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DOE/RA/50326-1145

FEASIBILITY STUDY

GASOLINE FROM COAL IN THE STATE OF ILLINOIS

DOE GRANT NO. DE-FG01-80RA-50326

CLARK OIL & REFINING CORPORATION

EBASCO

APPENDIX II -
ENVIRONMENTAL

DOE/RA/50326--1145-App.2

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APPENDIX II - ENVIRONMENTAL

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APPENDIX IIA

CLARK OIL AND REFINING CORPORATION

COAL CONVERSION PROJECT

ENVIRONMENTAL FEASIBILITY STUDY
FOR
GASOLINE FROM COAL
IN
NEW ATHENS, ILLINOIS

SEPTEMBER 1981

6538

7540/6538

APPENDIX II-A

ENVIRONMENTAL FEASIBILITY STUDY

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I. INTRODUCTION

This Environmental Feasibility Study Report constitutes a part of the overall alternative fuels feasibility study which has as its purpose to provide Clark Oil & Refining Corporation (Clark) and Department of Energy (DOE) with sufficient information to allow decision-making with respect to the funding for the construction and operation of the proposed coal conversion facility. The contents of the Environmental Feasbility Study Report include the following:

- Environmental setting - A qualitative description of the site environs prepared on the basis of field reconnaissance and the literature available through the various governmental and private sources.

- Environmental Impact Assessment - A qualitative assessment of the expected environmental impacts of construction and operation of the proposed facility at the New Athens, Ill. site. The qualitative impact assessment has been based on the conceptual design and engineering data currently available.

A. DESCRIPTION OF THE SITE

The proposed site for the coal converion project is located in New Athens Township, St. Clair County in southwestern Illinois, approximately 30 miles southeast of St. Louis, Missouri. The site lies within the boundaries of Peabody Coal Company's River King Mine Pit #3 and includes approximately 850 acres of land. Most of the site has formerly been strip mined. A small area (about 45 acres) in the southwestern part of the site was underground rather than surface mined. The entire site, including the underground mined portion, is presently covered by spoil materials.

St. Clair County is the most populous county in the southwestern Illinois region. The most heavily developed area of St. Clair County is the northwest portion of the county in the East St. Louis/Belleville/O'Fallon area. Belleville is the county seat which along with East St. Louis serves as the major commercial center of the county. The northwestern corner of St. Clair County is heavily influenced by the commercial and industrial opportunities in St. Louis. This is in sharp contrast to the remainder of the county, which is largely agricultural and undeveloped, interspersed with small communities.

New Athens Township is located in the southern portion of St. Clair County, two miles east of Monroe County and 8 miles north of Randolph County. The 1980 population of New Athens township was 2,493 (1980 Census). The character of New Athens is primarily agricultural, with 49.1 percent (11,272 acres) of the land area classified as cropland (SIMAPC, 1980).

The site, (Exhibit I-1) situated on the southwestern edge of the Illinois Coal Field, is a reclaimed strip mine having elevation range of 350 feet to 470 feet.

The northern and northwestern sections of the site are bounded by an earthen levee which is approximately 30 feet above the surrounding terrain. The site is bounded on the east by an active strip mine, the River King Mine Pit #3. The southern and western boundaries of the site lie within an area of older strip mined land consisting mostly of spoils.

Primary access to the site is from State Route #13 which travels in a northwest/southeast direction. Route 13 connects with Route 460, a divided, multilane highway which is the major route northwest to Belleville and St. Louis. Paralleling Route 13, and less than one mile from the site, is the Illinois Central Gulf Railroad.

B. DESCRIPTION OF THE PROJECT

The Project consists of coal-conversion facility designed to produce 12,000 barrels per day of unleaded gasoline. Discharge and intake structures will be located at the site on the Kaskaskia River. Gasoline is to be produced from coal by essentially the following processing:

- gasification of coal with oxygen and steam using KBW jacketed type gasifiers
- catalytic hydrogeneration to eliminate NO, SO_2 and O_2 from the raw gas
- CO conversion using sulfided cobalt-molybdenum catalyst to adjust the H_2/CO ratio of the gas
- purification of the gas by the Linde Rectisol process to remove sulfur compounds and excess carbon dioxide
- recovery of sulfur as a marketable product by Claus and SCOT processing
- synthesis of methanol from the purified gas by the ICI Low-Pressure Methanol Process
- conversion of the methanol to a raw gasoline by the Mobil MTG Process using fixed bed reactors
- stabilization of the raw gasoline by fractionation to remove propane and lighter components

The plant facilities are to produce and convert to gasoline 4,000 short tons per stream day of methanol (100 percent basis) from about 7,360 short tons per stream day of a typical south-western Illinois coal. Conversion of the methanol produces about 13,500 barrels per stream day of stabilzed synthetic gasoline (C_4s and heavier) for pipeline transport to Clark's Wood River Refinery where it is anticipated to yield about 12,000 barrels per day of motor fuel gasoline.

II. ENVIRONMENTAL CHARACTERISITCS OF THE SITE

A. LAND RESOURCES

1. Topography

a. Regional Topography

The proposed Clark Oil site is located in the valley of the Kaskaskia River within the Till Plain Section of the Central Lowland Physiographic Province. Deposition and erosion associated with the river, the complex history of glaciation, and recent extensive strip-mining have produced five distinct topographic land forms in the New Athens - Fayetteville region as shown in Exhibit II-1:

i) Floodplain

The Kaskaskia River is bordered by a wide, gently sloping floodplain formed by the deposition of sediments during periods of overbank flooding. The floodplain elevation ranges from 380 to 400 feet above mean sea level (MSL). Local relief is generally between 5 and 10 feet and slopes rise gently away from the river. The floodplain attains a maximum width of approximately 4 miles near the site.

ii) Terraces

Terraces occur at elevations of 400 to 430 feet and form the land area between the floodplain and the adjoining upland till plain. Terraces form nearly level or very gently sloping land bounded by slopes of 10 percent to 20 percent at their margins adjoining the floodplain.

iii) Upland Till Plain

Broad and relatively flat upland portions of the region such as the extensive upland area south of the proposed Site are referred to as Upland Till Plain. These areas are found above an elevation of 430 feet and rise to an elevation of 496 feet about 10 miles south of New Athens. Slopes average about 2 percent to 3 percent toward perennial stream valleys. Locally, slopes exceed 10 percent in valley walls cut by the abundant intermittent drainageways that dissect the upland till plain.

iv) Sand Hills and Till Ridges

Circular mound-shaped sand hills approximately 1/2 mile in diameter and narrow elongated till ridges which rise about 30 to 50 feet above the surrounding land surface are distinctive, though not very extensive, landforms in the region. The closest sand hills and till ridges are about 2 miles north of the proposed site.

v) Mined and Reclaimed Areas

Coal surface mining and reclamation has produced the fifth distinct land form in the region. Surface mining results in the removal and mixing of the unconsolidated deposits and bedrock overlying the coal and the redistribution of the "spoils" in elongated, narrow, steep-sided ridges. Many of these ridges have subsequently been smoothed out to varying degrees in compliance with evolving and increasingly strict reclamation laws, and have been seeded to reestablish vegetation cover.

b. Site Topography

The proposed coal conversion facility will be located in former floodplain and terrace areas which have been mined and reformed by the replacement of mine overburden and waste. Exhibit II-2 shows the topography of the site in detail. The site is bordered on the north and northwest by an earthen levee approximately 30 feet high. The level, however, was not engineered construction and has experienced serious sloughing and undercutting of its slopes. Therefore it can not be relied on to provide flood protection. The eastern boundary is formed by a narrow strip of working mine area with unmined land further to the east. On the south and southwest, the site is bordered by previously mined land. There are three ponds at the north end of the site at an approximate elevation of 360 feet. Three inclines, former haul roads into the active mining pit which have recently been abandoned, cross the site in a generally east-west direction. These trough-like features are between 20 and 70 feet below the elevations of the surrounding area and are partially filled with water.

The proposed site can be divided into two distinct topographic areas that reflect the progression of mining from west to east across the site and the history of mine reclamation laws. The northern and eastern portion of the site is relatively level, reflecting more recent reclamation laws. Elevations in the area range from approximately 360 feet to 410 feet and slopes are gentle. The spoils have been regraded and revegetated to produce a landscape of low relief similar to premining conditions. Broad, shallow depressions are common as a result of differential settling of the regraded spoils.

The southern and southwestern portions of the site are older mined areas in which the spoils were not graded after replacement. Spoils were replaced in linear ridges, separated by narrow valleys. The sides of the ridges are very steep and frequently marked by gullies. In the area enclosed by the two northernmost inclines, ridge tops are generally 410 to 420 feet in elevation. Between ridges, elevations range from 375 feet to 398 feet. South of the center incline, the topography becomes even more irregular reflecting the changing alignment of the mining operation. In the area that has been underground mined spoils have been placed over the undisturbed overburden materials raising the natural elevation of 410 to 415 feet to as much as 480 feet.

2. Geology

a. Regional Geology

i) History

The proposed site is located on the western margin of the Illinois Basin, a broad, oval shaped structural depression underlying most of central and southern Illinois. The basin is oriented south-southeast to north-northwest and reaches a maximum depth of nearly 15,000 feet in southeastern Illinois.

The basin began sinking during the Cambrian Period, approximately 550 million years ago, and was subjected to repeated episodes of sea invasion and withdrawl. The geologic units resulting from the changing marine-non-marine depositional environments are known as cyclotherms. They typically consist of gray shale underlain by limestone, black slaty shale, coal, underclay, and sandstone. Approximately 50 cyclotherms have been identified in Illinois. Following the Pennsylvanian Era the area was regionally uplifted and subject to extensive erosion. Geologic deposits for this period are consequently absent.

The most recent geologic units of the region are unconsolidated materials, including glacial, loess, and alluvial deposits. Over the last million years the region was subjected to four major glacial episodes in which large quantities of rock, gravel, sand, and clay were carried from the north and west and deposited in sheets as the glaciers retreated. These glacial deposits were then subjected to wind and hydrologic erosion and redeposition, forming the surficial loess and alluvial deposits of the region.

ii) Structure

In St. Clair County, the bedrock units exhibit a gentle regional dip to the east at a rate of several feet per mile. The continuity is disrupted, however, by many small folds, faults, domes and basins. The major structural features surrounding the basin are: the Sangamon and Mississippian Arches to the north, the Ozark uplift to the west, the Mississippi Embayment to the south and the Cincinnati Arch to the east. Principle geologic structures and major fault systems in Illinois are shown in Exhibit II-3. The most prominent structural feature in St. Clair County is the Dupo Anticline, an asymetrical northwest trending structure passing about 25 miles northwest of the Clark Oil site. No major faults are present in St. Clair County, but small faults have been recognized in the Smithton-Hecker area about 6 miles west of New Athens. The Ste. Genevieve Fault System, 30 miles west of New Athens, is the nearest major fault system. Other major fault systems in the region are the Cottage Grove Fault System, the Wabash Valley Fault System and the Fluorspan Area Fault System.

The proposed site is located in Seismic Risk Zone 2, an area which by definition may be expected to occasionally experience moderate damage from earthquakes. The site is also within the radius of influence of the New Madrid Fault System located in Missouri approximately 120 miles south of the site. This is the site of the 1811-12 quakes which at the epicenter registered XII on the Modified Mercalli Scale of 1931. To date, this is the highest intensity earthquake in the country. This quake registered VIII to IX in the New Athens Area (Waston, 1977). Other earthquakes have been centered closer to the site, but they were small by comparison to the New Madrid event. Although subsequent shocks have occurred in the New Madrid Zone registering between IV and VI, the latest of which occurred in 1974 and registered VI, none have significantly affected the New Athens area. An analysis of Dames and Moore (1976) and supported by Woodward Clyde Consultants (1976) concluded that a design basis earthquake of MMVII is appropriate for the Coalcon/Clark Oil site. Six epicenters are present within 32 kilometers (20 miles) of the site and are tabulated in Table II-1.

iii) Stratigraphy

The youngest bedrock formation in the area is the Carbondale Formation which is composed of about 180 feet of thinly interbedded shales, clays, limestones and coal. The Herrin No. 6 coal maintains a relatively uniform thickness of 6 to 7 ft within this formation. This coal is part of the Eastern Interior Coal Field and has been extensively mined at the Peabody River King Mine Pit No. 3. The Carbondale Formation is underlain by older rock units of regional importance. Limestone and dolomite outcrops of Mississippian age are quarried in the lower reaches of the Kaskaskia River basin and the western part of St. Clair County.

Six types of unconsolidated deposits are identified in the New Athens-Fayetteville Region:

- Till--poorly sorted mixtures of gravel, sand, silt and clay deposited by ice
- Loess--silt deposited by wind
- Lacustrine--fine grained silt and clay deposited in lakes and ponds
- Fluvial--well sorted and stratified gravels, sands, silts and clays deposited by running water
- Weathered material forming ancient and modern soils
- Weathered and regraded deposits (spoils) associated with coal strip mine activity containing a relatively heterogeneous mixture of the above deposits.

The general stratigraphic sequence, description and topographic setting of the unconsolidated deposits are given in Table II-2. The areal distribution of these deposits is shown in Exhibit II-4, and a cross-sectional view showing their sub-surface configuration is shown in Exhibit II-5. The stratigraphic sequence of these unconsolidated deposits is locally variable because of the complex glacial history of the area. Three stratigraphic sequences can generally be recognized: The Upland Sequence, the Ridge Sequence and the Valley Sequence. The occurrence of these sequences bears a close relationship to the topographic features of the region.

The Valley Sequence is present along the floodplain and terraces of the Kaskaskia River and beneath the proposed site. The formations present in ths sequence (from surface downward) are the Cahokia Alluvium, Equality Formation, Henry Formation and Pearl Formation.

