins. Excess rainfall runoff and effluent from the plant drainage ditch can be diverted to the overflow pond before reaching the retention basins. The pond also receives surface runoff from the site sanitary landfill. The overflow pond provides additional storage capacity for flow equalization and for settling of suspended solids. The pond effluent is discharged to the weir basin and NPDES Outfall 002.

Plant effluent from NPDES Outfall 002 flows west through a box culvert beneath the railroad tracks to an abandoned section of the Miami-Erie Canal. The box culvert is rated at 814 cubic feet per second (cfs) discharge and is the limiting constraint on the outflow from the drainage ditch and basin system. The effluent originally moved both north and south along the canal, but the north branch of the canal was blocked in July 1976 by the installation of a one-way valve. The valve prevents movement to the north (DOE 1979) but allows southward drainage during storm flow. The effluent currently flows through the south canal under the Dayton-Cincinnati Road and then in an open ditch to an outfall on the Great Miami River.

Watershed Areas

The Mound Plant can be divided into five watersheds (subwatersheds) with a total area of approximately 306 acres. The approximate areas of each the subwatersheds are shown below.

Subwatershed	Area (Acres)
1	99
2	33
3	142
4	18
5	14
	306 Total

Within subwatershed 1, drainage patterns have been modified by plant development, although the plant drainage ditch approximately follows its original course as it flows between the Main and SM/PP Hills (Plate 2). Storm water runoff and sediment from the south portion of the Main Hill and the north portion of the SM/PP Hill is routed to the ditch, the retention basins, and the overflow pond before being released through NPDES Outfall 002. Flow from the hillslopes is overland until concentrated by roads or locally lined open ditches and culverts.

Continued development on the Mound site has increased the quantity of storm water runoff in subwatershed 1. This has followed a typical sequence that occurs when vegetated lands are converted to industrial use. Impervious pavements and roof areas replaced grasslands that had allowed infiltration of rainfall. The additional runoff has overloaded the capacity of the original storm system and historically created minor flooding in several areas. There are plans to increase the capacity of the overflow pond within the next 5 years.

Subwatershed 2 flows into the overflow pond and also contributes to NPDES Outfall 002. On the northwest side of the SM/PP Hill the water is diverted around the south side of the buildings in the valley to the overflow pond. Along the southern boundary of the subwatershed, runoff is carried west down a concreted-lined channel built in 1989, where it is diverted into the overflow pond behind the site sanitary landfill. The modification of the natural divide allows runoff and surficially eroded soils to be diverted to the settling pond.

Subwatershed 3, on the new property, rivals the main plant for total catchment area (Plate 2). The natural east-west divide on the SM/PP Hill was engineered to divert some of the runoff into subwatershed 2. Runoff water and sediment that may overflow the subwatershed 2 diversion channel moves southward along the west plant boundary to a low-lying area in the southwestern part of the plant. This area lies within

the 100-year flood plain (FEMA 1983) and may allow local ponding of water and sediment. Much of the runoff within subwatershed 3 collects in the ephemeral streams and discharges offsite to the southwest. However, the area of the 100-year flood plain is generally poorly drained. This stream combines offsite with drainage in the south part of the Miami-Erie Canal and runs under the Dayton-Cincinnati Pike and into the Great Miami River.

Runoff in subwatershed 4 is channeled to the west, where most of it is routed to NPDES Outfall 001. During very heavy rainfall, storm water may be diverted directly to the plant drainage ditch. Some of the runoff may flow down the northwest side of the Main Hill. Water in subwatershed 5 largely collects from the parking lot and roads along the main plant entrance and is routed to the north.

6. PLATE 3 - HISTORIC TOPOGRAPHIC MAP OF MOUND PLANT AREA, 1946

The 1946 historic topographic map of Mound Plant depicts the terrain as it appeared before the plant was constructed. The 1946 map, entitled "Topographic Map of Lands Adjoining South Side of City of Miamisburg, Ohio, for Monsanto Chemical Company," was compiled by Arthur E. Bauer, Civil Engineer and Surveyor, Ohio License #52. The 1946 topographic map appears to have been compiled as part of the plant construction planning. The available map was received from Mound Plant as a paper print at a scale of 1:600 (1" = 50'). The map contains 10-ft index contours and 2-ft intermediate contours. The map was digitized for use by the ER Program to investigate significant terrain changes since 1946, particularly along the plant drainage ditch. The historic map was digitized by tracing the contours from the paper source map. A plot at the same scale was then visually compared. In no case were contours found to deviate from the source map by more than half the distance between contours. Generally, the accuracy of the digitized contours was found to be better than this.

7. PLATE 4 - ESTIMATIONS OF CUT AND FILL FROM 1946 TO 1986

An estimation of the volume of fill material used over the Mound Site during the time period of 1946 to 1986 could be useful in assessing potential pathways of contamination. Digital map data modeling techniques provide one method of deriving volume estimates if two different dates of topographic data are available. Two dates of topographic data are available for the Mound Plant: a hand drawn survey map dated December 1946 and the 1986 digital topographic data discussed earlier. The 1946 map only covered the northern half of the Mound Plant site.

The process for deriving the estimates of fill materials is based on the premise of subtracting one topographic surface from the other topographic surface. This methodology is used regularly in mining and construction work.

The 1986 digital topographic data was a subset of the digital information provided by Woolpert Consultants, discussed earlier in this document. For the estimate of cut and fill calculations, this data was used in its three-dimensional format, and only the 10-ft contours were used. The 10-ft contour map contained numerous interrupted contours requiring completion. These gaps in the contours had been created by removing the contour lines as they passed through structures, text, and other map elements. To make this data useful in the volumetric calculation, the gaps in the contour lines were closed. With reference to plots of the entire digital map file, the contours were closed by visually approximating the course of the contour extending through the structure, essentially in a straight line.

The two contour maps were then converted into a regular 50-ft grid of X, Y, and Z coordinates, using Intergraph's Digital Terrain Modelling (DTM) Software. This software interpolated Z (elevation) values based on the elevations of the three-dimensional contour lines. Only the 10-ft contours were used in this process because of the limitations of the 1946 data. An examination of the interpolated Z values for a small sample of points in the grid verified that the Z elevations agreed with the source contour maps.

