

ENVIRONMENTAL INVESTIGATIONS
AT
THE PADUCAH GASEOUS DIFFUSION PLANT
AND SURROUNDING AREA
MCCRACKEN COUNTY, KENTUCKY

VOLUME I

EXECUTIVE SUMMARY

Prepared by

Department of the Army
Waterways Experiment Station, Corps of Engineers
Environmental Laboratory
3909 Halls Ferry Road
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Engineer District Nashville
P.O. Box 1070
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Volume 1 of 5

May 1994
Final Report

Prepared for

Department of Energy
Oak Ridge Operations
Paducah Site Office
P.O. Box 1410
Paducah, KY 42001

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Conversion Factors, Non-SI to SI Units of Measurement

Non-SI units of measurement used in this report can be converted to SI units as follows:

Multiply	By	To Obtain
acres	0.405	hectares
feet	0.3048	meters
inches	2.540	centimeters
miles	1.609347	kilometers
square feet	0.093	square meters

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Preface

This document provides an executive summary to a five-volume report detailing the results of environmental and cultural resource investigations at the Department of Energy (DOE) Paducah Gaseous Diffusion Plant in Western Kentucky.

The technical investigations were conducted by the U.S. Army Engineer Waterways Experiment Station (WES) Environmental Laboratory (EL) and the U.S. Army Engineer District, Nashville (CEORN).

Dr. M. R. Kress was the WES project coordinator and prepared the executive summary. Mr. Tom Swor was the CEORN project manager and provided overall direction and guidance to the investigations.

Supervision for the WES investigations was provided by Mr. Roger Hamilton, Chief, Resource Analysis Branch, Mr. Hollis Allen, Acting Chief, Stewardship Branch and Mr. Wade West, Chief, Environmental Characterization Branch. General supervision for the study was provided by Dr. Robert Engler, Chief, Natural Resources Division, EL and Dr. John Harrison, Director, EL.

Director of WES during the investigations was Dr. Robert W. Whalin. Commander was COL Bruce K. Howard.

1 Introduction

This five-volume report details the results of four studies into environmental and cultural resources on and near the Department of Energy's (DOE) Paducah Gaseous Diffusion Plant (PGDP) located in Western Kentucky in McCracken County, approximately 10 miles west of Paducah, KY (Figure 1). The area investigated includes the PGDP facility proper, additional area owned by DOE under use permit to the Western Kentucky Wildlife Management Area (WKWMA), area owned by the Commonwealth of Kentucky that is administered by the WKWMA, area owned by the Tennessee Valley Authority (TVA), the Metropolis Lake State Nature Preserve and some privately held land (Figure 2). The study area is collectively referred to as PGDP regardless of ownership. The study area shown in Figure 2 is approximately 4,746 hectares (11,719 acres). Of this area, approximately 312 hectares (771 acres) inside two fenced areas were not investigated.

DOE requested the assistance and support of the U.S. Army Engineer District, Nashville (CEORN) in conducting various environmental investigations of the area. The U.S. Army Engineer Waterways Experiment Station (WES) provided technical support to the CEORN for environmental investigations of 1) wetland resources, 2) threatened or endangered species and habitats, and 3) cultural resources. A floodplain investigation was conducted by CEORN.

Purpose and Scope

The purpose of the WES and CEORN environmental investigations was to support PGDP's National Environmental Policy Act (NEPA) compliance program. These investigations provide current information about environmentally sensitive areas on the PGDP reservation and support the development of environmental impact statements planned for the PGDP site. Further, these investigations support current DOE regulations (10 CFR 1022) which implement Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands), and support DOE to comply with Section 106 of the National Historic Preservation Act and the Endangered Species Act of 1973.

The studies at PGDP were initiated to provide information needed in determining sensitive resources to be considered in remediation of TCE and Technetium contamination in ground water at the PGDP site. While that particular need was the driver to undertake these studies, the information developed has other applications that increase utility of the results well beyond immediate requirements.