The Cahokia Alluvium represents the recent deposition of the Kaskaskia River. The formation consists primarily of silt and fine sand, but includes clay-filling of oxbow lakes, some gravelly beds, and some highly compressible beds of organic-rich sediment. The formation outcrops between elevation 380 and 385 feet adjacent to the Kaskaskia and thins to a feather edge away from the river.

The Equality Formation consists of silt and clay of Wisconsin age that underlies the Cahokia Alluvium and is exposed adjacent to the Cahokia on higher levels of the Kaskaskia floodplain and terraces. A younger predominately clay unit of the Equality is present under the higher portions of the floodplain and an older predominantly silt and clay unit is present under the terraces. A five foot thickness of Peoria Loess is generally present on terraces, but is absent over the Equality on the floodplain. The average thickness of the Equality is about 50 feet. The Equality Formation may be underlain directly by Pennsylvania bedrock, Vandalia Till, or by the Henry and Pearl Formation.

The Henry Formation is a sandy Wisconsinan outwash present at depth beneath the terraces and floodplain along the Kaskaskia River. The unit does not outcrop at the surface in the New Athens area.

The Pearl Formation is an Illinoian outwash that, when present, forms the lowermost glacial unit present beneath the floodplain and terraces. The Pearl Formation consists of coarse sand and becomes coarser grained and gravelly with depth. This formation, in connection with the Henry Formation, constitutes the best potential aquifer in the New Athens region.

iv) Mineral Resources

St Clair County is endowed with a variety of mineral resources including sand and gravel, limetone, clay and shale, oil and gas, and coal.

Sand and gravel is quarried in recent alluvium and glacial deposits in certain areas of the region. Clay and shale are produced from the lower Pennsylvanian units and coal is produced from the middle and upper units, particularly the Carbondale Formation.

The most important mineral resource in the region, as measured by value produced and known reserves, is coal. The region's main coal seam is the Herrin No. 6 which maintains a thickness of 6 to 7 feet in the New Athens-Fayetteville area and yields 7 to 9 million tons per square mile. The Herrin No. 6 coal presently being mined in the operation adjacent to the site will be the coal source for the proposed facility. The boundary of the Herrin coal is oriented northwest-southwest, a line roughly coincident with Sparta and Belleville, Illinois. To the west of this line, the coal is missing, and eastward the seam is progressively deeper. The coal is sufficiently shallow (less than 150 feet) to allow strip mining between 5 and 8 miles east of the outcrop (western boundary) line. In the sections where the seam is deeper, it is mined underground.

b. Site Geology

i) Pre-Mining Geology

Logs of coal prospect borings show that prior to mining the proposed site was underlain by an average thickness of 30 feet of unconsolidated deposits and 35 feet of bedrock overlying the coal. In the 45 acre parcel in the southwestern portion of the site these materials remain intact, buried beneath spoil materials excavated from surrounding surface mining operations.

The unconsolidated deposits consisted primarily of soil and clay that graded into sand and gravel with increasing depth. The soil and clay ranged in thickness between 3 ft and 40 ft but averaged 16 ft. The clay probably represents the Equality Formation and in some cases the Cahokia Alluvium. These deposits were generally coarser in the northern portion of the site, decreasing in grain size with distance from the river. Sands and gravels encountered at an average depth of 16 ft probably represent the Henry or Pearl Formation. Although not logged in prospect borings, some silt (loess) material also must have been present in the soils or overburden, because it is now present in spoils piles. Bedrock capping the Herrin No. 6 coal consisted of 1 ft to 10 ft thick beds of limestone, shale, and clay, averaging 35 ft in total thickness with thinner deposits occurring in the northeastern portion of the site.

A prospect log from the underground mined area and generally representative of pre-mining conditions at the site, is shown in Exhibit II-6. A cross-section prepared from prospect logs and showing the present stratigraphy of the underground mined area and generally representative of premining subsurface conditions at the site is presented in Exhibit II-7. The location of the cross section and the underground mined area are shown on Exhibit II-8.

ii) Post-Mining Geology

As the surface mining operation proceeded across the proposed site the overburden materials stripped from the active mining pit were used to fill the previously mined area. The resulting spoils which now underlie the Clark Oil site consist of a heterogeneous mixture of the formerly discreet layers of alluvial silts and clays, glacial sands and gravels and bedrock. Over most of the site tha spoil materials directly overlie bedrock. However, in the underground mined area these spoils have been placed over the naturaly undisturbed sequence of unconsolidated and bedrock formations (Exhibit II-7).

In March and April 1976 Dames and Moore drilled twenty exploratory borings on a portion of the proposed Clark Oil Site (former Coalcon site) as part of a detailed soils investigation for Coalcon. The locations of these borings are shown in Exhibit II-8. The borings generally show the site subsoils to consist of interbedded layers of silty clay, sand, and clayey silt with zones of gravel and cobbles encountered at varying depths in most of the borings (Exhibit II-9 and II-10). A gravel and cobble layer varying in thickness from one to ten feet and averaging 5 feet thick was encountered immediately overlying the bedrock. Northward, towards the Kaskaskia River, the subsoil usually consist of poorly graded fine to coarse sand, with the clay and silt layers appearing less frequently.

Throughout the site, the consistency of the material is variable, ranging from dense to medium stiff with local pockets of soft or loose material. The thickness of the reworked material at the site ranges from 50 to 90 feet and is considered normally consolidated although occasional underconsolidated zones are present.

Bedrock elevation in the surface mined areas of the site is fairly uniform. Most of the borings encountered bedrock at elevations between 325 and 330 feet. The bedrock below the Herrin No. 6 coal is thinly laminated, moderately to highly weathered shale interbedded with limestone. In seven of the borings, limestone was found immediately below the spoils; in those cases where drilling was continued, shale was encountered within several feet.

c. Soils

i) Regional Soils

The soils developed in the vicinity of the proposed site have been grouped by the US Soil Conservation Service into five soil associations-the Darmstadt-Piasa, Iva-Alford, Okaw-Hurst, Wakeland-Belknap-Bonnie, and Orthents. The distribution of these soil associations in the site vicinity is shown in Exhibit II-11.

The Darmstadt-Piasa soil association is found on the nearly level to moderately sloping glacial outwash plains to the east of New Athens. The soils have formed in the thick loess overlying the glacial outwash. They consist primarily of silt loam and silty clay loams and are somewhat poorly drained. The soil association is made up of 50 percent Darmstadt soil, 40 percent Piasa soil and 10 percent minor soils.

The Iva-Alford soil association is also found to the east of New Athens. This soil association consists of soils formed in loess on nearly level to steep slopes on upland glacial outwash plains. The association is made up of about 80 percent Iva soils, 10 percent Alford soils, and 10 percent minor soils. The minor soils of the association are the Weir and Wakeland soils. The Iva soils are somewhat poorly drained silt loams and silty clay loams, with mottled, low permeability subsoils and high water tables during the spring months.

The Okaw-Hurst soil association is found to the east of New Athens and the project area. The Okaw-Hurst soils have developed in loess overlying acid and clayey lake bed sediments on the stream terraces. These silt loam and silty clay loam soils are formed on nearly level to gently sloping terrain and are somewhat poorly to very poorly drained. Shallow water tables of 1 to 3 feet occur below the Hurst soils during the spring months. The water table below the Okaw soils remains at or within 2 feet of the surface year round.

The Wakeland-Belknap-Bonnie is a bottomland soil association formed in silty alluvial sediments. It consists of nearly level silt loam, silty clay loam, and silty clay soils which are somewhat poorly to very poorly drained.

b. Site Soils

The Orthents are a pseudo-soil association with cover much of the Clark Oil site. The orthents consist of young soils which are forming in weathered spoils materials in strip mine areas, quarries or other land disturbing operations. They have little profile development and consist of a thin A horizon overlying C horizon soil material. These soils range from somewhat poorly to well drained.

The Orthents soils are found on slopes ranging from 0 to 60 percent, depending on the degree of strip-mine reclamation of the area. In spoil areas created before current reclamation regulations, the soils are rocky, ungraded and very often on steep slopes (30-60 percent) and soil slippage is common. In some areas the top of the spoil material has been leveled off. Spoils created under current land reclamation laws must now be reshaped to conform to the original landform to allow for future land use. The spoil material is reworked to flatten sharp ridges and to bury undesirable rock. All rocks greater than 8 inches in diameter are removed from the soil surface. In addition current mining regulations require that topsoils be stripped from the surface, stockpiled, and replaced on the prepared spoils prior to revegetation.

The orthent soils are highly variable. The surface textures generally range from silt loams to silty clay loams. Soil permeability varies form very slow to rapid depending upon the texture of the spoil material.

Engineering properties of the site and surrounding area soils, including erosion hazard, permeability, depth to water, shrink-swell potential, moisture holding capacity, and corrosion potential are summarized in Table II-3. The ratings for in-situ soils are based on information from the US Soil Conservation Service Soil Interpretation sheets. The ratings for the Orthents soils were developed by R.F. Weston for Coalcon and were based on a range of the properties of the soils and geologic materials that make up the Orthent soils.

The shrink-swell potential depends upon the clay minerals found in the soils and their textural composition. The Alford and Wakeland soils have a low shrink-swell potential. The other soils contain higher amounts of expanding lattice clays such as montmorillinite and have a higher shrink-swell potential during moisture changes. The moisture-holding capacity of the soils in the site area varies from droughty in the lighter textured sandy soils to high moisture availability in the heavier textured soils such as Ebbert, Wakeland and Herrick. All soils (depending upon their acidity, soil drainage, and conductivity of the soil solution) vary in their potential for corrosion of steel and concrete.

In May 1981 Ebasco Services Inc. obtained two samples of cohesive soils in the vicinity of the site for laboratory testing. The results of this testing are shown in Table II-4.

B. TERRESTRIAL ENVIRONMENT

1. Vegetation

St Claire County lies in the Till Plain section of the Central Lowland physiographic Province. Illinoian till overlays sandstone, limestone, coal or shale bedrock. Terrain is nearly flat with broad floodplains along major streams, such as the Kaskaskia. High clay content and frequency of claypan subsoil promote spring flooding followed by hard, dry soil conditions in summer. Pre-settlement vegetation was prairie with scattered groves of pin oak (Quercus palustris), shingle oak (Q. imbricaria), post oak (Q. stellata) river birch (Betula nigra) and honey locust (Gleditsia triacanthos). Low terraces and floodplains supported mixed hardwoods forests of variable composition (Braun, 1950; Schwegman, as cited in Mohlenbrock, 1975). Along the Kaskaskia, silver maple (Acer saccharinum), willows (Salis spp), sycamore (Platanus occidentalis) and American elm (Ulmus americana) were probably abundant while pin oak, white oak (Q alba), hickories (Carya spp), ashes (Fraxinus spp), hackberry (Celtis occidentalis) and honey locust characterized portions of the floodplain farther removed from the river (Schwegman, as cited in Mohlenbrook, 1975).

For the most part, agriculture and development have replaced the original vegetation. Only five percent of St Clair County is currently wooded (Wallace, 1978).

Strip-mining commenced in the New Athens area in 1960 and eventually encompassed esentially the entire site. One portion not stripped is overlain by 60 feet of spoil. The present vegetation represents various stages of succession as influenced by reclamation efforts and the man-made soils which resulted from the mining operations. Terrestral communities of the site and immediate environs were investigated in 1975 and 1976, in connection with licensing applications (Coalcon, 1977; Peabody Coal Company, 1977). The site was again recônnaissanced in July, 1981.

Plant communities of the site and environs are shown in Exhibit II-12. Delineations and nomenclature generally follow reports of the 1975 and 1976 field investigations with modifications reflecting recent mining activity. Field type 4 occupies an area mined from 1960 to 1967, left essentially unreclaimed as a series of parallel hills 20 feet high and 90 feet apart. Ground cover in early July was predominantly grass (Festuca spp). Linear bands of cottonwood (Populus deltoides) saplings as large as 10 inches in diameter grow in the depressions. Other shrub species include boxelder (Acer negundo), poison ivy (Rhus radicans) and slippery elm (Ulmus rubra).

In the area of Field type 3 mining ceased as recently as 1969. Terrain and flora are similar to Field type 4: ridge tops appear broader, and cottonwood saplings are smaller (5-8 inches diameter) and more widely spaced. In addition to grass (Festuca spp), characteristic ground cover includes scattered patches of sweet clover (Melilotus sp) and small thickets of sandbar willow (Salix interior).

Field types 1 and 2 are treated together as they could not be readily distinguished in the field or from aerial photography. They occupy an area under reclamation since 1974 when mining ceased. Approximately 25 to 50 percent of ground area is bare ground and litter, and 25 to 50 percent planted alfalfa. Grass and weeds (eg Setaria faberi, Festuca sp., Solanum americanum, Sonchus sp and Chenopodium sp) account for remaining cover. Terrain is flat.

Occurrence of threatened or endangered plant species on proposed site is considered extremely unlikely because of the extensively disturbed soils. No species encountered in field surveys of the site (Coalcon, 1977; Peabody Coal Company, 1977) are listed or under consideration for listing by the Federal or Illinois State governments (U S Department of the Interior, 1980; Illinois Department of Conservation, 1980). The nearest floristically significant area is the Freeburg Rod and Gun Club woods located immediately north of the Kaskaskia River from the proposed site (Exhibit II-12). This area has been identified in the Illinois Natural Area Inventory (Department of Conservation) as undisturbed floodplain forest.

Vegetation adjacent to the site is residential (west), cultivated cropland (south and east), and floodplain forest. Field type 5, depicted in Exhibit II-12, overlies disposed dredge material and is characterized by lespedeza (Lespedeza striata) and early successional species including evening primrose (Oenothera biennis), hedge hyssop (Veronica peregrina) and others. The floodplain forest community is dominated by silver maple and associated species including sugarberry (Celtis laevigata) shellbark hickory (Carya laciniosa), boxelder, elms, pin oak and pecan (Carya illinoensis) (Peabody Coal Co., 1977).