The two grid files (one for 1946 and one for 1986) were then subtracted one from the other to derive a third grid file representing the difference in topography between 1946 and 1986. This grid file was used to generate a contour map of the change in topography, again using Intergraph's DTM software.

8. REFERENCES

DOE. 1979. "Final Environmental Impact Statement, Mound Facility, Miamisburg, Ohio." U.S. Department of Energy report DOE-E1S-0014. June 1979.

FEMA. 1983. Flood insurance rate map of City of Miamisburg, Montgomery County, Ohio prepared by Federal Emergency Management Agency, revised January 14, 1983.

APPENDIX A

APPENDIX A

ALGORITHM FOR CONVERSION FROM MOUND PLANT

TO STATE PLANE COORDINATES

```
:INSTRUCTIONS TO CONVERT THE OHIO PLANT COORDINATES TO STATE PLANE
:CREATE A FILE WITH X FIRST AND Y COORDINATES SEPARATED BY SPACES
:USING A PROGRAM CALLED XY.IPF
:COMBINE WALTF.DAT AT THE BEGINNING OF THIS FILE
:DO THIS BY SAYING COPY FILE1+FILE2 FILE3
  ON THE PROGRAM CALLED WALTF.EXE BY SAYING WALTF
  THIS WILL PROMPT YOU FOR AN INPUT AND OUTPUT FILE
:THE OUTPUT FILE WILL GIVE YOU THE PLANT COORDINATES AND STATE PLANE
:THEY WILL BE SEPARATED BY COMMAS
:KMAN WILL READ THIS FILE AS 4 NUMBER FIELDS
:THEN USE THE PROGRAM XYINSRT.IPF IN KMAN TO INSERT THESE VALUES
```

John:

This is the documentation for the program that we left Thursday.

D Monty

```
C*TYPE WALTF.FOR
C     PROGRAM WALTF.FOR
C
C*****************************************************************
C
C1 PROGRAM: WALTF.FOR   COMPUTER: IBM COMPATIBLE MICRO   REVISION: 1
C1 MICROSOFT FORTRAN
C4 PURPOSE: THIS PROGRAM WILL GET THE TWO MAP TIE-DOWN
C4          OR ALIGNMENT POINTS FROM A PREVIOUSLY SAVED FILE.
C4          THIS FILE ALSO CONTAINS THE POINTS THAT ARE TO BE
C4          CONVERTED TO NORTHINGS AND EASTINGS AND SAVED IN
C4          AN OUTPUT FILE.
C4          THIS PROGRAM COMBINES 2 ROUTINES
C4          1. LOCMAP - LOCATES THE MAP ORIENTATION
C4             RELATIVE TO THE GRID SYSTEM.
C4          2. PTSCNV - READS POINTS FROM PREVIOUSLY
C4             SAVED FILE  AND CONVERT (X,Y) COORDINATES
C4             OF POINTS INTO NORTHINGS AND EASTINGS AND SAVES THE
C4             RESULTS IN AN OUTPUT FILE
C6 PROGRAMMER: R. J. ZINKL
C
C*******************   REVISION LIST   ***************************
C
C   RV DATE       BY       REASON FOR CHANGE
C   -- --------   ------   ------------------------------------
C
C   01 04/09/90   RZ       INITIAL RELEASE. MODIFIED FROM XYPTSS.FOR
C                          REVISION 1.
C
C*   ***************************************************************
C
C9 INTERNAL SUBPROGRAMS: LOCMAP,PTSCNV,POLAR
C0 EXTERNAL SUBPROGRAMS: NONE
CA EXTERNAL SYSTEMS: NONE
C
C*****************************************************************
      CHARACTER*20 FNAME
C
C**** OPEN PRINTER FOR OUTPUT
C     OPEN(6,FILE='PRN')
C
C**** ENTER INPUT FILENAME AND OPEN FILE
      WRITE(*,5)
C     WRITE(6,5)
    5 FORMAT(' ENTER INPUT FILENAME')
      READ(*,'(A)') FNAME
C     WRITE(6,'(1X,A)') FNAME
      OPEN(22,FILE=FNAME,STATUS='OLD')
C
C**** ENTER OUTPUT FILENAME AND OPEN FILE
      WRITE(*,10)
C     WRITE(6,10)
   10 FORMAT(' ENTER OUTPUT FILENAME')
      READ(*,'(A)') FNAME
C     WRITE(6,'(1X,A)') FNAME
      OPEN(23,FILE=FNAME,STATUS='NEW')
C
C**** LOCATE MAP ON TABLET
      CALL LOCMAP
C
C**** TRANSFORM (X,Y) COORDINATES INTO EASTINGS/NORTHINGS
      CALL PTSCNV
```

```
      STOP
      END
      SUBROUTINE LOCMAP
      IMPLICIT REAL*8 (A-H,O-Z)
      COMMON XX(2),YY(2),ROT,X1,Y1
      PI=DATAN(1.)*4.
C
C*    READ EASTING AND NORTHING OF POINT 1
C*    READ EASTING AND NORTHING OF POINT 2
      READ(22,*) X1,Y1,X2,Y2
C
C**** READ EASTING/NORTHING COORDINATES
      DO 800 K=1,2
      READ(22,*) XX(K),YY(K)
  800 CONTINUE
C
C**** CALCULATE ROTATION ANGLE
      XDIS=X2-X1
      YDIS=Y2-Y1
      CALL POLAR(XDIS,YDIS,ANGA)
      XDIS=XX(2)-XX(1)
      YDIS=YY(2)-YY(1)
      CALL POLAR(XDIS,YDIS,ANGB)
      ROT=ANGB-ANGA
C
      RETURN
      END
      SUBROUTINE PTSCNV
      IMPLICIT REAL*8 (A-H,O-Z)
      COMMON XX(2),YY(2),ROT,X1,Y1
      PI=DATAN(1.)*4.
C
C*    READ POINTS OF MAP
      N=1
  100 READ(22,*,END=220,ERR=220) X,Y
      ~~XO=X~~
      ~~YO=Y~~                          IXO=X
      X=10000.-X                        IYO=Y
      Y=10000.-Y
C
      XDIS=X-XX(1)
      YDIS=Y-YY(1)
      RAD=DSQRT(XDIS*XDIS+YDIS*YDIS)
      CALL POLAR(XDIS,YDIS,ANG)
      ANG=ANG-ROT
      IF(ANG.LT.0.) ANG=2.*PI+ANG
      X=RAD*DCOS(ANG)
      Y=RAD*DSIN(ANG)
      X=X+X1
      Y=Y+Y1
      X=X+1490000.
      Y=Y+590000.
C     WRITE(*,200) X,Y          IXO,IYO,X,Y
C     WRITE(6,200) X,Y
      WRITE(23,200) X,Y
  200 FORMAT(4F12.2,2F8.4)
      N=N+1                     200 FORMAT(I4,',',I4,',',F10.2,',',
      GO TO 100
      CONTINUE
C
      RETURN                                                F9.2)
      END
      SUBROUTINE POLAR(X,Y,ANG)
      IMPLICIT REAL*8 (A-H,O-Z)
```

```
>TYPE WALTF.DAT
    7442.47     4339.59   7045.09    9018.24
    6461.34     3951.99
    8030.80     8377.89

>
```

```
    TYPE WALTF3.DAT
    7442.47     4339.59   7045.09    9018.24
    6461.34     3951.99
    8030.80     8377.89
5538.66 6048.01
4621.44 5436.17
5102.85 5226.18
3398.97 5301.94
4882.73 4112.45
3703.30 4102.73
2672.12 4460.27
[illegible]94.12 4163.15
[illegible]10.61 3856.40
4885.14 3224.88
[illegible]513.65 3972.02
3019.81 3698.19
2525.74 3081.67
[illegible]508.76 2916.82
4321.60 2133.51
[illegible]44 2561.03
[illegible]79 2238.65
[illegible].20 1622.11

>
```

```
      IF(X.EQ.0.) GO TO 40
      ANG=DATAN(Y/X)
      IF(X.GT.0.) GO TO 20
   10 ANG=PI+ANG
      GO TO 30
   20 IF(Y.GT.0.) GO TO 30
      ANG=2.*PI+ANG
      RETURN
   30 IF (Y.LT.0) GO TO 10
      GO TO 30
      END
```