Consistent with a remedial investigation level of detail, information was developed on presence of wetlands, threatened and endangered species, floodplains, and cultural resources in the PGDP study area. This information is contained in data layers in digitized format for direct application via Geographic Information System, which can be manipulated in various combinations using appropriate computer hardware and software. This feature of the studies yields a high degree of flexibility in both present and future applications of the data.

While the data provided in the reports and databases are consistent with planning level needs, they also serve as a basis for beginning compliance processes on any number of actions being considered in the area of study. These data alone do not suffice for compliance with regulatory requirements in any of the four areas studied.

Whenever a specific action is being considered, it will be necessary to contact the agencies that regulate activities affecting a particular resource. In the case of wetlands, the federal agency is the U.S. Army Corps of Engineers Louisville District, although state agencies including Department of Fish and Wildlife Resources and Department of Water also have interests in wetlands protection. For endangered species, the U.S. Fish and Wildlife Service is the lead federal agency for federally listed species, while several state agencies also have interests in both federal and state listed species. For cultural resources, the Kentucky Historic Preservation Officer has the lead in compliance matters, although the President's Advisory Council on Historic Preservation must also be afforded the opportunity to comment on any undertakings affecting historic properties. The Federal Emergency Management Agency is the first stop in dealing with floodplain matters, but a number of other federal and state agencies also have interests in floodplain management.

Each of the sensitive resource areas included in these studies are regulated under established procedures. Detailing the specific procedures for each resource component is well beyond the scope of the current effort. In general, however, the reports and databases allow DOE to make initial determinations of whether an action being considered could potentially affect the resource and how. In addition, during the planning stage for a project, this information allows considerable flexibility in making adjustments to a project to minimize or avoid impacts to sensitive resources.

To maximize the utility of the information provided, the databases should be considered dynamic in nature, and periodic updates should be prepared. The advantage of gathering the information and keeping it current comes with

knowing more about the resources on the PGDP site than the agencies with regulatory responsibilities for those resources. This demonstrates that stewardship on the part of DOE is taken seriously and that the agency has taken a proactive approach to compliance.

The five-volume results of the environmental investigation are presented as follows:

- Volume I: Executive Summary
- Volume II: Wetlands Investigation
- Volume III: Threatened and Endangered Species Investigation
- Volume IV: Cultural Resources Investigation
- Volume V: Floodplain Investigation

A summary of each volume is presented below.

2 Wetland Investigation Summary

The wetland investigation provides a planning level wetland identification, delineation and characterization. A planning level wetland delineation is defined as the identification of wetlands that meet the jurisdictional requirements under Section 404 of the Clean Water Act, but are located only to the nearest contour interval without formal surveying techniques. Thus, the wetland boundaries provided in this planning level investigation are not intended to represent definitive, jurisdictional boundaries.

Extensive field studies were conducted during the wetland investigation. The methods used for identifying and delineating wetlands are given in Corps of Engineers Wetland Delineation Manual (CEWES 1987) and Federal Manual for Identifying and Delineating Jurisdictional Wetland (Federal Interagency Committee for Wetland Delineation 1989). Briefly, the method involves the observer's walking the entire study area, identifying plant communities, selecting representative observation points, characterizing the plant community, recording the indicator status of dominant species, determining whether hydrophytic vegetation is present, evaluating wetland hydrologic indicators, determining whether wetland hydrology is present, characterizing the soils, determining whether soils are hydric and finally making a wetland determination.

Detailed characterizations of sixty-four (64) representative sample points were completed in this investigation. A vascular plant list was compiled. A discussion of all dominant plant species in each stratum of each wetland type is presented, as well as a discussion of the hydrology and the hydric soils associated with each type. Human disturbances to wetlands are reported.

The investigation resulted in the delineation of 640 hectares (1,581 acres) of wetland. These acres occur as 1,083 separately delineated wetland areas. Sixteen wetland cover types were identified. Sixty-three percent of the total wetland area is forested.