2. Wildlife

a. Regional and Historic Perspective

Habitats available for wildlife in southwestern Illinois have been intensively modified by man during the past century. The predominant land use is now intensive agriculture. Hardwood forests are now restricted to areas too steep or frequently flooded to warrant clearing for agriculture. Oak woodlands, once extensive in the region, have been replaced by annual cropland, principally corn.

Radical modification of existing habitats has resulted in a general reduction in abundance of many spcies populations and in the extripation of some. A few species, generally those adapted to disturbed habitats benefited from these man-induced habitat changes and form the principal species present today.

Strip mining has been a major activity, although secondary to agricultural development, in the area. Areas mined prior to establishment of restrictive reclamation regulations are characterized by broken, uneven topography covered by trees and grass. Areas mined post-reclamation law are generally level with topsoil horizons replaced and the area revegetated to grass. Pre-reclamation mined areas offer fair to moderate quality forested habitats for wildlife in a region where woodlands have generally declined at alarming rates. Reclaimed strip mined land provides moderate to good quality grassland habitat to wildlife but may eventually be converted to pasture or agriculture, uses which are generally not beneficial to wildlife.

b. Site Perspective

i) Wildlife Habitats

All of the proposed site has or will be subjected to strip mining prior to construction of the proposed facility. The site offers two principal habitat types to wildlife. Areas mined prior to establishment of stringent reclamation regulations encompass the western portion of the site. This area is covered by long piles of unsorted overburden which have had their tops flattened to reduce erosion and which have been planted or allowed to succeed naturally to scattered cottonwoods with a dense low groundcover formed of grass, sweet clover, and lespedeza.

Mined areas which have been recontoured, resurfaced with topsoil, and replanted to establish groundcover comprise most of the eastern two thirds of the proposed site. These areas provide dense groundcover for small mammals and field dwelling birds but are barren of trees.

Several shallow ponds currently exist on the site. Although man-made and subject to periodic disturbance by fishermen and mining activities, the ponds offer food and cover to waterfowl and are regularly used by migrant waterfowl. The most important of these ponds is the largest one located on the northern boundary of the proposed site. This pond is surrounded with wetland vegetation and is regularly used by several hundred migrant ducks.

ii) Wildlife Species

Mammals -

Studies of the proposed site and the woodlands immediately north of the site have recorded 28 species of mammals (Table II-5). Most of these species are associated with the woodlands adjacent to the site. Principal mammals on the site are woodchucks and other small rodents associated with grassland. Muskrats occur in the ponds and deer and larger mammals may be found in the stands of cottonwood in the unreclaimed mine area encompassed by the western portion of the proposed site.

Birds -

Studies of the proposed site and the woodlands immediately north of the site have recorded 147 species of birds (Table II-6). Although many of these species are characteristically associated with thickets or woodlands, most can be expected to occur at least occasionally in existing habitats on the proposed site. Migrant waterfowl use of the northernmost pond on the site appears to be relatively high and some waterfowl hunting apparently takes place. Although several species on the Illinois state endangered and threatened species list (Little Blue Heron, Mississippi Kite, Marsh Hawk, Black Tern, Veery and Loggerhead Shrike) have been observed on the site during the migration periods or during the winter, intensive surveys of the proposed site during the 1981 breeding season indicated that none of these species currently nest on the site. Common breeding species on the site include dickcissel, killdeer, eastern kingbird and indigo bunting.

Reptiles and Amphibians -

Due to its history of mining disturbance the proposed site is poor habitat for most species of reptiles and amphibians. Most of the 17 species recorded during studies of the site and immediate vicinity (Tables II-7 and II-8) were found in the old oxbow and woodlands north of the proposed site.

C. AQUATIC ECOLOGY

1. Introduction

The project site is located at RM 31 on the Kaskaskia River, which drains the largest watershed wholly contained in Illinois. Because of its large variety of habitats, the Kaskaskia River is known to have supported over 100 fish species historically, including unusual species such as blue sucker, freckled madtom, slender madtom, bigeye shiner, sauger, and river darter (Smith, 1971), and certain species listed as rare in Illinois by the Department of Conservation (Coalcon, 1977). These include aligator gar (*Lepistosteus spatula*), Alabama shad (*Alosa alabamae*), bigeye chub (*Hybopsis ambiops*), sturgeon chub (*Hybopsis gelida*), sicklefin chub (*Hybopsis meeki*), bigeye shiner (*Notropis boops*), and western sand darter (*Ammocrypta clara*). Non-point source impact (largely siltation), habitat destruction or alteration, and some point source impacts, however, probably limit present distribution and abundance of these species.

The Kaskaskia River has been channelized (dredged and straightened) from its mouth through the project site. Channelization, notorious for decreasing fish production (N. Central Div., Amer. Fish. Soc., 1971), will ultimately be extended to Fayetteville (RM 50). Although channelized portions of the river do support commerical and sport fisheries, most production and fishing activity occurs in backwaters and oxbows . The Illinois Department of Transportation's Master Plan for the lower Kaskaskia River (Ill. Dept. Trans., ND), which supports the channelization, lists improved oxbow access via marinas and boat ramps as a significant benefit of the project.

Aquatic habitats at the proposed project site comprise a typical series of plains - type oxbow, channel, and pond environments. No critical habitat, as defined relative to endangered species, is present at the site, and no rare or endangered species have been found. Most ponds represent artifacts of former strip-mining activity, but this type of habitat appears to support a sport fishery.

Oxbow areas are the most important fisheries habitats directly associated with the Kaskaskia River. They have value as spawning, refuge, and sport fishing habitat. While a fishery does exist in channelized portions of the Kaskaskia River, designated uses of such areas can best be described as navigation and stormwater conveyance.

2. Habitat

Exhibit II-13 is a plan view of aquatic habitats in the vicinity of the project site. Shown on this figure are the old Kaskaskia River channel, now represented as a serious of oxbows; the new channel created by the Corps of Engineers and Illinois DOT; and numerous ponds resulting from groundwater seepage and rainfall collection in abandoned strip mining areas. A small stream is also present on the eastern border of the site. The mean depth and width of the new channel are 3.3 and 85 meters, respectively (Peabody, 1977). The oxbow on the north side of the site averages about 1.5 meters in depth and 25 meters in width. Water hardness ranges from moderate (channel) to hard (oxbows). Dissolved oxygen concentrations in the river apparently satisfy aquatic life criteria (ie 5.0 mg/l) except at the bottom of oxbows where average levels between 1 and 3 ppm have been reported (Peabody, 1977). Representative oxbows, ponds and channel areas in the site vicinity have been sampled periodically since 1973 in relation to impact of proposed industrial development on aquatic resources (Peabody, 1977). Studies are presently being conducted by Peabody Coal Company at places shown in Exhibit II-13 as the solid dark areas (Jones, 1981). Results of these studies from the basis for this report.

3. Fish

Forty seven species of fish have been reported present in oxbow and channel areas adjacent to the project site (Table II-9). This is about half the number of fish species known to have inhabited the Kaskaskia system historically. Dominant species are shads, carp, black buffalo, emerald shiner, black bullhead, channel catfish, crappies, and bluegill sunfish. Species of sport value include catfish, crappies, sunfish, bass, and walleye. Commercial species include carp, catfish, and buffalo.

Oxbows are the most important site area habitats. Although the existing oxbow north of the site receives heavy silt loads when the main channel overflows (Jones, 1981), it does provide refuge and spawning habitat for sport fish. This oxbow will be destroyed as part of the River King pit 3 extension project, but it will be reconstructed and improved when mining is complete (Jones, 1981).

On-site ponds support Centrarchid fisheries and some have reportedly been stocked with sunfish, crappies, or bass (Jones, 1981). Many of these ponds are ephemeral, appearing and changing in relation to mining activity, abandonment and reclamation. However, site observations indicate that the larger ponds on site, and those north of the site, are popular local sport fishing places.

4. Invertebrates

Table II-10 is a composite list of benthic species reported by Peabody (1977) for the Kaskaskia River, oxbow, and pond systems. Dipterans (eg midges) are a dominant group in all habitats, while mayflies (Ephemeroptera), caddisflies (Trichoptera), and stoneflies (Plecoptera), are found more frequently in channel habitats than the more poorly circulating backwaters.

The zooplankton community is dominated by rotifers and cladocerans (Peabody, 1977). Thirteen families were represented in oxbow and channel areas sampled in spring, 1977. Oxbows and ponds are more diverse and productive in zooplankton than is the main channel (Peabody, 1977; Woodward-Clyde, 1976).

5. Algae

Diatoms and green algae were the dominant planktonic and periphytic groups in Kaskaskia River oxbow and main channel samples taken in spring and fall (Peabody, 1977; Woodward-Clyde, 1976). No summer data are available. Twenty-two families were represented in periphytic samples collected in spring 1977, and twenty-six families were represented in corresponding phytoplankton samples (Peabody, 1977). Peabody's (1977) data suggest that algal abundance and diversity is similar in channel and oxbow areas. Greater productivity is expected in oxbows, but the Kaskaskia River channel probably receives significant algal influx from these oxbows.

D. METEOROLOGY/CLIMATOLOGY

An analysis of the meteorology and climatology at the site is necessary in order to determine the dispersion characteristics of the atmosphere. The potential impact to the air quality of the surrounding area due to the proposed project can then be determined by the use of computer models. Climatological data may also be used in the plant design stage to determine cooling tower or pond size, stress limits on structures due to high winds or ice and snow loading, the potential for flooding due to torrential rains, and others.

The following description of the long-term climatology of the site is taken from the 1977, Local Climatological Data (LCD) annual summary prepared by the National Climatic Center in Asheville, North Carolina for St. Louis, Missouri (U.S. Department of Commerce, 1977). The proposed site is about 30 miles southeast of St. Louis and, because there are no significant terrain variations in the area, the data is assumed to be representative of the site. On-site meteorological data is currently being collected from a 10-meter tower to confirm this assumption.

1. General Climatology

Being near the geographical center of the United States, the site is influenced by warm, moist air from the Gulf of Mexico to the south and by cold dry air masses from Canada to the north. The alternate invasion of the area by air masses from these sources, and the conflict along the frontal zones where they come together, produces a variety of weather conditions, none of which persist to the point of monotony. The climate could be described as a modified continental climate with four distinct seasons with none being unduly severe.

Winters are brisk, but seldom severe. Since 1871, temperatures have dropped to zero or below an average of only two to three days per year. Temperatures remain below freezing on only 20-25 days per year. The record low temperature for St. Louis was -23°F in 1864. Snowfall averages less than 20 inches per year and varies from less than an inch to greater than 40 inches in any given year.

The average date of the last freeze in the spring is April 15, and of the first freeze in the fall is October 20. There is an average of approximately 190 days between the last freeze of one winter and the first freeze of the next.

The average annual precipitation for the St. Louis area is 35 inches per year. April, May and June are the wettest months and the three winter months are the driest. Thunderstorms occur on the average 40 to 50 days per year. Generally, a few of these thunderstorms, during any year, can be classified as severe storms with hail and damaging winds. Since 1871, there have been only four tornadoes which produced extensive damage and loss of life in St. Louis.

2. St. Louis Climatological Conditions

Climatological data presented in this section were recorded at Lambert International Airport in St. Louis. This is the closest (located approximately 41 miles northwest of the site) currently operating first-order weather station. These data are presented in the same LCD (St. Louis, 1977) from which the general climatological description was obtained.

a. Temperatures

Monthly and annual values of average daily mean, maximum and minimum temperatures recorded at St. Louis during the period 1941-1970 are presented in Table II-11. Temperature extremes are also included. The annual mean temperature is 55.9°F, with the monthly means ranging from 39.9°F in January to 88.4°F in July. The highest temperature recorded was 106°F (July, 1966), and the lowest temperature was -14°F (January, 1977).

b. Atmospheric Humidity

The annual average relative humidity in the St. Louis area is slightly greater than seventy percent. Monthly and annual averages of relative humidity are presented in Table II-12. The humidity is generally highest during the morning hours, typically ranging between 70 and 90 percent, compared with about 55 to 70 percent during the afternoon. Mean relative humidities tend to be lowest in the spring months (64 percent in April) and highest in the winter months (78 percent in December).

c. Winds

Exhibit II-14 is an annual surface level wind rose for the period 1960 to 1964 at St. Louis (U.S. Department of Commerce, 1974). These data indicate a bi-modal distribution with the greatest frequency of winds out of the south and the west-northwest directions. Table II-13 presents monthly and average wind speeds and directions recorded at St. Louis during the 1941 to 1970 period. The annual average wind speed for this period was 9.5 miles per hour (mph), with southerly winds being the most common. The most common direction varies from southerly in the summer and fall to northwest and west-northwesterly in the winter and spring. The monthly mean wind speed varies from 11.8 mph in March to 7.4 mph in August.

Winds in excess of 39 mph have been recorded in every month of the year in St. Louis. Strong, gusty surface winds often occur in association with severe thunderstorm activity, well developed cold fronts, and tropical cyclones. The fastest mile of wind (the fastest speed, in miles per hour, of any "mile" of wind which passes the anemometer) on record at St. Louis is 91 mph from the northwest in 1896. One method which is used to quantify wind potential for a given area is the 100-year fastest mile wind speed which is the maximum expected wind over a 100-year interval. The 100-year fastest mile wind speed as calculated by the American National Standards Institute (ANSI, 1972) in the St. Louis area is 84 mph.

d. Precipitation

Rainfall in the St. Louis area reaches a maximum in the late spring and early summer and diminishes in the fall and winter. Summer rainfall tends to be in the form of convective showers with large differences in amounts from one location to another on any given day. Winter precipitation is generally associated with frontal activity from migrating low-pressure systems and is more evenly distributed in a spatial sense. Some of the winter precipitation falls as snow.