PLANT COORDINATES

	X	Y	X'	Y'
1.	3538.66	6048.01	0.0	0.0
18.	1969.20	1622.11	-1569.46	-4425.90

$$\theta = \tan^{-1} \frac{\Delta Y}{\Delta X} = \tan^{-1} \frac{4425.90}{1569.46} = 70.47508115^\circ$$

$$R = SQRT(1569.46^2 + 4425.90^2) = 4695.933933$$

$\Delta X = 1969.20 - 3538.66 = -1569.46$

$\Delta Y = 1622.11 - 6048.01 = -4425.90$

STATE PLANE COORDINATES

	X	Y	X'	Y'
1.	7442.47	4339.59	0.0	0.0
18	7045.09	9018.24	-397.38	4678.65

$$\theta = \tan^{-1} \frac{\Delta Y}{\Delta X} = \tan^{-1} \frac{4678.65}{-397.38} = 85.14524845^\circ$$

$$R = SQRT(-397.38^2 + 4678.65^2) = 4695.495361$$

$\Delta X = 7045.09 - 7442.47 = -397.38$

$\Delta Y = 9018.24 - 4339.59 = 4678.65$

$$\gamma = (90 - \theta) + (90 - \phi) = 24.3796704^\circ$$

$\Delta X = 4621.44 - 3538.66 = 1082.78$

$\Delta Y = 5436.17 - 6048.01 = -611.84$

$$\beta = \tan^{-1} \frac{\Delta Y}{\Delta X} = \tan^{-1} \frac{611.84}{-1082.78} = 29.46922789^\circ$$