3 Threatened and Endangered Species Investigation Summary

The threatened and endangered species (TES) and Kentucky Special Concern (KSC) species investigation provides information on TES and KSC species on the PGDP and in the surrounding area. The report contains species accounts, distribution maps, potential habitat maps and management recommendations. The following categories of species are addressed:

- 1) Federally listed or candidate species reported from PGDP
- 2) Federally listed or candidate species reported from McCracken or Ballard Counties
- 3) State listed or KSC species reported from PGDP
- 4) State listed or KSC species reported from McCracken or Ballard Counties

The TES investigation identified five species of notable concern: the Indiana bat, the orange-footed pearly mussel, the bald eagle, the copperbelly water snake and the interior least tern. Detailed accounts of the distribution, behavior and habitat requirements of these species are presented. Management recommendations are also provided.

The Indiana bat is an important species for management concern at PGDP. A Federally listed endangered species, this bat was found west of the Bayou Creek Ridge State Natural Area in 1991. A potential Indiana bat summer habitat map was developed for the PGDP, reflecting quality ratings of poor, fair and good. Results indicate approximately 255 hectares (631 acres) of poor quality potential summer habitat, 382 hectares (944 acres) of fair quality potential summer habitat and 231 hectares (571 acres) of good quality potential Indiana bat summer habitat.

The bald eagle is not known to be nesting on the PGDP. However, old growth bottomland hardwoods on the WKWMA and the Metropolis Lake State Nature Preserve provide potential breeding habitat for this species.

Many state listed species are discussed, most notably two prairie community plants present on the PGDP: the compass plant (State threatened), and the cream wild indigo (special concern).

4 Cultural Resources Investigation Summary

Results of the cultural resources investigation are organized into two parts. Part A presents the results of the field survey. Part B discusses the methodology used for designing the field survey and the potential for finding additional cultural resources in unsurveyed areas.

The cultural resources investigation provides information on the locations, identifications and significance of cultural resources in the study area. This investigation also provides information on the potential for the occurrence of such resources in unsampled portions of the PGDP.

A literature review, records search, archival research and informant interviews were conducted to identify all cultural resources known to occur in the study area. Based on the distribution pattern of the known cultural resources, a field survey plan was developed. Forty-one survey units totaling 669 hectares (1,653 acres) were selected for field survey.

The cultural survey resulted in seven previously undocumented prehistoric and four previously undocumented historic sites being recorded and assigned state site numbers. Twelve additional nonsite localities were recorded but not assigned state site numbers. All sites and localities were documented and characterized. With one exception, all sites exhibit some degree of disturbance.

Data on the age, location and landscape setting of all known cultural resources were used to estimate the probability of finding additional cultural resources in unsurveyed parts of the PGDP. A Chi-square based statistical approach was used to assign relative probabilities of occurrence to certain geographic zones of the study area. These zones were defined based on geomorphic and soil type characteristics. Relative probabilities ranged from very low to very high.

5 Floodplain Investigation Summary

An engineering investigation was made for the entire PGDP reservation to determine and map the 100-year and 500-year floodplains for all streams with drainage areas greater than one square mile. This investigation included collection of field-surveyed stream cross sections and backwater computer modeling. The results of the study are presented in two forms: as flood profiles (a plot of computed flood elevations vs. stream miles) and as flood inundation boundary maps (shown on 1-foot or 2-foot contour interval topographic maps).

There are three major streams that can cause flooding at the PGDP reservation: the Ohio River, Bayou Creek, and Little Bayou Creek. The flood inundation maps represent the controlling flood elevations from all three streams; however, only flood elevations for the two creeks were computed for this study as the Ohio River elevations were determined previously by the Louisville District Corps of Engineers. Approximately 9.7 miles of Bayou Creek and 6.8 miles of Little Bayou Creek were modeled through the reservation to determine flood elevations. The flood elevations in the lower reaches of both creeks are controlled by backwater flooding from the Ohio River. This backwater flooding is depicted as a horizontal line in the plotted flood profiles.

Although the principal flood threat for the PGDP reservation is from the three streams mentioned above, there are smaller streams and other drainage systems on the site that can overflow and cause flooding. A formula to estimate flood heights for streams with drainage areas between one-half and one square mile has been included to obtain flood information in these areas when it is required.