The average annual precipitation at St. Louis during the period 1941 to 1970 was 35.89 inches. Monthly average precipitation amounts are listed in Table II-14. The water equivalent of snow and ice is included in these figures. The month with the highest average precipitation was June with 4.42 inches. Lowest average precipitation occurred during January with 1.85 inches. The record rainfall for one month occurred during August 1946 when 20.45 inches fell. The record for a 24-hour period is 8.78 inches which also occurred in August 1946.

Based on various observations and extrapolation techniques, Hershfield (1961) calculated expected maximum point precipitation quantities for various durations and return periods. These calculated values are presented in Table II-15.

3. Dispersion Climatology

a. Stability

Atmospheric stability in conjunction with general wind patterns and mixing height determines the potential of the atmosphere to disperse airborne pollutants. Atmospheric stability conditions are typically categorized as unstable, neutral, or stable. An unstable atmosphere is one in which rapid diffusion takes place in both the horizontal and vertical direction. In terms of temperature changes with height, an unstable atmosphere is characterized by a sharp decrease in temperature with height. Neutral conditions, which are characterized by moderate decreases of temperature with height, are common in the atmosphere and are associated with moderate diffusion rates. A stable atmosphere is characterized by only slight decreases, or even increases of temperature with height, and greatly reduced diffusion rates in comparison with unstable or neutral atmospheres.

The stability classifications presented in this section are based on the Turner (1964) or "STAR" method, which assigns a stability on the basis of surface wind speed, cloud cover, and solar angle. The mean seasonal and annual frequency distribution of stability classes for a five-year period from 1960 to 1964 at St. Louis is summarized in Table II-16. The seasonal stability distribution indicates that during the summer months there is a high incidence of unstable (Classes A, B and C) conditions (31 percent), while winter has the lowest incidence of unstable conditions (6 percent) and the highest percentage of neutral (Class D) conditions (65 perecent). The largest relative percentage of stable (Classes E, F and G) conditions (38 percent) occurs in the fall followed by 37 percent in the summer. There are also distinct dirunal trends displayed by atmospheric stability. The daytime hours are characterized by unstable conditions; stable conditions prevail at night.

b. Mixing Height

An important parameter which describes the regional dispersion capability of the atmosphere is mixing height. Mixing height is simply the vertical extent of the surface layer within which relatively vigorous mixing of pollutants takes place. Holzworth (1972) has compiled statistical summaries for mixing height at various locations throughout the United States based on twice daily balloon soundings. The nearest station to the proposed site is Columbia, Missouri. Average mixing heights and associated average wind speeds through the mixing layer for Columbia during the period 1960 to 1964 are shown in Table II-17. This table also shows the number of episodes characterized by two or more consecutive days with mixing heights and mixing layer wind speeds lower than selected values. Holzworth's comparison (Holzworth, 1974) of 62 locations throughout the United States indicates that conditions in the proposed site area are more favorable for regional dispersion than they are in about 70 percent of the remainder of the country.

4. On-Site Meteorological Conditions

a. General

An on-site meteorological monitoring program is being conducted to provide data which would, together with the regional data described above, allow a description of on-site meteorological conditions to support the environmental impact analyses. Monitoring for wind direction and speed, temperature, humidity, precipitation, and an atmospheric stability parameter was begun in February, 1981 at the proposed site.

Brief summaries of the data collected to date (Envirosphere, 1981) are presented in the following sections along with comparisons with regional data.

b. Temperature

Table II-18 presents the monthly mean and extreme temperatures for February, March and April, 1981 measured at the on-site monitoring facility along with the long-term monthly mean St. Louis Airport temperatures recorded from 1941 to 1970.

c. Atmospheric Humidity

Table II-19 summarizes the monthly mean relative humidity as a function of time of day at the monitoring facility. The relative humidity at the site was highest in the early morning hours during the three months of record, with 6 a.m. average humidities ranging from 66 percent in April to 81 percent in February. The lowest relative humidity usually occurred during the afternoon hours. These on-site mean relative humidity values are about 13 percent lower than the long-term mean relative humidity values recorded at the St. Louis Lambert International Airport which are summarized in Table II-12. The differences are probably due to several factors, some of which are the natural variation of short-term data from a long-term trend, instrumentation and mounting height, and local influences on the sensor.

d. Winds

Table II-20 presents the monthly averaged wind speeds and most frequent wind directions measured at the monitoring facility during the early part of 1981 and at the St. Louis Airport during the period 1964 to 1977. The monthly averaged wind speeds ranged from 6.8 in February to 8.4 in April. The prevailing wind directions during the three months of record varied from the south-southeast in February to north in March and back to the south in April. Long-term wind speeds at the airport are several miles per hour higher than the mean speeds measured at the site. The prevailing direction during this part of the year is generally from the west-northwest rather than from the south or north.

These data indicate that airport data is either not representative of the site or that 1981 was not a typical year when compared with long-term data. A more useful comparison could be made between the on-site data and airport data collected during the same time period rather than with the long-term data.

Without benefit of this comparison at this time, it is believed that the airport data is representative and that, in terms of wind speed and direction, the early months of 1981 did not fit the usual pattern.

e. Precipitation

Precipitation was measured at the facility using a volumetric rain gauge. The monthly precipitation totals along with the long-term data from the St. Louis Airport are summarized in Table II-21. Monthly totals at the site ranged from a low of 1.31 inches in March to a high of 3.31 inches in April for the three month period of record. The February and April totals appear to be fairly typical of the long-term trend at the St. Louis Airport but March was somewhat drier than usual.

f. Stability

The horizontal wind direction standard deviation, or wind sigma, was computed directly from the wind direction measurements at the on-site monitoring station. The wind direction standard deviation provides one indication of the atmospheric stability. Table II-22 presents the first sampling quarter frequency distribution of the various stability classes as determined by this method. As can be seen in the table, neutral and stable conditions were predominate during the February through April period of 1981.

The stability classification system used on the St. Louis International Airport data is based on a different method which used cloud cover, wind speed, and sun angle. This stability classification, commonly referred to as the Turner classification method, was applied to five years of airport data and is summarized in Table II-16. A comparison of the two tables indicates significantly more neutral conditions in the winter and spring at the airport than on-site. However, the difference is more likely due to differences in stability determination methods than to actual stability condition differences.

E. AIR QUALITY

1. Ambient Air Quality Standards

Ambient air quality standards (AAQS) have been established by the USEPA and the Illinois EPA to protect the health and welfare of the general public. These standards (NAAQS and IAAQS) have been developed for seven air pollutants, known as the criteria pollutants, and are presented in Table II-23. The national primary standards define levels of air quality which the USEPA Administrator judges are necessary to protect public health with an adequate margin of safety. The national secondary standards define levels of air quality which the USEPA Administrator judges are necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. The States have the flexibility to establish ambient standards which are more stringent than the national standards, but Illinois has not and its standards are identical to the NAAQS.

The current attainment status of St. Clair and its contiguous counties with respect to meeting national ambient air quality standards as determined by USEPA and the state of Illinois through monitoring and/or other means is shown in Table II-24. In general, the counties of interest meet the primary and secondary NAAQS for almost all criteria pollutants. The exception is particulates and ozone for which St. Clair County is currrently designated as nonattainment with respect to the primary standards. Both Madison and Monroe Counties are also nonattainment, at least in part, for these pollutants as well. Recent conversations with Illinois EPA (Lawler, 1981) have indicated that they are planning to request a redesignation from nonattainment to attainment with respect to both the primary and secondary particulate standards for a portion of St. Clair County which includes the project site. The ozone status will remain nonattainment, however.

2. Prevention of Significant Deterioration Increments

Both federal and state regulations require that major new sources (such as the proposed plant) undergo a review to ensure that the projected emissions together with emissions from other new sources (constructed after a certain baseline date) will not cause significant deterioration of air quality above baseline air quality levels. This applies in areas where current air quality is cleaner than that allowed by the ambient air quality standards discussed above. The amount of incremental air quality deterioration allowed (PSD increment) for sulfur dioxide and particulates is dependent upon the classification of the region. Class I areas (national parks, wilderness areas, etc.) are allowed very limited increases in calculated ground level pollutant concentrations while moderate increases are allowed in Class II areas. Class III areas are allowed even greater concentration increases. Table II-25 presents the allowable ground level concentration increases for Class I, Class II and Class III areas.

St. Clair and all contiguous counties are currently designated as Class II areas (moderate amounts of air quality deterioration allowed) under classifications created by PSD regulations promulgated by EPA on December 5, 1974, and confirmed by the Clean Air Act Amendments of 1977 (CAA77). A study is underway to determine the feasibility of reclassifying portions of St. Clair County from Class II to Class III for sulfur dioxide (Illinois EPA, 1980). Areas which are nonattainment for sulfur dioxide or particulates are not affected by this classification since the PSD regulations do not apply to those areas.

The CAA77 mandated that certain international and national parks and wilderness areas above specified size limits and other specified federal lands be Class I for PSD. The Mingo Wilderness Area, located in southeastern Missouri is the closest area to receive the Class I designation. However, this area is over 100 miles from the site, which is too far away for consideration.

3. Existing Air Quality

Air quality data from various sources was reviewed in preparing this description of air quality conditions existing at the site. However, much of the data was found to be non-representative of site conditions because of the sampler location or the age of the data. The Illinois EPA has many samplers in the region, but they are concentrated in the industrialized areas such as east St. Louis in the northern part of St. Clair County. The nearest state sampler to the proposed site is a TSP sampler in Belleville about 15 miles to the north, but it is located in the downtown area near a main street where particulate conditions are totally different from those at the site. None of these data reflect site conditions. During the Old Coalcon Study, Woodward Clyde Consultants conducted a ten day monitoring program in 1975 and R. F.

Weston, Inc. conducted about a three-month monitoring program in 1976 on the proposed site. But, these data are now five or six years old and most probably do not reflect current site conditions. Data which is representative and is presented in the following discussion was obtained from the on-site monitoring station which has been in operation since February, 1981 (Envirosphere, 1981), from two of the SO_2 monitoring stations in the Baldwin network which is operated by Illinois Power (Illinois EPA, 1979) and from the results of computer modeling by the Illinois EPA to determine the effects of reclassifying portions of St. Clair and two other counties from Class II to Class III (Illinois EPA, 1980). Ozone data presented was from two Illinois EPA stations in the east St. Louis area (U.S. EPA, 1979).

a. Sulfur Dioxide (SO_2)

Table II-26 presents the available data for SO_2. These data are very representative of the site area with one station located on the site, another located about 2.5 miles northwest, and a third about 2.6 miles south-southeast. Additionally, levels projected by the Illinois EPA are presented. These levels agree fairly well from one station or source to the next and they will probably agree better when more on-site data is collected. Presently the on-site data maximum values are the lowest, but this is probably due to the short duration (3 months) of monitoring data to date.

The maximum 3-hour SO_2 level presented was 700 ug/m^3 from the New Athens Station in the Baldwin network. This is well below the secondary standard of 1300 ug/m^3. The maximum 24-hour level was 157 ug/m^3, also from this station, and this level is well below the primary standard of 365 ug/m^3. Annual averages of monitored data ranged from 16 ug/m^3 at the New Athens Station to 26 ug/m^3 at the Lenz 1 Station, also in the Baldwin network. These levels are also well below the annual primary standard of 80 ug/m^3.

b. Total Suspended Particulates (TSP)

The available data for particulates are presented in Table II-27. Data from the on-site monitoring station were collected by the high volume method during the period of February through April, 1981. TSP levels projected by the Illinois EPA agree very well with the on-site data. The maximum 24-hour value projected by the EPA is 120 ug/m^3 which is higher than the maximum of 105 ug/m^3 obtained at the site to date. However, there is a high probability of exceeding the 105 level and approaching the 120 ug/m^3 level during the remaining nine months of the sampling program. Both of these levels are well below the secondary standard of 150 ug/m^3. The projected annual average is 50 ug/m^3 which compares very well with the first sampling quarter on-site average of 52 ug/m^3. These levels also are well below the annual primary standard of 75 ug/m^3. These data indicate the site area is attainment for particulates although the entire county, including the site, is designated as a non-attainment area. The basis for this designation was high particulate levels obtained from samplers located in the highly industrialized northern portion of the county.

c. Nitrogen Oxides (NO_x)

There are no representative NO_x data available other than the on-site data currently being collected. The average of the NO_x data collected to date (February - April, 1981) is 15 ug/m^3 which is only 15 percent of the annual primary standard of 100 ug/m^3. The only state monitor in the region which recorded sufficient data to compute a valid annual average in 1979 (Illinois EPA, 1979) was located in Edwardsville which is a highly industrialized area where levels should be much higher than at the proposed site. Even so, the annual average NO_x level for 1979 was only 26 ug/m^3 at that location.

d. Carbon Monoxide (CO)

Because the primary source of CO is automobile engines' exhaust, and because the site area is rural with low density population, CO levels are expected to be very low. There are no CO data available for this area and it is not being monitored at the on-site monitoring station for the reasons given above. At other similar sites where CO has been monitored, the level rarely exceeds 1 ppm (1150 ug/m^3) which can be compared with the 1-hour primary standard of 40,000 ug/m^3.

e. Ozone (O_3)

Ozone monitoring at the on-site monitoring station began May 1, 1981 and data is not yet available from that station. However, because ozone is a long range transport pollutant, data from monitors as far away as east St. Louis may be representative of site values. The east St. Louis monitor, in 1979, recorded a maximum level of 206 ug/m^3 and a second highest level of 194 ug/m^3 (Illinois EPA, 1979). The monitor at the Bi-State Park in Cahokia, several miles south of east St. Louis, recorded a maximum 1-hour concentration of 186 ug/m^3 and a second highest of 178 ug/m^3 in 1978 (U.S. EPA, 1979). All of these levels are below the 1-hour primary standard of 235 ug/m^3. Both of these stations are in a northwesterly direction 25 to 26 miles from the proposed site.

f. Lead

The only available lead data for the site was obtained from the on-site monitoring station during the February through April period of 1981. The quarterly average for this period was 0.035 ug/m^3 which can be compared with the quarterly primary lead standard of 1.5 ug/m^3.