$$R = SQRT(-611.84^2 + 1082.78^2) = 1243.688351$$

$$\alpha = 29.46922789^\circ - 24.3796704^\circ = 5.08955749^\circ$$

$Y = R \sin\alpha = 1243.688351 \sin 5.08955749^\circ$

$X = -R \cos\alpha = -1243.688351 \cos 5.08955749^\circ$

$Y = 110.3310271$

$X = -1238.784799$

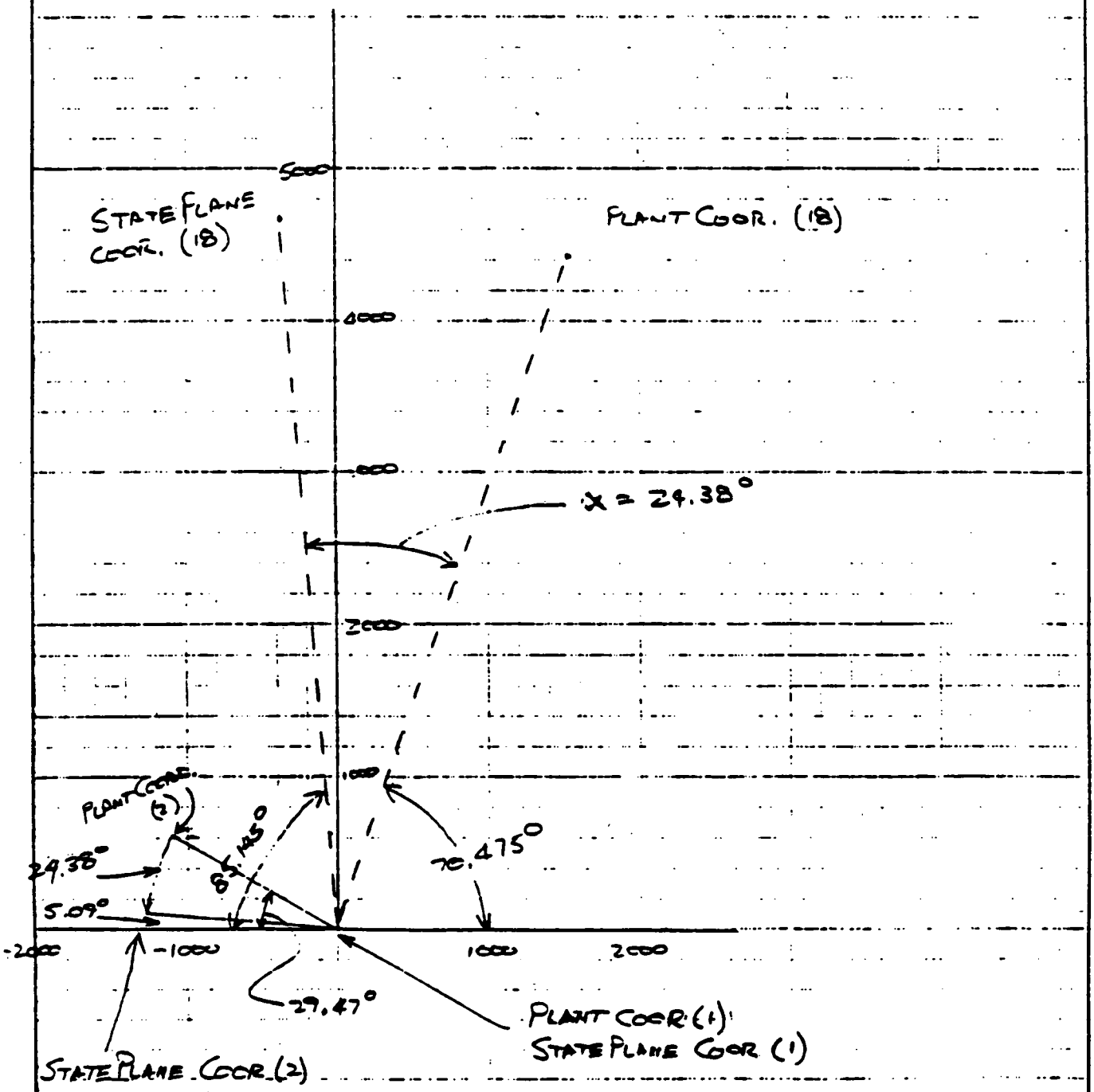
$X = 7442.47 - 1238.79 = 6203.73$

$Y = 4339.59 + 110.33 = 4449.92$

ACTUAL

6203.80

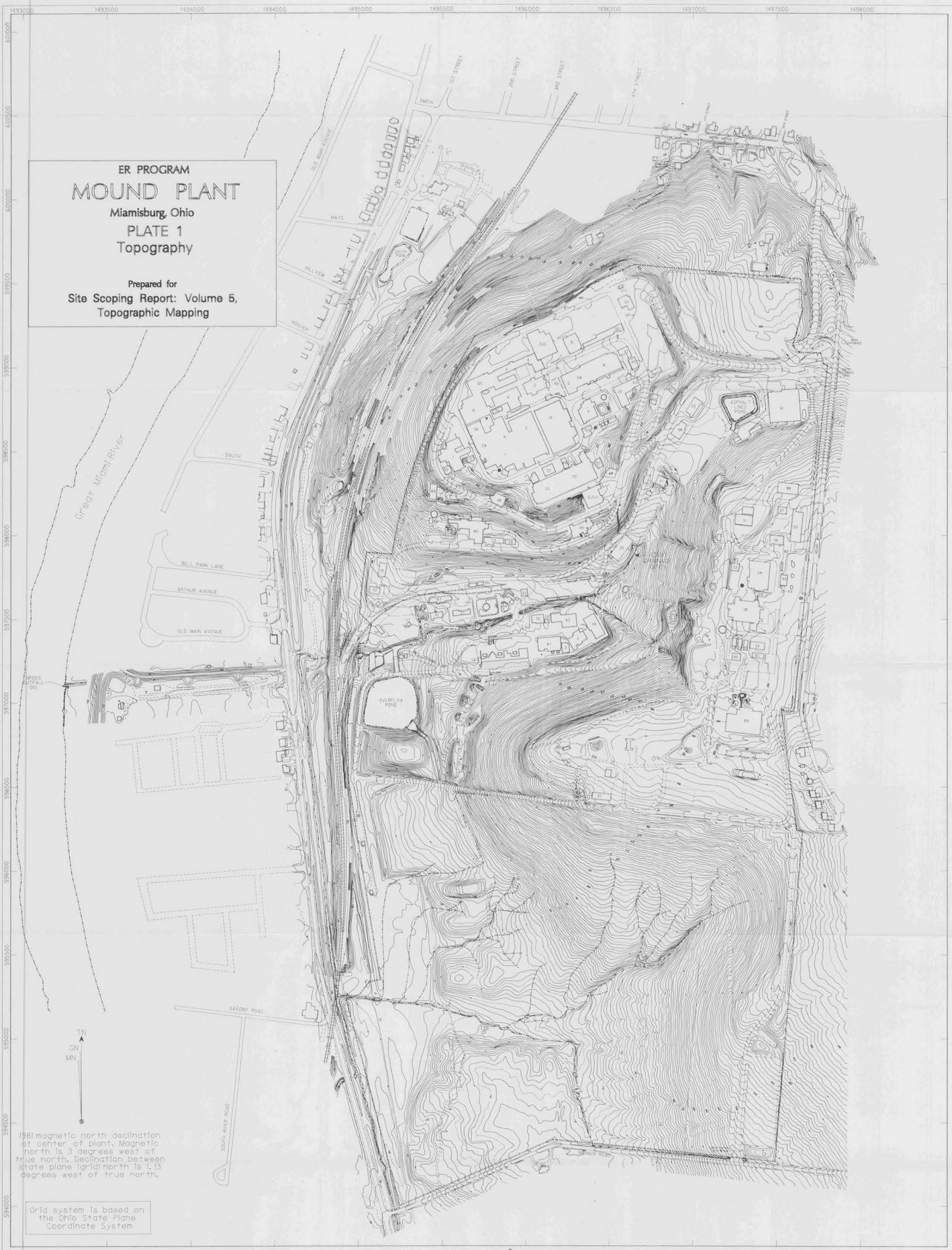
4449.90


5000
4000
3000
2000
1000
-2000
-1000
1000
2000
STATE PLANE COOR. (18)
PLANT COOR. (18)
x = 24.38°
PLANT COOR. (2)
24.38°
5.09°
8.425°
70.475°
29.47°
PLANT COOR (1)
STATE PLANE COOR (1)
STATE PLANE COOR (2)