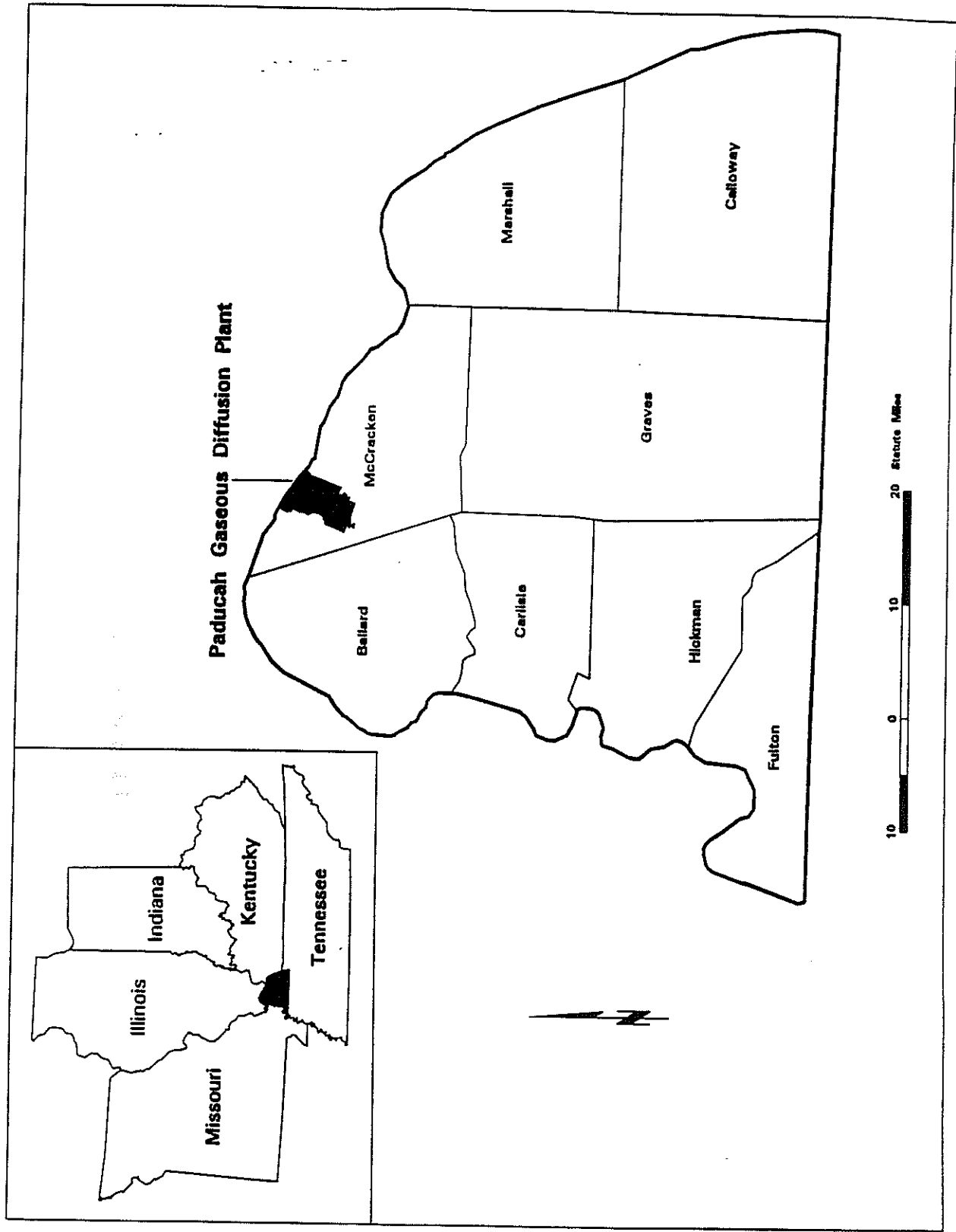


Figure 1. Location of the Paducah Gaseous Diffusion Plant in Western Kentucky.