4. Existing Air Pollution Sources

The location of the major pollutant sources within 25 Km of the proposed plant site are depicted in Exhibit II-15. In addition to these major sources, there are a large number of minor sources in the area, especially in Belleville, which also contribute to air pollution. For a source to be considered as a major source for the purposes of this study, it must have the potential to emit at least 50 tons/year of either TSP, SO_2 or NO_x.

Table II-28 presents a listing of the major sources which met these criteria. It also presents the maximum amounts of each of the major pollutants for which it has a potential to emit. The UTM (Universal Transverse Mercator) coordinates for each source are also presented. As can be seen from the table, the Baldwin Power Plant, located about 10 miles south of the site, is by far the largest single source in the area.

F. WATER RESOURCES

1. Surface Water Hydrology, Availability And Quality

a. Description of surface Water Hydrology General Drainage Description

i) Regional Drainage

The New Athens-Fayetteville Region is drained by the Kaskaskia River and its perennial tributaries: Mud Creek, Little Mud creek, and Silver Creek. The density of permanent tributaries entering the Kaskaskia in the New Athens region is very low, with the majority of drainage in this area provided by a randomly oriented network of shallow intermittent drainageways. These drainageways carry storm water from the adjacent uplands into marshes or lakes on the floodplain, with few drainageways making a direct surface connection with the Kaskaskia River.

Numerous marshes and oxbow lakes occur within the floodplain near the normal pool elevation of 368 feet. These features, reflecting previous courses of the Kaskaskia River, are also indicative of the low gradients that exist in the floodplain area. Areas in the floodplain between an elevation of 390 feet to 400 feet do not contain marshes indicating better drainage conditions at these elevations.

The upland till plains, sand hills, till ridges, and terraces are generally well-drained. Drainage within and from the strip-mined areas is mostly poor because of numerous enclosed surface depressions resulting from spoils disposal, differential compaction of the spoils and general land disturbance accompanying the mining operation.

The natural relationship between the Kaskaskia River and its floodplain has been altered in the Fayetteville-New Athens reach of the river by straightening and deepening the river channel, by construction of the Carlyle Reservoir and Lake Shelbyville, and by construction of levees. These actions were taken to provide improved navigability, to reduce the flood potential of the river and to reduce stream flow.

ii) Site-Specific Drainage and Flood Plain

The proposed site is located on the Kaskaskia River near mile marker 31.The area in which the proposed plant will be located is described as a saucer-shaped depression with no surface water outlet. As a result of this situation very poor drainage conditions result. The differential settling of the acclaimed area leads to the creation of many small ponds. These conditions present difficulties in maintaining a dry condition on the site.

Although the site is located on the 100 year flood-plain, it is protected by a levee 30 foot high above the surrounding terrain. The site lies in an area whose altitude ranges between 350 to 470 feet on a reclaimed strip mine.

The site specific flood stage information for high flow river conditions near mile marker 31 (provided by USCE river routing programs)+.

River Stage Prediction For
Kaskaskia Navigation Channel Mile 31.0

River Stage (ft MSL)	Discharge (cfs)	Recurrence Interval (years)
372	10,000	1.4
382	30,000	6.7
387.5	50,000	30
396	83,000	333

The proposed site, although in the Kaskaskia River flood-prone area, is protected by a 30 foot high levee. The Corps of Engineers River Stage Prediction for Kaskaskia Navigation Channel Mile 31.0 as presented above provides the probability of a flood occurrance. Given these data, the site appears to be relatively assured of protection from flooding.

The normal pool elevation of the Kaskaskia River at the site location is 368 ft. MSL corresponding to this is the width of the channel bed is 225 ft and the channel surface 297 ft and minimum depth of 9 feet. Minor flooding begins as the water level exceeds 380 ft. The probability of the river elevation approaching 400 ft MSL is much greater than once every 100 years according to the U.S. Corp. of Engineers routing program for the Kaskaskia Navigation Project. The mean high water elevation is 386.5 ft. The Kaskaskia Navigation Project, see Exhibit II-16, situated on the river between Fayetteville, Ill. (mile marker 50.2) and the Mississippi River (mile marker 0.0), includes the construction of the Kaskaskia River Lock and Dam facility (river mile 0.8) and the Carlyle Reservoir and Shelbyville Reservoir (river mile 106.4 and 221.5 respectively). These facilities control the flow regulation of the Kaskaskia River through the reservoir releases and the gate manipulation at the Lock and Dam facilities.

b. Surface Water Availability

i) The Kaskaskia River

The Kaskaskia River is the major surface water body near the proposed plant site. Examination of the 10 year (1961-1970) Kaskaskia River discharge data, measured at the Route 13 bridge gaging station has indicated a mean annual maximum discharge of 24,554 cfs, a mean average of 3,209 cfs, and a mean minimum of 157 cfs. With the installation of The Carlyle Dam, the maximum annual discharge (1969-1971) has averaged 22,433 cfs, the average mean 4,285 cfs, and the average minimum 245 cfs. (SIMAPC, 1974 b). Thus, surface water available at New Athens is dependent on the release of water from the Carlyle and Shelbyville

Reservoirs located at river miles 105.75 and approximately 200, respectively. (New Athens is located at river mile 30).The 7 day, 10 year low flow estimates developed by the Illinois State Water Survey are based on flow estimated for the entire Kaskaskia basin above New Athens and indicate flow values of 50 cfs at Carlyle and 93 cfs at New Athens. These estimates include data through 1970 and therefore include low flow records for a period including dam control of flows.

The representative of the Illinois Department of Transportation - Division of Water Resources in Springfield, Illinois, indicated that through releases from Lake Shelbyville and Lake Carlyle, 60 mgd are available to downstream users. This 60 mgd is based on a one in fifty year drought probability. A permit would be required and the water would be purchased. Currently the rate for purchase of the water is $.05/1000 gal or at a proposed requirements of 15 mgd, a cost of $750/day. He stated that at this time there are no major users of this 60 mgd.

It has been estimated that the water consumption for the proposed plant would be approximately 15 million gallons per day, therefore it is concluded that the Kaskaskia River will be able to supply the required volume of water.

c. Surface Water Quality

This section defines the water quality of the Kaskaskia River in the vicinity of the proposed plant site. Data utilized to characterize the water quality of the river were obtained from the following sources:

- Environmental Protection Agency (EPA) STORET Data System
- Water Resources Data for Illinois Water Year 1976
- Peabody Coal Co. - Environmental Impact Report River King Pit #3 Extension - Oct 1977

The water quality of the Kaskaskia River at or near the plant site is presented in Table II-29. This information is based on EPA STORET river monitoring data for the following sampling stations in:

* Roots, Illinois at mile 3.3 approximately 28 miles down river from the proposed site,

* a point mile 28 approximately 3 miles down river from the proposed site, and

* Venedy Station mile 71 approximately 40 miles up river from the proposed site. As can be seen from comparing these data, most of the parameters agree relatively closely to one another except for such parameters that can be influenced by outside sources such as a population center (New Athens) and corresponding domestic sewage plant effluent and agricultural runoff which contains phosphorus and nitrogen.

The close correlation between the up river Venedy Station site and the site 3 miles down river from the proposed site also was observed by the report for Peabody Coal Co. "Applicant's Env Impact Report - River King Pit #3 Extension" Oct 1977.

The dissolved oxygen, ammonia-nitrogen and sulfate concentration on the average have been well within the Illinois standards (5 mg/l, 1.5 mg/l and 500 mg/l respectively) except on an occasion where these standards have been exceeded.

The data indicates that the river is of moderate hardness with a mean value of approximately 180 mg/l.

The temperature, pH, nitrate-nitrogen, dissolved solids fluoride, chloride parameters fell well within all Illinois standards (34^{o}C, 6.5-9.0, 10 mg/l, 1000 mg/l, 1.4 mg/l, 500 mg/l respectively).

Iron (Table II-29) has been found to be higher than the Illinois standards (1.0 mg/l) this observation agrees with conclusion reached in the R F Weston Report, "Phase II Environmental Analysis for Coal Con Clean Boiler Fuel Demonstration Program - Jan 1977". According to the Weston report, the iron and manganese combined cause taste and aesthetic problems in potable water.

In summary, it appears that the Kaskaskia River water quality presents no problems for its intended use. This opinion is alos presented by the R F Weston Report, the Coal Con Phase II Environmental Analysis Report for Coal Con Clean Boiler Fuel Demonstration Program - Jan 1977.

2. Groundwater Hydrology And Quality

a. Groundwater Hydrology

i) Regional

Groundwater resources in the vicinity of the Clark Oil site are available, in limited quantities, from the consolidated and unconsolidated formations in the area. The generalized yield and quality characteristics of the major water bearing deposits in the area are summarized below.

Bedrock

Some groundwater is available in the shallow Pennsylvanian Age sandstones and limestones of the Carbondale Formation. Wells in the Pennsylvanian formations range in depth from 80 to 200 feet below land surface. Yields in these formations are low, typically less than 25 gpm. This water also tends to be highly mineralized. The combined low yields and water quality result in severe limitations for development of water supplies from these sources.

Unconsolidated Deposits

The unconsolidated deposits in the region are generally the highest yielding aquifers in the region. However, due to their glacial origin, they are generally discontinuous and heterogeneous, resulting in highly variable yields and water quality over short distances. The unconsolidated deposits in the area consist of alluvial clays and silts of the Cahokia Alluvium and Equality Formations, underlying glacial outwash sands and gravels of the Henry and Pearl

Formations, and various upland deposits of glacial till and loess (Exhibit II-5). The Cahokia Alluvium and Equality Formations and the generally thin surficial upland till and loess deposits are capable, based on Illinois State Water Survey (1975) estimates, of yields only up to 5 gpm. Their use has typically been restricted to shallow, large diameter domestic wells.

The highest yielding unconsolidated formations are the glacial outwash sand and gravel deposits of the Henry and Pearl Formations which underlie, at depth, the Kaskaskia River floodplain and adjacent terraces. The Illinois State Water Survey (1975) estimates that these formations are capable of well yields up to 100 gpm although smaller yields are likely as these formations are discontinuous and frequently intermixed with fine grained silts and clays which decrease permeability.

The water table in the area is generally a subdued replica of the surface topography with higher levels in the upland areas and sloping gently to levels at or near the land surface near the river. Groundwater flow is normally toward the Kaskaskia River. Levels fluctuate with precipitation and changing river stage and are generally higher in the spring and lower in fall with the amount of fluctuation higher in the uplands and lower in the more permeable valley deposits.

ii) Site Conditions

Groundwater yields, levels, flow patterns and possibly quality have been altered by past and current surface mining and associated dewatering operations at the Clark Oil site and adjacent areas.

The site is currently underlain by replaced spoil materials ranging from 50 to 90 feet in thickness and saturated below the water table. The spoil materials are a mixture of the coarse glacial outwash sands and gravels with the formerly distinct overlying alluvial silts and clays and the underlying bedrock formations. Lower yeilds might therefore be expected from wells constructed at the site as compared with the surrounding, undisturbed area.

An earlier geotechnical investigation at the Coalcon site (Dames and Moore, 1976) estimated the permeability of the clay materials at the site to be 0.25 feet per year (2.45×10^{-7} cm/sec). Permeability of the sandy materials more prevalent nearer the Kaskaskia were estimated (Weston, 1977) to be on the order of 10^{-3} cm/sec or greater. Permeability of the spoil mass thus varies considerably with the distribution of sand and clay layers.

Groundwater levels and flow patters at the site have been significantly altered as a result of pumping up to 3 million gallons per day (MGD) from an active mine pit east of the site. As part of the Dames and Moore geotechnical investigation, 4 site borings were converted to groundwater monitoring wells. Locations of the borings and monitoring wells are shown in Exhibit II-8. Groundwater levels were measured from August 1976 through November 1976. Groundwater levels in the monitoring wells varied less than one foot during the four month sampling period with a generally decreasing trend coinciding with a drop in the level of the Kaskaskia River.

Groundwater levels were also noted for several of the site borings during drilling. The elevation of the groundwater table ranged from 371.7 feet msl in boring B-19 adjacent to the Kaskaskia to 338 feet msl in boring B-10. The data show a general decrease in groundwater elevations with distance from the river indicating a reversal of normal groundwater flow direction and induced recharge from the Kaskaskia as a result of the mine dewatering operations. Hydraulic gradients were on the order of .01 in the vicinity of the river and .001 in the area of the northern most incline. Groundwater levels noted on the site boring logs and measured in the monitoring wells are shown in Table II-31.

Peabody Coal Co presently monitors water levels in twelve monitoring wells in the unmined areas north and east of the proposed site. These wells are installed in both the unconsolidated deposits and/or bedrock. The locations of these wells are shown on Exhibit II-16. Data on the wells and groundwater levels are presented in Table II-32.

There are presently no groundwater monitoring wells on the proposed site. However two ponds at the extreme northern end of the site and the deeply excavated abandoned inclines which traverse the site and are partially filled with water, are assumed to reflect groundwater levels in various portions of the site. Elevation of the water surface in the northern-most incline, measured during a (date) topographic survey, was 358 ft. Comparing this level with the groundwater elevations of 341 ft and 338 ft noted during drilling of borings B-5 and B-10 respectively indicates that current flow directions at the site are generally consistent with those measured during the 1976 geotechnical investigation although groundwater levels have since risen as the active mining area has progressed to the east. The pond surface elevations generally increase in a northerly and westerly direction away from the active pumping center. Groundwater flow at the site is generally towards the active mine pit east of the site. As the mine dewatering activities proceed east, away from the site, groundwater levels should continue to use. Eventually water levels should stabilize at or slightly above river level and groundwater flow will again be towards the Kaskaskis River.

b. Groundwater Quality

i) Regional

Very limited data is available on the quality of groundwater in the vicinity of the proposed site although these aquifers are known to supply many rural residences in the area with potable water. According to the US Geological Survey (1971) groundwater in the regional bedrock formations tends to be highly mineralized with total dissolved solids increasing with depth to as much as 80,000 mg/l at 1000 to 2000 feet. Below a depth of 500 feet groundwater is generally saline with chloride levels greater than 250 ppm.