APPENDIX B

APPENDIX B

USGS 7.5-MINUTE TOPOGRAPHIC SHEETS



Legend

- 53 Structures
- Paved Roadway
- Unpaved Roadway
- Railroad
- Water
- Fences
- Retaining Wall
- Mound Plant Boundary

NOTES:

1. The electronic base map data file was obtained by WESTON from Woolpert Consultants, Inc., Dayton, Ohio. The data were photogrammetrically compiled from aerial photography dated 12/08/85.

2. WESTON converted MOUND plant coordinates to Ohio State Plane Coordinates using an algorithm provided by Oak Ridge National Laboratory, Grand Junction Project Office.

3. Area west of Dayton-Cincinnati Pike was digitized from a hand drafted map. Dated 3/12/86 from Monstanto Research Corp.

Contour Interval 2 ft.

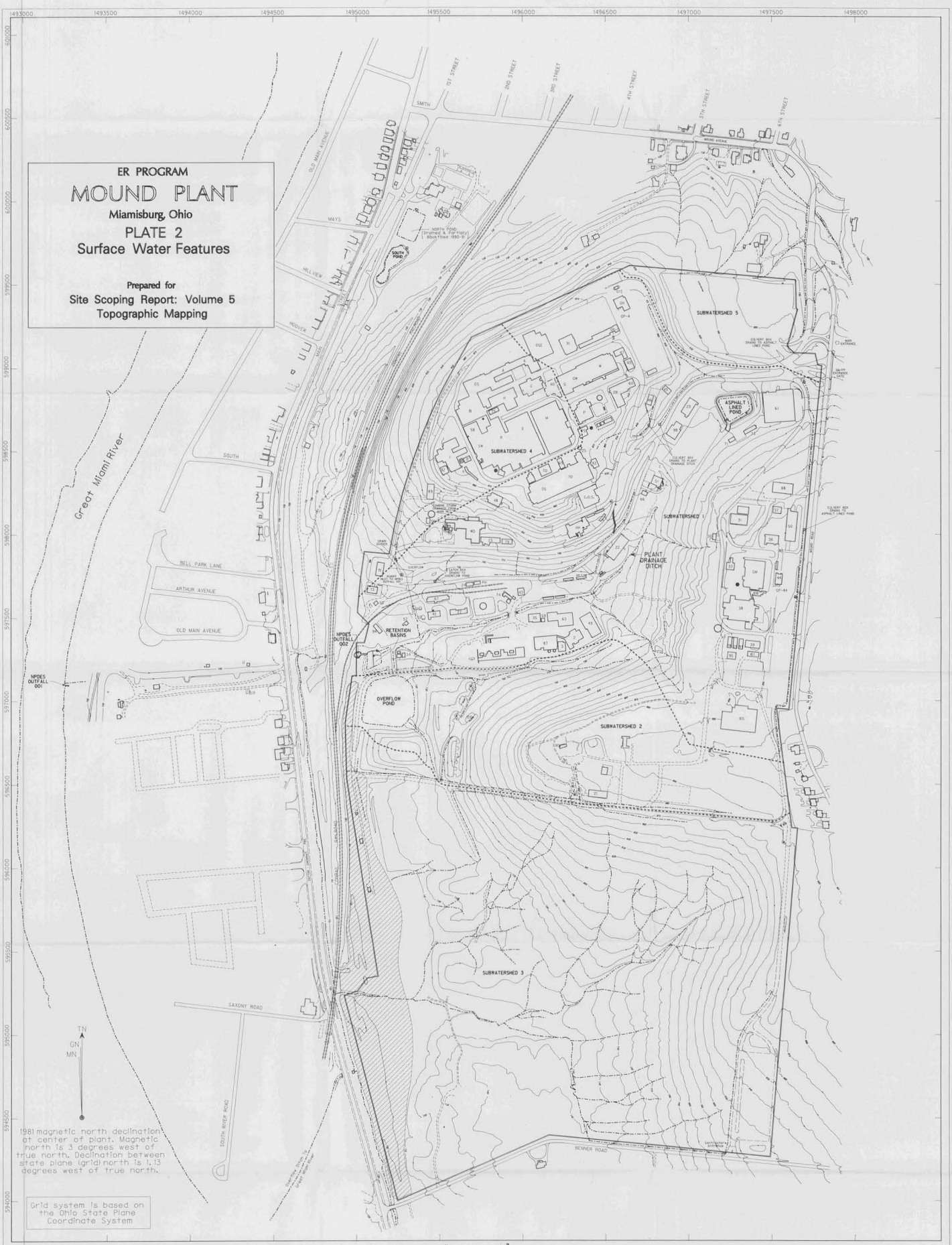
0 100 200 400 600 800 1000

Scale in Feet

WESTON
MANAGERS DESIGNERS/CONSULTANTS

6501 Americas Parkway N.E.
Suite 800
Albuquerque, New Mexico 87110
505-884-5050

C:\DGN\MOUNDB\SPS_1 040891



Legend

- 53 Structures
- Paved Roadway
- Unpaved Roadway
- Railroad
- Surface Water Drainage
- Fences
- Retaining Wall
- Mound Plant Boundary
- Subwatershed Boundary

100 Year Flood Plain: generalized from Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map, City of Miamisburg, Ohio. Map Number 390413 005C, dated January 14, 1983.

NOTES:

1. The electronic base map data file was obtained by WESTON from Woolpert Consultants, Inc., Dayton, Ohio. The data were photogrammetrically compiled from aerial photography dated 12/08/85.