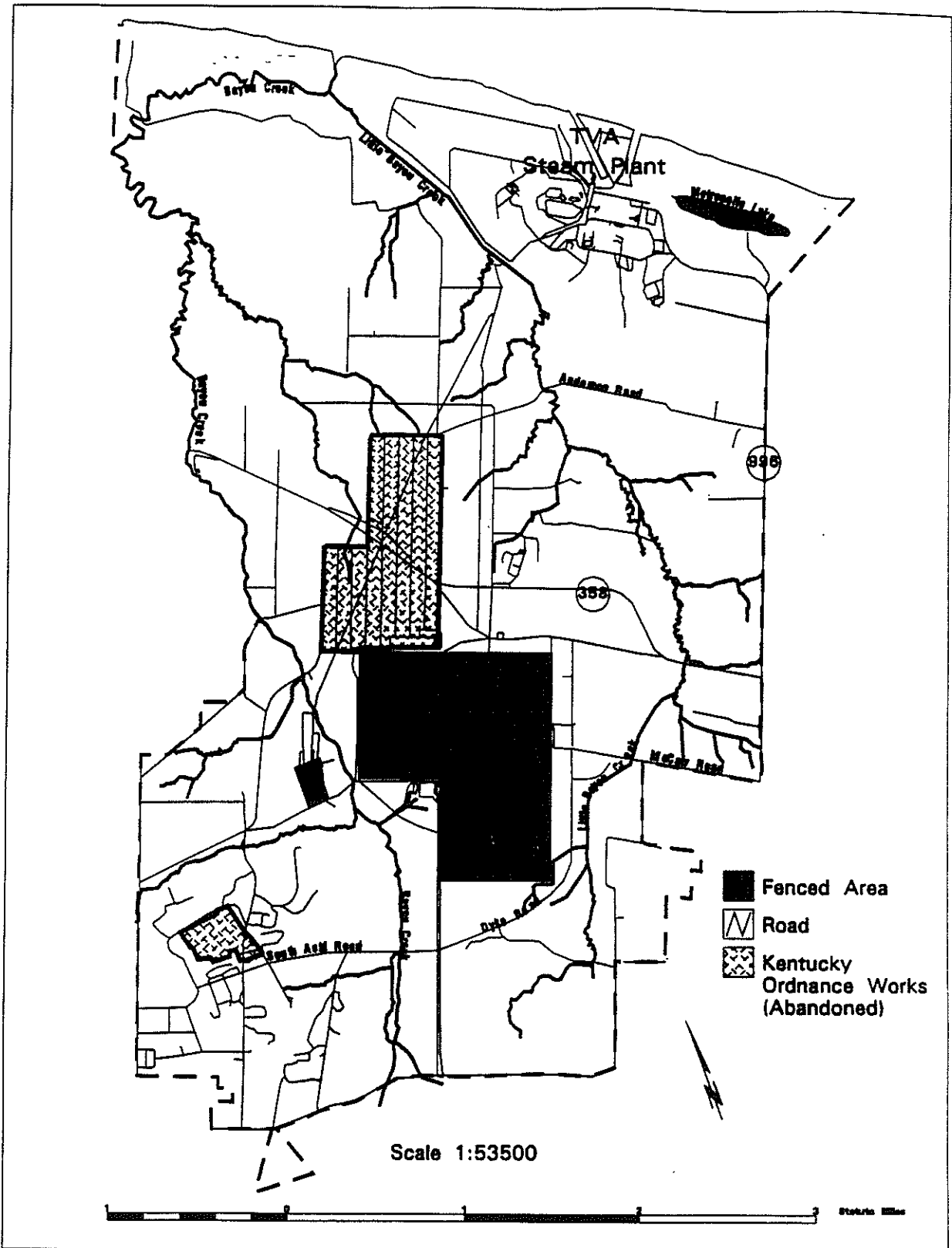


Figure 2. Boundary of the Paducah Gaseous Diffusion Plant as used in the environmental investigations. The two fenced areas were not investigated.