Groundwater in the unconsolidated deposits generally has a lower mineral concentration and is of better quality than that found in bedrock formations. This groundwater is used widely in the area by the smaller municipalities and numerous individual domestic and commercial users. Water quality varies considerably but is generally high in total disolved solids, frequently very hard (greater than 250 ppm), and often contains iron and manganese concentrations in excess of the drinking water standards. The limited groundwater quality data available for the area are presented in Table II-32.

ii) Site Conditions

As part of the River King Pit 3 groundwater monitoring program Peabody Coal Co conducted monthly groundwater sampling and analysis at Monitoring Wells 1 and 2. Both of these wells are screened in the shallow bedrock formations above the Herrin Coal. Results of analyses from the July 1980 through December 1980 sampling period are summarized in Table II-33. Water quality data for the shallow unconsolidated deposits and in the spoil areas are not presently available.

G. SOCIOECONOMIC ENVIRONMENT

This section is to describe the current socioeconomic environment, for specific geographical areas which surrounding the proposed facility. The baseline information for the socioeconomic environment is comprised of five major components: land-use, economy, demographic, infrastructure, and cultural resources.

The land-use component includes current land-use patterns for St. Clair County and a nine-township area which includes New Athens Township, and other, communities within a eight (8) mile radius around the proposed facility (Exhibit II-17).

The economy component, examines both employment and personal income trends from 1969 to 1979 for the five county region within a twenty (20) mile radius from the proposed plant.

The demographic component, examines past and projected (1970 and 2010) population trends for both five county region, and the nine-township area.

The infrastructure component focuses upon the public and private services available in the Village of New Athens.

1. Land Use

a. St. Clair County

The most recent existing land use data for St. Clair County was collected as part of a 1978 LANDSAT Satellite data demonstration project carried out cooperatively by the Illinois Environmental Protection Agency, the Illinois Department of Local Government Affairs, and the Southwestern Illinois Metropolitan and Regional Planning Commission.

Land use for the St. Clair County and the nine townships adjacent to the site has been classified into eight different categories. These land use categories are defined as follows:

Developed - Land features typical of urban and suburban development such as residential, commerical, and industrial development.

Agricultural/Row Crops - Land utilized for the production of food and fiber products exclusive of pasture land.

Pasture & Grass/Inactive Mine Lands - Land cover including pasture land, reclaimed abandoned strip mines and mined land undergoing reclamation.

Open Space/Forest - Land with extensive grass cover or well developed tree cover. This category embraces golf courses, parks, orchards and forest land.

Active Mines/Mine Waste - Active mineral extraction and coal mine waste materials.

Barren - Barren earth with essentially no vegetative cover.

Water/Wetlands - Water surfaces as well as marshes, swamps, and mudflats.

Uncategorized - All other land areas.

The total land area for St. Clair County is 429,692 acreas or 671 square miles (Table II-34). The most predominant land use within the county is agricultural which encompasses 229,504 acres or 53.5 percent of the County's total land area. The county in general has remained agriculturally oriented, even though the northwestern part of the county is extensively urbanized.

The pasture land and open space/forest land categories account for an additional 139,901 acres or 32.5 percent of the total land area within the county. Open space/forest land category, which includes recreation facilities, contains 8.132 acres of Parks. The average size of the parks with the exception of Kaskaskia Fish and Wildlife Area is 61 acres. The Kaskaskia Fish and wildlife Area is 4,000 acres extending along the Kaskaskia River from New Athens to Baldwin, 10 miles south of the site. Table II-35 summarizes the major recreation facilities within St. Clair County.

Developed acreage within the county accounts for 41,482 acreas or 9.7 percent of the total land area, while barren land accounts for 4,911 acreas of 1.1 percent of the total land area.

Mining land in the county totals 2,717 acres or less than 1 percent of the land area. Even though mining land occupies less than one percent of the land area of the county, historically, coal mining has played a prominent economic and employment role. In 1979 alone, 2.1 million tons of coal were mined in St. Clair County (Illinois EPA, 1980). The Illinois Department of Mines and Minerals indicates that St. Clair County generally ranks second in the state in total coal production.

b. Nine Township Area

The existing land uses for the nine townships within eight miles of the site are similar to those of the county with the exception of developed land. As shown in Table II-36, developed acreage in the study area is only 1.3 percent of the total, compared to 9.7 percent for the county. The developed land uses adjacent to the site include commercial, residential and industrial uses. The commercial uses are located in the Village of New Athens business district, which lies north of Route 13, approximately 1 mile west of the site. The residential uses are also located in the Village, situated between Route 13 and the Illinois Central Gulf (ICG) tracks, with the nearest residential unit situated one-half mile south of the site. The industrial uses are located south of the site and west of the site along the ICG tracks, with a large industrial district located between the business district of New Athens and the proposed site. The proposed site and the area immediately adjacent to it is zoned A - Agricultural even though it is being utilized as a strip mine.

The most prominent land use within the nine township area is agriculture, comprising about 57 percent (116,378 acres) of the total land area. The area of greatest concentration of prime farmland is north of the site in the Caseyville - Belleville area and Moscoutah, while other concentrations of prime farmland are located near the site along the Kaskaskia River and Fork Mud Creek.

Pasture/inactive mine lands are also a significant land use accounting for 25.5 percent (52,188 acres) of the nine township areas total land area. The strip mining activities of the past have greatly influenced land development patterns within the study area, leaving much of the reclaimed areas as vacant land. The proposed site is a partially reclaimed strip mine.

Open space and forest land in the nine township area totals 21,959 acres or 10.7 percent of the total land, of which about 4,465 acres are categorized as recreational lands. The largest recreational area within the nine township area, as shown in Table II-37, is the Kaskaskia Fish & Wildlife area, which is located near the site. There are two other recreational areas also located within New Athens. The first recreational area, Village Park, located about 1.5 miles west of the site, is a 2.5 acre neighborhood park with open play areas and entertainment stand. The second recreational area is an unnamed park, located about 2 miles west of the site between Main Street and the river levee, includes open play areas and a baseball diamond.

Water surfaces in the nine township area total 6,068 acres or 3 percent of the total land area. The most significant water surface is the Kaskaskia River which originates in Urbana, Illinois, and flows into the Mississippi River about 20 miles south of the proposed site. The Kaskaskia River forms the northern border of the site. The other major water body is Baldwin Lake located in southern St. Clair County and partially in Randolph County. Baldwin Lake with a surface area of 2,200 acres is part of the Baldwin Lake conservation area.

Land devoted to mining in the nine township area similar to the county, amounts to less than one percent of the total land use. Even though the land area devoted to mining is minimal, it is a mainstay of the area's economy. At the present, coal is being mined adjacent to the site in the River King #3 mine by the Peabody Coal Company.

2. Economy

a. Employment

Industrial employment in 1969 (Table II-38), for the five county region was 106,525 employees. The major industrial divisions which made up the region's economic base in 1969, were government with 27,173 employees (25.5 percent), manufacturing with 20,533 employees (19.3 percent) and services with 17,557 employees (16.5 percent).

By 1979, regional employment attained a level of 117,493 employees, which is a 10.3 percent increase over the 1969 regional employment levels but slightly below the national growth rate of 22.4 percent (U.S. Bureau of Economic Analysis, 1981) for the same period. The government division, in 1979, still remained the major industrial division employing 32,149 persons, and its overall proportion within the region's economy increased slightly to 27.4 percent of the region's total employment. The major contributing factor to the government division maintaining its primary position in the region's economy was due to the significant growth in state and local government sector (SIC 92.)

The industrial divisions that experienced significant growth during the period 1969 to 1979 were mining, wholesale trade, services, and retail trade. From 1969 to 1979, the mining division increased in total employment from 1,540 employees to 3,004, a 94.3 percent increase, which seems to have been induced by the increase emphasis given to coal as are energy source. The wholesale trade, industrial division, experienced the second largest growth within the region, which in 1969 employed 2,928 persons and by 1979 expanded to 4,520 persons, a 54.4 percent increase. The services industrial division experienced a 29.0 percent increase during 1969 to 1979. The employment in this catagory rose from 17,557 employees 1969 to 22,645 employees in 1979. The growth within this division was due to major employment increases within the medical and other health services sector (SIC 80). The other industrial division experiencing significant growth during this period was retail trade. In 1969, retail trade employment was 15,144 employees and by 1979 employment reached a level of 18,461 employees, a 21.9 percent increase. The growth within this division was due to major employment increases in the general merchandise (SIC 53) and eating and drinking (SIC 58) sectors.

The manufacturing and transportation, communication & public utilities (TCPU) division experienced significant declines in employment during the 1969 to 1979. The manufacturing division, in 1969 had 20,553 employees and by 1979 employment declined to 16,709, a 18.6 percent decrease. This decline seems to be due to a significant cutbacks in employment in the food and kindered (SIC 20); stone, clay and glass products (SIC 32) and electrical equipment and supplies (SIC 36) sectors. The TCPU division, which contained 10,556 employees in 1969, declined to 7,556 in 1979, a 28.4 percent decrease. The decline seems to have been brought about by employment reductions in both the transportation services (SIC 47) and electric, gas and sanitary services (SIC 49) sectors. The declines in the manufacturing and TCPU Sectors of the economy have adversely effected the unemployment situation in St. Clair County. As of October 1, 1980 unemployed workers in St. Clair County represented 9.9% of the workforce.

Looking more specifically at industrial employment by county for the period 1969 to 1979, (Tables II-39 and II-40), St. Clair County remained the major employment center for the region throughout this time period. In 1969, St. Clair County accounted for 77.1 percent (82,162 employees) of the region's total employment and by 1979 contained 76.9 percent (90,328 employees) of the region's total employment. In terms of specific industrial divisions, St. Clair County during the period 1969 to 1979 had almost 70 percent of all employment for the region's industrial divisions, with the exception of agriculture.

b. Income

In 1969, the total personal income generated by the region's employment divisions was almost $782.6 million, with about 78 percent ($610.7 million) being concentrated within St. Clair County (Table II-41). By 1979, total regional personal income increased to about $1.8 billion, which is 126.9 percent increase, below the national rate of 161.0 percent (U.S. Bureau of Economic Analysis, 1981.) In 1979, the St. Clair County accounted for almost 76 percent ($1.3 billion) of the region's total and continued to be the major center for the generation of personal income.

The county that experienced the greatest rate of growth in personal income generation during the 1969 to 1979, was Washington County, where the personal income rose from $23.3 million to $63.7 million, a 173.9 percent increase.

3. Demographics

In 1970, the total residential population for the five county region was 377,896 persons, with about 76 percent of the total population concentrated in St. Clair County (Table II-42). By 1980, the total population for this region declined to 367,47, a 2.9 percent decrease. However, St. Clair County still remained the major population center containing 264,177 persons or 72.0 percent of the five county total. From 1970 to 1980 however, St. Clair County's population declined by 21,414 persons gains experience by the four other counties within the region made up for most of this loss.

Table II-43, illustrates that 15,929 persons lived within the nine township area during 1970. By 1980, population of this area grew to 17,837 persons, which is a 12.0 percent increase. This increase is significant, since all of the townships, except the portion of Prairie du Long in Monroe County, are located in St. Clair County which experienced a 7.5 percent population loss during the same period. This indicates a shift in population from the more urban northwestern portion of the county to a more suburban/rural environments. The major population concentrations within the nine township area during this time period were Freeburg, Marissa, Smithon and New Athens Townships which comprise about

71 percent of the total population. Between 1970 to 1980, New Athens Township experienced a slight loss in population of less than 1 percent (2570 persons to 2493 persons).

During the time period between 1980 to 1990 both the five county region and nine township area are projected experience population increases, as shown in both Tables 1-9 and 1-10. In 1990, the five county region is expected to reach a level of 372,758 persons, which is a 1.6 percent increase above the 1980 resident level. St. Clair County's population level is expected to increase by 1 percent during this period, expanding to 266,935 persons by 1990. For the nine township area, resident population is expected to reach a level of 18,631 persons, which is about a 4.5 percent increase. More specifically, New Athens Township is expected to increase by 13.3 percent to a level of 3825 persons.

For the remaining future periods of 1990 to 2000 and 2000 to 2010, both the five county region and the nine township areas are expected to continue experiencing population increase as shown in Tables 1-9 and 1-10. By the year 2010, the five county region is expected to reach a level of 396,950 persons while the nine township area is projected to contain a resident population level of 19,938 persons. New Athens Township, during the above mentioned periods, is expected to attain a resident population level of 3,304 persons by 2010.

4. Infrastructure

a. Public Safety

Law enforcement is provided by the New Athens Township Police Department, the St. Clair County Sheriff's Department and Illinois State police. The township has 3 full-time police officers and (Coalcon, 1976a) two radio equipped cars. The St Clair County Sheriff's Department has 102 employees, including 34 full time deputies.

Fire protection is provided by the New Athens Volunteer Fire Department which is a separate taxing body. The New Athens Volunteer Fire Department has a membership of approximately 135, and 5 pieces of fire fighting equipment. Approximately 25 members serve as active volunteers. A mutual assistance agreement with other departments in St Clair and Clinton counties provides manpower and equipment to fight fires (Coalcon, 1977).

b. Education

School age children residing within New Athens Township can either attend either public or parochial school for grades K to 8 and New Athens Township High School for grades 9-12. For the 1980-81 school year, the New Athens Township Schools had a total enrollment of 695 students in all grades and capacity to accomodate 780 students (Ingalls, 1981).

c. Water and Sewer

New Athens is served by the Kaskaskia Water District, which also includes Lenzburg, Marissa and Tilden. The water district has a current capacity of .49 million gallons per day (MGD) and the demand or usage of .3 MGD, resulting in an excess capacity of .19 MGD (Coalcon, 1977).