2. WESTON converted MOUND plant coordinates to Ohio State Plane Coordinates using an algorithm provided by Oak Ridge National Laboratory, Grand Junction Project Office.

3. Area west of Dayton-Cincinnati Pike was digitized from a hand drafted map, dated 3/12/86 from Monstanto Research Corp.

Contour Interval 10 ft.

0 100 200 400 600 800 1000
Scale in Feet

WESTON
MANAGERS DESIGNERS/CONSULTANTS
6501 Americas Parkway N.E.
Suite 800
Albuquerque, New Mexico 87110
505-884-5050

CY:\UGN\MOUNDB\SR5_2 042991

ER PROGRAM

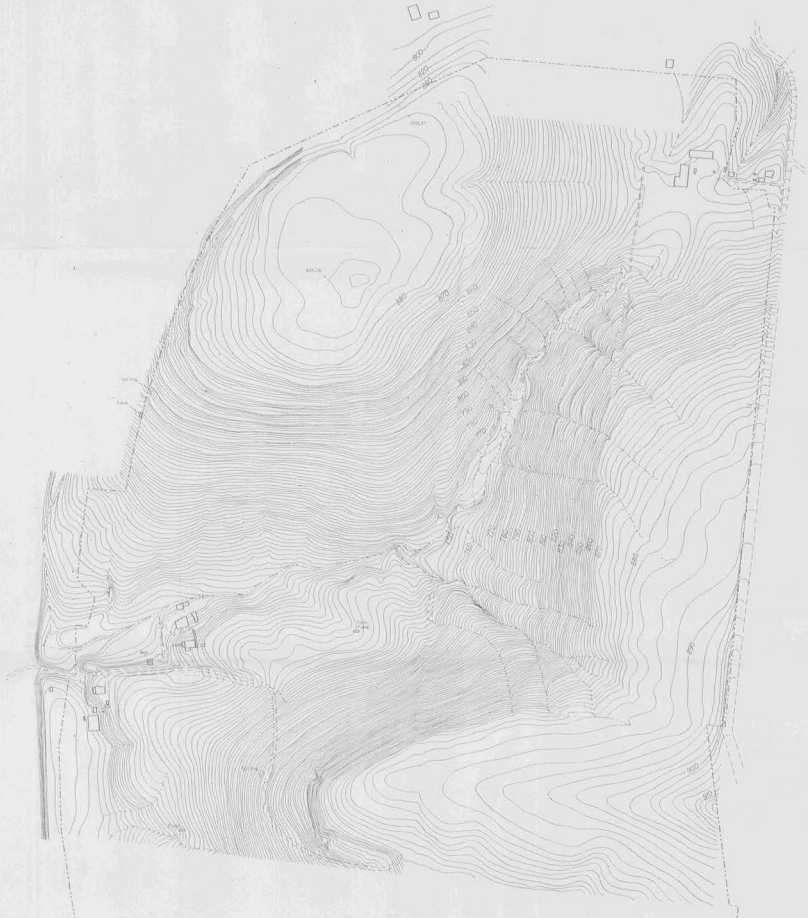
MOUND PLANT

Miamisburg, Ohio

PLATE 3
Historic Topographic Map of Main Hill, 1946

Prepared for

Site Scoping Report: Volume 5
Topographic Maps



TOPOGRAPHIC DATA
FOR 1946
NOT AVAILABLE

Plant Boundary Shown for Reference

TN
GN
MN

1981 magnetic north declination at center of plant. Magnetic north is 3 degrees west of true north. Declination between state plane (grid) north is 1.13 degrees west of true north.

Grid system is based on the Ohio State Plane Coordinate System

Legend

- Structures
- Mound Plant Boundary
- Paved Roadway
- Unpaved Roadway
- Water Course
- Spring
- Well
- Tank/Pump

NOTES:

1. The electronic base map data file was obtained by WESTON from Woolpert Consultants, Inc., Dayton, Ohio. The data were photogrammetrically compiled from aerial photography dated 12/08/85.

2. WESTON converted MOUND plant coordinates to Ohio State Plane Coordinates using an algorithm provided by Oak Ridge National Laboratory, Grand Junction Project Office.

3. Contours digitized from: "Topographical map of lands adjoining south side of city of Miamisburg, Ohio for Monsanto Chemical Company. Dated December 1946. Map produced by: Arthur E. Bauer, Civil Engineer and Surveyor, Ohio #627."

Contour Interval 2 ft.

0 100 200 400 600 800 1000
Scale In Feet

ER PROGRAM

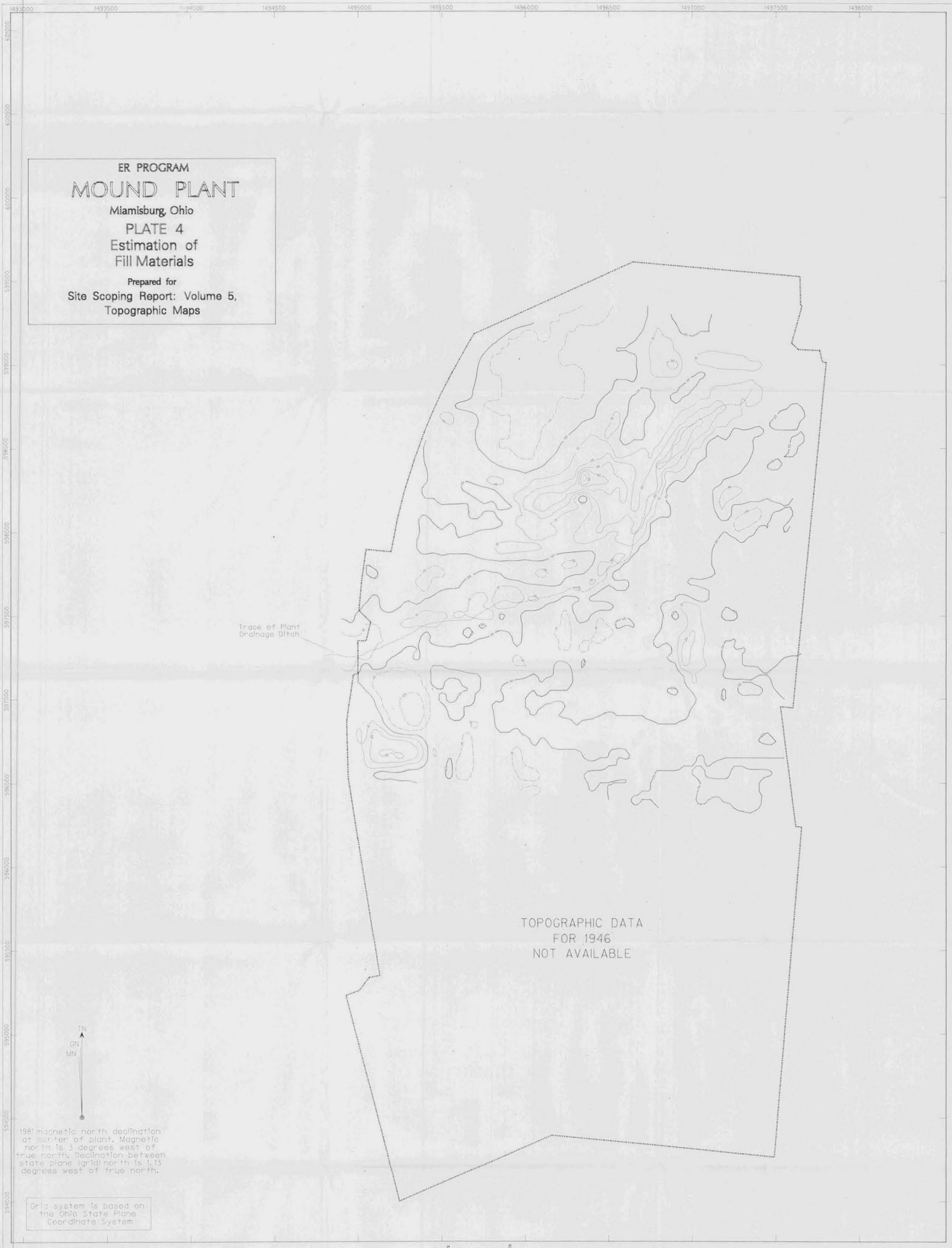
MOUND PLANT

Miamisburg, Ohio

PLATE 4
Estimation of Fill Materials

Prepared for

Site Scoping Report: Volume 5, Topographic Maps



1981 magnetic north declination at center of plant. Magnetic north is 3 degrees west of true north. Declination between state plane (grid) north is 1.13 degrees west of true north.

Grid system is based on the Ohio State Plane Coordinate System

Legend

Mound Plant Boundary

Material Removed 1946-1986

No Change in Elevation

Material Added 1946-1986

Contour Interval 10 Feet

NOTES:

1. The electronic base map data file was obtained by WESTON from Woolpert Consultants, Inc., Dayton, Ohio. The data were photogrammetrically compiled from aerial photography dated 12/08/85.

2. WESTON converted MOUND plant coordinates to Ohio State Plane Coordinates using an algorithm provided by Oak Ridge National Laboratory, Grand Junction Project Office.

3. Contours derived by subtracting digitized 1986 data from the digitized 1946 data. 10 foot contours used for calculation.

0 100 200 400 600 800 1000

Scale in Feet

WESTON

MANAGERS DESIGNERS/CONSULTANTS

5301 CENTRAL AVENUE N.E.
SUITE 1000
ALBUQUERQUE, NM 87108
PHONE: (505) 255-1445

C:\DGN\MOUND\SR5_4 041491

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

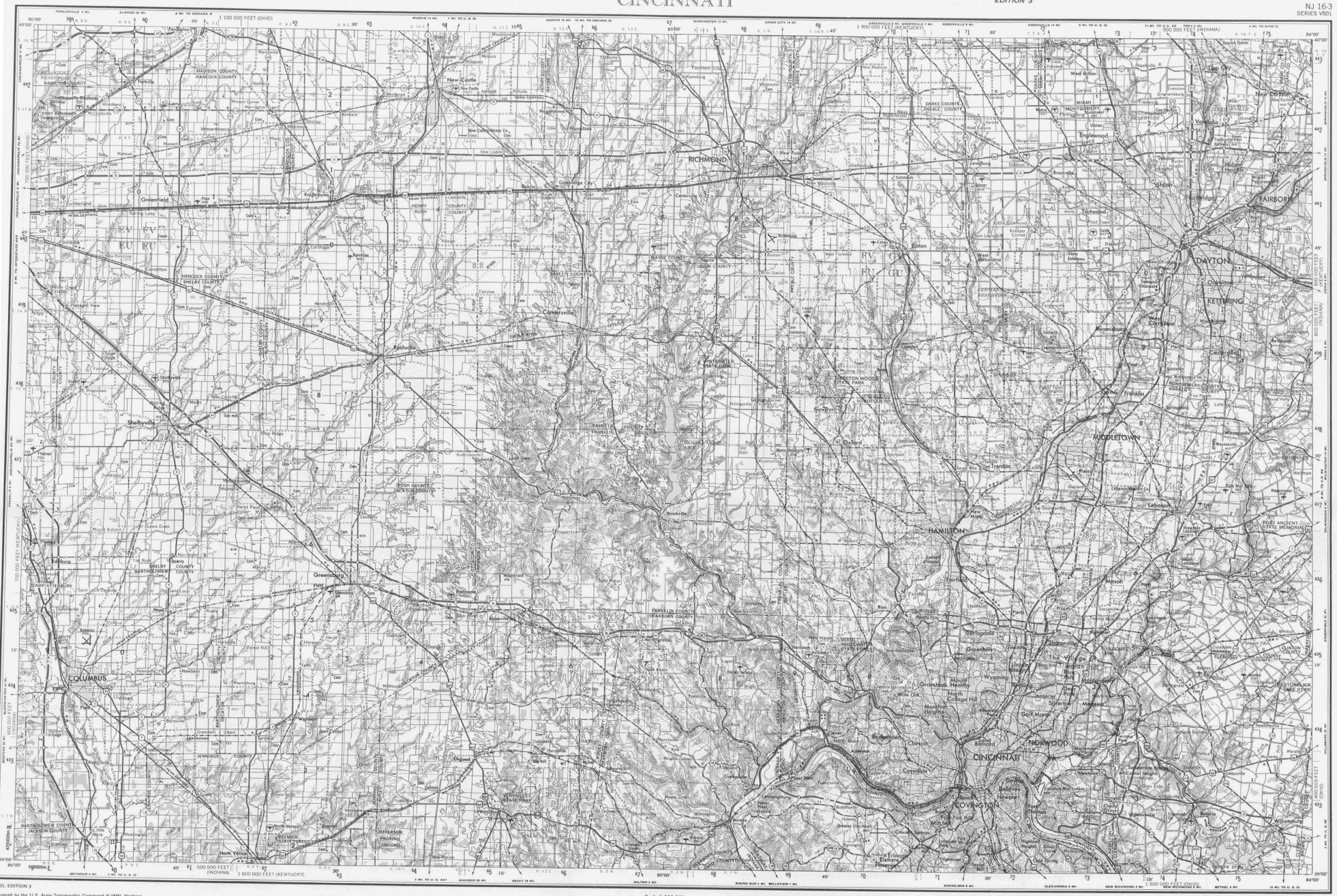
MIAMISBURG QUADRANGLE
OHIO—MONTGOMERY CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DAYTON
Crown Point
Drexel
Ridgewood Heights
Six Mile
VETERANS ADMINISTRATION CENTER
New Chicago
Liberty
Frytown
JEFFERSON
OPOSSUM CREEK RESERVE
MORAINE
Ellerton
Whitfield
WEST CARROLLTON
GERMAN
Germantown
MIAMISBURG
MIAMI
RIVER
MOUND LABORATORY
MIAMISBURG MOUND STATE MEMORIAL
PERRY
MADISON
JACKSON
Little Beaver Creek
Beaver Creek
Little Beaver Creek
Bear Creek
Run
Spring Run
Little Run
Beaver Creek
Little Beaver Creek
Little Beaver Creek
Little