The Village of New Athens is presently served by a sewer system, which has a current capacity of .3 MGD and a resident demand of .2 MGD, resulting in an excess capacity of .1 MGD (Rhutasel, 1981).

d. Hospitals

Emergency medical facilities are readily available in the St Louis metropolitan area. A total of 13,753 hospital beds are available in this area. In Belleville, seventeen miles north of New Athens, two hospitals offer more than 900 beds as well as emergency room facilities. Ambulance service is provided by the New Athens Fire Department and by a private ambulance service based in Freeburg, 7 miles north of the site (Coalcon, 1976a).

e. Transportation

The site is served by highway, rail, and river facilities. The major highway access into New Athens is State Highway 13, which is a two lane roadway from its junction with U.S. 460 (10 miles north of New Athens) to New Athens. Traffic on this section of the highway is expected to increase to approximately 600 5,600 vehicles per day by 1995 (Coalcon, 1976b). U.S. 460 travels west to a major interstate system in St Louis and east to Interstate 57 and major north/south destinations.

The Illinois Central Gulf Railroad serves the site through the East St Louis-DuQuoin line. The service is on a single trail line, equipped with centralized traffic control. The track at New Athens can hold 198 cars in addition to intermediate siding which can hold 125 cars. The main North-South line of the Illinois Central Gulf Railroad (Chicago to New Orleans) runs through DuQuoin, approximately 42 miles east of New Athens. There is no passenger service in the area. (Coalcon, 1976b).

River access to the site is possible along the Kaskaskia River which, in 1969, was channelized in the vicinity of the project.

The nearest International Airport is in St. Louis, 40 miles northwest of New Athens, on I-70 airport in Sparta, Ill., 15 miles South of New Athens.

f. Housing

In 1980, there were 971 housing units (U.S. Bureau of Census, 1981) in New Athens Township, and assuming a constant vacancy rate of 5 percent (U.S. Bureau of Census, annual) for both village and township, there were about 44 housing units. For the Village of New Athens, where immigrant workers are assumed to relocate, there were 774 housing units (U.S. Bureau of Census, 1981) with about 39 units assumed to be vacant.

5. Cultural Resources

There are no historic or archeological sites on the proposed site or in the immediate vicinity. Both the site and the immediate vicinity have been strip mined to a depth of 100 feet, which precludes the existence of any sites. The staff archeologist of the Illinois Department of Conservation, representing the State Historic Preservation Office, reviewed the site in connection with the Coalcon project and concluded there would be "no adverse impact on archeological sites" (Coalcon, 1977).

There are no historical sites, buildings structures, or districts listed on the National Register of Historic Places in the area of the site. The nearest such site is the Belleville Historic District located 15 miles north of the plant site. There are three buildings in the New Athens area that are considered historic sites by the Southwest Illinois Metropolitan Planning Commission. These buildings are:

- A residence at 409 Market Street, New Athens
- A residence on Van Buren Street, New Athens
- The Geiger Store Company, New Athens.

These structures are located approximately one mile west of the site.

III. ENVIRONMENTAL IMPACT ASSESSMENT

This section identifies the environmental affects that may occur during the site preparation, plant construction, and operation phases. Analyses have been performed to estimate the impacts on:

- topography and geology
- surface and groundwater
- aquatic biology
- air quality
- terrestrial ecosystems (vegetation and wildlife)
- socioeconomics, land use and aesthetics, and
- noise

The environmental impact assessments presented in this section have been performed utilizing the most conservative assumptions, to reasonably identify maximum possible adverse impacts. Appropriate environmental protection plans which will be implemented during the construction and operation will further minimize the potential for significant adverse environmental impact.

A. LAND RESOURCES

1. Topography

The primary impact on site topography will be the regrading and leveling of large areas of the site. In the vicinity of the plant, spoil material will be excavated and smoothed to acheive a final plant grade of 415 feet. North of the plant, the two inclines traversing the site will be backfilled with spoil materials excavated from nearby ridges. An overall elevation of approximately 400 feet is anticipated. The site preparation and regrading activities should have an overall positive impact on site topography. The artificial ridge topography will be smoothed and the deep excavations filled. The final topography will more closely resemble the natural, pre-mining topography of the site. No natural topographic features on the site will be adversely affected by the proposed development.

2. Geology

There are no natural geologic features on the site that might be jeopardized by the proposed development because of the previous mining. However, the geologic character of the site could negatively affect the proposed plant. The planned development of the site, including the location of facilities and site preparation procedures have been carefully developed in order to minimize these potential adverse impacts.

The site is located in Seismic Risk Zone 2, an area that by definition is subject to moderate damage from earthquakes. An analysis by Woodward-Clyde Consultants (1976) of the liquefaction potential of the former Coalcon site which overlaps with the proposed Clark Oil site indicated that, based on a design earthquake of MM VII, the site has a high liquefaction potential. The study concluded that the liquefaction potential dereases substantially if the site grade is at or above elevation 395 or if an unsaturated zone of at least 25 feet is maintained below foundation grade. All site facilities except for some of the waste storage ponds have therefore been located above elevation 395 feet. This will ensure that even at the cessation of mining when groundwater levels reestablish at or slightly above the Kaskaskia River level, a minimum of twenty five feet of unsaturated material will underlie all facilities. All facilities have been located in the southern portion of the site which, because it is underlain be more fine-grained materials, has a lower liquefaction potential. No major adverse impacts resulting from liquefaction are anticipated.

To provide an additional margin of safety the plant site has been located on a portion of the site which has been underground rather than surface mined. The plant site is underlain by approximately 15 to 45 feet of clay and sand deposits below which lies a 20 to 30 foot thickness of interbedded shale and limestone above the mined out coal layer. The mined-out coal workings which consist of a 6 foot high room and pillar layer will be backfilled with granular material to provide added strength and reduce the potential for subsidence. Areas bordering the plant site that have been surface mined will be surcharged to assure additional strength. Strip spoils presently on the surface will be removed.

The instability of spoil materials and the propensity to settle by differential compaction were also considered. Analyses of soils data from the Dames and Moore drilling program (1976) on the Coalcon site indicated that the spoil materials at the site are generally normally consolidated although some underconsolidated zones are present. Various foundation treatments such as preloading of the soil with a surcharge or dynamic consolidation may be used to help compact the strip mine spoil material and reduce future surface settlement. Future geotechnical investigations at the site will provide data to determine the appropriate foundation design and site preparation to maximize the strength and stability of these materials.

3. Mineral Resources

Coal utilized at the Clark Oil facility will be purchased from Peabody Coal. Mining of these coal resources to supply general market needs would continue in the area regardless of the development of the proposed plant. However, depending on market conditions, the development of the Clark Oil facility may increase the rate of coal production in the region. The Clark Oil facility will use approximately 7,400 tons of coal per day.

Construction of the Clark Oil facility will also provide an attractive market for local sand and gravel and limestone suppliers.

4. Soils

The impact of the proposed plant on site soils will be minimal. The natural soils of the site have already been destroyed by mining activities. Further development of the orthents soils will be largely precluded by development of the site and the soils will subsequently be classified as urban land.

A more detailed presentation of various site preparation and foundation alternatives considered is contained in the Foundation Support Evaluation Report prepared by Ebasco Services, Inc. (1981).

During construction the removal of vegetation will result in exposure of the site soils and an increase in the potential for erosion and sedimentation. However, site preparation practices will be carried out in a manner which minimizes exposure. Prompt reseeding and sediment control will be utilized to reduce soil erosion and sedimentation problems.

The State of Illinois requires a clay liner of 10 foot thickness and 1×10^{-7} cm/sec or less permeability beneath solid waste disposal facilities (letter communication, T. Cavanagh, IEPA). Liners beneath wastewater treatment ponds must be designed to acheive a percolation rate of less than 500 gallons per day per acre (Great Lakes - Upper Mississippi River Board of State Sanitary Engineers, 1978). This will require a clay liner approximately 1 foot thick based on a permeability of the clay of 1×10^{-7} cm/sec and a water depth of six feet.

It is currently anticipated that undisturbed clay materials east of the active mine pit will be used as liner material for the waste disposal facilities at the site. A laboratory tests of this material (Table II-4) indicates that at optimum moisture content and 95% compaction the permeability of this clay is 1.2×10^{-7} cm/sec. Compacted at optimum moisture content the clay sample was just short of meeting the state requirement of 1×10^{-7} cm/sec for solid waste disposal facilities. However, the permeability of clay materials can sometimes be decreased by compaction at wet of optimum moisture content (Lambe, 1958). Testing of additional samples and at wet of optimum moisture content would provide more reliable estimates of the clay characteristics and suitability. Assuming that the permeability of these materials can be reduced through compaction to 1 x 10^{-7} cm/sec, approximately 470,000 cubic yards of clay will be required for lining the waste treatment ponds, coal pile, and ash storage area, including the dike around the ash storage area. The clay will be excavated from an area just east of the active mine pit. These materials would otherwise be stripped as part of the mining operation. There will be no incremental excavation impacts or loss of productive soils from the region. A minor, very localized impact will be an increase in the permeability of the resultant spoils as a result of the decreased clay content.

B. TERRESTRIAL VEGETATION AND WILDLIFE

1. Construction Impacts

Facility construction will alter existing patterns of vegetation and wildlife abundance. The nature and magnitude of change are functions of facility acreage requirements and ecological factors pertaining to plant communities and wildlife habitat affected. Important ecological factors relating to plant communities are habitat for threatened or endangered flora; regional status (abundance or rarity); diversity of species or of vegetation environment relationships; successional status (replacement time); existing condition (pristine vs disturbed); productivity; and functional relationships to other communities (for example nutrient export).

a. Vegetation

Approximately 625 acres will be required to meet project construction and operation needs. The area thus affected encompasses most of the Coalcon site excluding one portion north of the fly ash/sludge storage cell and clean water runoff basin (Exhibit II-2). From the perspective of vegetation resources the plant communities involved exhibit few features of local or regional significance. Field community types affected are:

- not known or likely to support threatened or endangered species
- of low species diversity
- early successional (short replacement time)
- adapted to disturbed soils, and
- relatively unproductive.

Potentially significant features of these communities include hilly physiography, and role as wildlife habitat and perhaps as stabilizing influence on pond water quality. The hilly terrain of Field Types 3 and 4 provides a vegetation - environment landscape which to a certain extent is uncommon in the New Athens area. In time, these two community type may envolve into modified upland forest types. Juxtaposition of upland and floodplain forest communities would also represent a somewhat uncommon vegetation-landscape feature in New Athens and the surrounding region. Both of these features however, hilly terrain and juxtaposition of upland and floodplain forest types, presently occur near the Coalcon site (area of Mud Creek two miles east of the site, and other stripmined land near Lenzburg and Marissa).

Although the proposed site has been subjected to extensive perturbation, some of the communities present provide fair to good habitat for wildlife. The most valuable habitat is probably the large pond/marsh area in the northern portion of the site. This pond currently serves as a settling basin and may eventually be removed as mining activities proceed eastward. Its principal value at present is to migrant waterfowl which rest and feed there during the spring and fall. If, as is currently planned, mining is conducted through the Kaskaskia Oxbow the existing settling pond will be removed however, reclamation of the Oxbow area will provide additional wetland habitats superior to those currently present (Riley 1979).

The grassland habitats which would be removed by the facility will gradually be replaced as the existing mine/reclaimed area moves eastward. Although the area to be impacted currently offers good cover for grassland wildlife, species present are common and regional populations are unlikely to be significantly affected. The cottonwood/grassland complex present on the western portions of the proposed site is utilized by a greater variety of species than the more recently reclaimed grassland areas on the eastern portion. Fauna occupying the cottonwood/grassland habitat also occur, generally in greater abundance, in the bottomland forest community along the Kaskaskia River and removal of this acreage through construction and operational activities is unlikely to pose a major impact on local or regional populations of any wildlife.

2. Operations Impacts

Air emissions attending coal combustion and potentially having an adverse effect on vegetation include SO_2, NO_2 and trace substances. Sulfur dioxide effects have been identified as potentially important to project development. Concentrations of NO_2 are not likely to affect vegetation per se, but can alter plant responses to SO_2 and are discussed in this context. While several mechanims for injury from settleable particulates including fugitive dust have been postulated (Lodge et al., 1981), the potential occurrence and significance of vegetation impacts from particulate emissions are considered too small to affect project feasibility.

Evaluation of potential ecological impacts attending atmospheric emission of trace metals, fluoride and organic substances concerns processes of long-term accumulation and biological concentration. In a generic manner, the scientific literature has identified substances including hydrogen sulfide, carbonyl sulfide, carbon dioulfide and polycylic aromatic hydrocrabon such as azaarenes as ones meriting initial special concern with regard to synthetic fuels and their production (Morris et al., 1979; Giddings and Washington, 1981; Sourthworth et al., 1980). No reports of synthetic fuel-related emission effects on terrestrial flora or fauna have yet been published. It appears unlikely that concern with terrestrial ecological effects of trace substances would impede project development but these concerns could influence the type and extent of monitoring programs required.

a. Sulfur Dioxide

i) Literature Review

Although over 100 investigations of SO_2 effects on vegetation have been published (National Research Council, 1978 (NRC)), plant responses to SO_2 under field conditions are not readily predictable. Adverse effects are manifested as visible foliar injury, decreased rates of growth (yield) or photosynthesis, or as altered chemical composition of plant tissues (NRC, 1978; Dodd et al., 1979). Predisposition to disease, and reduced reproductive capacity, which are long-term ecologic effects, have also been postulated (Smith, 1974).