CINCINNATI

EDITION 3

NJ 16-3
SERIES V501


RICHMOND
DAYTON
FAIRBORN
KETTERING
MIDDLETOWN
HAMILTON
CINCINNATI
NORWOOD
COVINGTON
COLUMBUS
Greenfield
Greensburg
Shelbyville
Connersville
Rushville
Oxford
Franklin
Lebanon
Mason
Batavia
Wilmington
New Castle
Hagerstown
Eaton
Greenville
Troy
Piqua
Sidney
Xenia
Springfield
Fairfield
Middletown
Madison County
Hancock County
Shelby County
Henry County
Wayne County
Union County
Fayette County
Franklin County
Butler County
Warren County
Clinton County
Clermont County
Brown County
Adams County
Highland County
Pike County
Scioto County
Lawrence County
Gallia County
Meigs County
Jackson County
Vinton County
Hocking County
Ross County
Pickaway County
Fairfield County
Perry County
Morgan County
Washington County
Monroe County
Belmont County
Jefferson County
Harrison County
Carroll County
Tuscarawas County
Coshocton County
Knox County
Licking County
Muskingum County
Guernsey County
Noble County
Morrow County
Delaware County
Marion County
Hancock County
Shelby County
Darke County
Preble County
Montgomery County
Greene County
Clark County
Champaign County
Logan County
Auglaize County
Mercer County
Allen County
Putnam County
Hardin County
Wyandot County
Crawford County
Bucyrus
Marion
Mansfield
Ashland
Wooster
Zanesville
Cambridge
Chillicothe
Athens
Marietta
Portsmouth
Ironton
Gallipolis
Jackson
Lancaster
Newark
Coshocton
Dover
Canton
Massillon
Akron
Cleveland
Lorain
Elyria
Sandusky
Bellefontaine
Urbana
Kenton
Findlay
Lima
Van Wert
Celina
Defiance
Bryan
Napoleon
Fremont
Tiffin
Norwalk
Medina
Wadsworth
Alliance
Steubenville
Wheeling
Parkersburg
Point Pleasant
Huntington
Ashland
Catlettsburg
Maysville
Covington
Newport
Ft. Thomas
Bellevue
Dayton
Springfield
Xenia
Troy
Piqua
Sidney
Lima
Fort Wayne
Indianapolis
Cincinnati
Louisville
Lexington
Frankfort
Richmond
Cincinnati
Covington
Newport
Ft. Thomas
Bellevue
Dayton
Springfield
Xenia
Troy
Piqua
Sidney
Lima
Fort Wayne
Indianapolis

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

FRANKLIN QUADRANGLE
OHIO
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey
Revised in cooperation with State of Ohio agencies

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1949. Field checked 1951. Revised from aerial photographs taken 1964. Field checked 1965

Polyconic projection. 10,000-foot grid ticks based on Ohio coordinate system, south zone. 1000-meter Universal Transverse Mercator grid ticks, zone 16, shown in blue. 1927 North American Datum.

The difference between 1927 North American Datum and North American Datum of 1983 (NAD 83) for 7.5-minute intersections is given in USGS Bulletin 1875. The NAD 83 is shown by dashed corner ticks

Fine red dashed lines indicate selected fence and field lines where generally visible on photographs. This information is unchecked

Red tint indicates areas in which only landmark buildings are shown

MN GN
4½° 80 MILS 1°43' 31 MILS
UTM GRID AND 1992 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 10-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225 OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Area west of the Great Miami River lies within the Miami River Survey. Area east of the Great Miami River lies within the Between the Miamis. Land lines based on the Great Miami River Base

OHIO
QUADRANGLE LOCATION

Revisions compiled in cooperation with State of Ohio agencies from aerial photographs taken 1988 and other sources. Contours not revised. This information not field checked. Map edited 1992

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
Interstate Route — U. S. Route — State Route

FRANKLIN, OHIO
39084-E3-TF-024

1965
REVISED 1992
DMA 4163 III SE-SERIES V882