In addition to dosage, the type and severity of plant response is influenced by species or variety-specific sensitivity, effects of other air pollutants present, plant physiological state, and environmental conditions. At least four variables of dosage are important: concentration, duration, number of exposures, and interval between successive exposures (NRC, 1978).

Short-term (less than 12 hours), single-event, exposures to SO_2 directly affect plants by causing visible foliar injury. Threshold dosages vary widely with species and factors noted previously. From an extensive reivew of the literature Heck and Brandt (1977) projected the following exposures, in the absence of other pollutants, to cause about five percent visible injury on sensitive species growing under conditions which favor susceptability:

Time (hours)	Concentration ppm	(ug/m3)
0.5	1.0 - 4.0	(2620 - 10480)
1.0	0.5 - 2.5	(1310 - 6550)
2.0	0.3 - 2.5	(876 - 5240)
3.0	0.2 - 1.6	(524 - 4192)*
4.0	0.15 - 1.25	(393 - 3275)
8.0	0.1 - 0.75	(262 - 1965)

*Extrapolated.

Citing much of the same literature, the National Research Council (1978) concluded:

> Foliar injury may occur on susceptable species and varieties of plants under some ambient conditions if a peak atmospheric sulfur dioxide concentration greater than 2,600-5,200 ug/m^3 (1.0-2.0 ppm) occurs for less than 1 h, the concentration exceeds 1,300-2,600 ug/m^3 (0.5-1.0 ppm) for 1 h, the 3-h maximal average concentration exceeds 780-1,300 ug/m^3 (0.2-0.3 ppm) or the 6-8 h maximal average

concentration exceeds 520-780 ug/m^3 (0.2-0.3 ppm). Foliar injury on most species is unlikely if the atmospheric concentration of sulfur dioxide does not exceed 520 ug/m^3 (0.2 ppm).

Extrapolation of laboratory - derived injury thresholds to field situations is tenuous due to unpredictable effects of environmental conditions and modification of plant susceptability to air pollution injury when more than one air pollutant is involved. Short-term exposures required to produce injury may be raised or lowered by concommitant exposure to SO_2 and ozone (O_3) or SO_2 and nitrogen dioxide (NO_2). For example, a single 4 hour laboratory exposure of radish and alfalfa to 655 ug/m^3 SO_2 and 196 ug/m^3 ozone, produced an average of 21-22 percent injury on the three most injured leaves; while exposure to either gas separately effected no visible symptoms (Tingey et al., 1973). Similarly, Tingey et al. (1971) produced trace injury to pinto beans, oats, radish, soybean and tobacco with a single 4 hour exposure in the laboratory to 131 ug $SO_2/m3$ in combination with 94 ug NO_2/m^3.

Jones et al (1979) have reported actual field observation of visible foliar inquiry to crops and selected native species growing in the vicinity of Tennessee Valley Authority (TVA) coal-burning power plants. Of particular interest are their data concerning soybeans, which are sensitive to SO_2 injury (Benedict etal., 1971) and an important crop in the New Athens area. (Corn is ranked intermediate in sensitivity.) Of 102 observations, twelve yielded evidence of foliar chlorosis presumed to have resulted from SO_2 episodes. Lowest SO_2 concentration (measured near sites of inquiry) associated with observed chlorosis were 2740 ug/m^3 (peak), 1830 ug/m^3 (1-hour average and 970 ug/m^3 (3-hour average). From least squares regression analysis of their data and extrapolation to the y- intercept, Jones etal. speculate that 3 - hour average concentration of 450 ug/m^3 presents a threshold (short-term) dose for visible inquiry to soybeans.

Yield reductions may or may not result from foliar injury depending in part on severity, species, and growth stage. Yield reductions proportional to percent area damaged have been reported for soybeans (Davis, 1972), although investigations conducted by TVA indicate that growth stage at time of injury is a critical factor: five to 50 percent of the leaf area of soybeans growing in the vicinity of a TVA coal-burning facility evidenced SO_2 injury, with no reduction of soybean yields. The absence of a yield effect was attributed to the early stage of growth (pre-flowering) at time of foliar injury (Jones et al., 1973), and recovery capability of the plants.

Intermittent exposure to SO_2 or long-term continuous exposure may also injure vegetation. Symptoms include visible folra injury or changes in rate of photosynthesis or growth. Threshold dosages are unknown. One of the lowest concentrations reported to adversely affect vascular plants is 47 ug/m^3 applied continuously to <u>Lolium perenee</u> (perrenial ryegrass), which suppressed dry matter production with no visible leaf injury (Bleasdale, 1973, as cited in Crittenden and Read, 1978). Sprugel et al. (1980) observed reduced yields, also without visible injury, in field-grown soybeans exposed 18 separate times over 48 days to a mean 4.2

hour concentration of approximately 236 ug/m^3. Similarly, Heggestad and Bennett (1981) found reduced yields in snapbeans exposed to 157 ug SO_2/m^3 6 hour/day, 24 times over a 31 day period, when exposures were conducted with nonfiltered ambient air containing hourly peak ozone concentrations of 196 to 255 ug/m^3. Jones et al. (1979), however, reported no yield differences between field grown soybeans raised in ambient air and those raised on ambient air with SO_2 concentrations artificially reduced to 260 ug/m^3 or less. During the pod-filling stage of growth uncontrolled ambient air exhibited hourly and three-hour peak concentrations of 2100 and 1000 ug SO_2/m^3. The National Research Council (1978) concluded that long-term mean concentrations near 130 ug/m^3 can adversely affect growth and yield of some agricultural and forest species, but that increases in growth and yield of the same or other species can also occur at mean concentrations between 50 and 200 ug SO_2/m^3.

ii) Facility Impacts

Three-hour concentrations predicted from the proposed facility as well as contributions from Illinois Power Company's Baldwin plant are reported in Section III-D. The 50 highest three-hour values occurring with 1-3 km of the proposed facility (586-687 ug SO_2/m^3) and 50 highest occurring within 3-5 km (644-813 ug SO_2/m^3) approach or exceed slightly concentrations believed to be thresholds for visible injury to soybeans (450-2600 ug SO_2/m^3 3 hrs.).

These data indicate some, probably small, potential for occasional trace or small amounts of visible foliar injury to soybeans, which are believed to be the most sensitive crop species in the site area. Air pollution research has focused on economically important species such as crops, but there is no reason to believe that any native species (with the exception of giant ragweed (Jones et al., 1979) is significantly more sensitive to SO_2 than soybeans.

No useful estimate of probability of visible injury occurrence can be derived, due to the complexity of plant responses to air pollutants under field conditions. The ambient air environment of New Athens is probably conducive to SO_2 injury, because of high humidity and temperature and relatively high levels of ozone and perhaps NO_2. There is also an evident tendency for maximum concentrations to occur during late July through September, when soybean yields would be most susceptable to effects from foliar injury. Six of the nine days on which one or more of the 100 three-hour maxima occur lie between July 15 and September 20 (pod-filling stage). On the other hand, it should be noted that all but one of the two groupings of 50 highest three-hour maxima lie below the visible injury threshold identified by the National Academy of Sciences (780 ug/m^3), and none of these values exceed 970 ug/m^3, the lowest concentration reported to injure (presumably trace) soybeans growing in fields exposed to SO_2 from an actual industrial source (power plant).

While the above evaluation of potential for visible injury is based on known approximate threshold concentrations, similar information is unavailable for assessing impacts of recurring or long-term exposure to SO_2. Until recently it was widely assumed that economically significant yield reductions resulted only when substantical visible injury had been produced. Recent data from Sprugel et al. (1980) and Heggestad and Bennett (1981) indicate that the case may be otherwise. Their data suggest that existing air quality (SO_2 and O_3) in the New Athens area may currently be causing reduced soybean yields relative to pristine air, and that SO_2 emissions from the proposed synthetic fuel facility may cause further reductions.

No significant impacts on wildlife are anticipated to result from operation of the facility. Wildlife populations present on the site which will be displaced by the facility operations are common and widespread in the region. No rare, threatened, or endangered species on either the state or federal listing are known to breed on the site and any populations off the site are unlikely to be adversely affected by the plant operations.

C. AQUATIC ECOLOGY

1. Introduction

The purpose of this section is to provide a preliminary evaluation of the probable impact of the proposed project on aquatic resources. These resources include the Kaskaskia River (new channel), the Kaskaskia River Oxbow north of the site (after reconstruction following River King Pit #3 mining), and a variety of ponds on and adjacent to the site..

Sources of information for this evaluation included site observations; environmental report data for Peabody mining projects; conceptual engineering drawings water quality system data and hydrothermal data.

Impacts which were considered here included those associatd with constructing the facility; withdrawing water from the Kaskaskia River; and discharging water (effluent) back to the Kaskaskia River. Effects of leachate and runoff are not discussed based on the assumption that runoff and wastes are colected and treated in clay-lined ponds, and the only effluent of significance is that pumped from the final polishing and holding pond.

2. Construction Impact

Construction of the proposed gasification project will result in loss of most of the ponds shown in Exhibit II-13. The large pond on the southwest side of the site will serve as the final polishing and holding pond, and most of the smaller ponds will either be used for waste treatment or will be occupied by coal storage and plant processing units. The large ponds along the northern border of the project site will be unaffected by the proposed project, but will probably be lost prior to this project as River King Pit #3 activity commences. Loss of these ponds as a result of either the River King and/or Clark Oil projects will reduce sport fishing opportunity in the area, some of which may be compensated for by eventual reconstruction of the old oxbow northwest of the site and increased access to other oxbows resulting from improved access to the Kaskaskia River (channel improvement project).

3. Water Withdrawal Impact

Surface water withdrawal normally results in changes in downstream discharge and entrainment of aquatic organisms, which must be considered in impact projections and design of the plant. The former is not a factor for this project since the State of Illinois plans to increase upstream (dam) releases in order to accomodate water needs for the gasification plant (about 20 cfs). This increase in river flow will also mitigate entrainment losses by increasing the base rate against which the plant will draw; thus at 7 day 10 year low flow conditions the percent of flow used will be 18% rather than 20%, while the absolute amount withdrawn (20 cfs) will be superfluous. At average flow rates for the Kaskaskia River (4285 cfs + 20 cfs) the plant withdrawal rate will be less than one (1) percent of the river flow. Most entrainment concerns are expressed in relation to ichthyoplankton losses, which can occur in spring when river flow is at or above average levels. It appears that impact of the proposed facility due to withdrawal of Kaskaskia River water should be insignificant; especially since much of the sport fish spawning activity occurs in oxbows.

4. Water Discharge Impact

All point and non-point sources of pollution from the proposed project will be collected, treated, and utimately discharged to the Kaskaskia River through a single (effluent) point source. The volume of discharge, estimated to be 4.5 cfs, represents less than five (5) percent of the Kaskaskia River 7 consequetive day 10 year low flow and about one-tenth (0.10) percent of the average annual river flow. Under these circumstances impact is commonly considered minimal, given that concentrations of toxic wastes are not high.

In the proposed case, concentrations of potentially toxic chemicals in the final polishing pond effluent are almost all within State of Illinois "general use" water quality criteria, without taking into account a mixing zone. Copper and chromium effluent concentrations exceed general use standards by 0.018 and 0.005 mg/l, respectively, but are well within the maximum allowable effluent stndards of 1.0 mg/l (Ill. Pollution Control Board Rules and Regulations, Chapter 3, Part IV, Section 408). They are also within the concentrations specified for the less stringent Illinois criteria for "secondary contact and indigenous aquatic life". These data suggest that chemical impact on aquatic life, due to operating the proposed plant, will be minimal.

Effluent from the final polishing and holding pond may be discharged at greater than ambient temperatures, depending upon final plant design and layout. In the case where cooling water flow is introduced at the southern end of the final holding pond, thermal impact will be insignificant throughout the year (3.3F delta-T in winter; 0.06F delta-T in summer). If the cooling water stream is introduced just upstream of the construction access road culverts, however, atmospheric cooling potential is minimized and effluent temperature to the Kaskaskia River is estimated to be 20F above ambient during winter (no significant difference during summer). While the surface mixing zone (at 5F) is relatively small (approx 25' x 30'), a temperature difference of this magnitude may have an impact on fish attracted to the plume or organisms drifting through it. Cold-shock within the mixing zone is likely if the plant goes off-line. Thus, input of cooling water effluent at the southern end of the final holding pond is preferred.

The major impact of the proposed project as presented in the following are: loss of on-site sport fishing habitat and opportunities. Without the project, the fate of many of these ponds is unknown; some may continue to be available while others may eventually succumb to a different project. Impact of water withdrawal and discharge should be expected to be minimal on the basis of engineering, water quality, and hydrothermal data available at this time. However, lining of treatment and storage ponds with clay is assumed in this analysis, as is input of cooling water to the southern end of the final holding pond.

D. AIR QUALITY

1. Facility Emissions Estimates

a. Criteria Pollutants

The criteria pollutants are the pollutants which are regulated by the National Ambient Air Quality Standards (NAAQS) and include sulfur dioxide (SO_2), nitrogen dioxide (NO_2), total suspended particulates (TSP), carbon monoxide (CO), hydrocarbons (VOC) ozone (O_3), and lead. Table III-2 summarizes the emission parameters for all of the criteria pollutants from all of the sources at the proposed synfuels plant, except for lead, which is treated as a trace element in this analysis. The main boiler is the major source of SO_2 emissions, while the recycle gas bags are the primary source of NO_2 emissions. The dust collection system, coal handling operations, and coal storage pile and the recycle gas bags are all major components of the total particulate emissions. The primary emission point for carbon monoxide is the gas synthesis area. The gasoline synthesis area and the recycle gas bags are the primary sources of organic compounds.

Air quality emission standards applicable to coal conversion plants have not yet been promulgated by EPA. Hence, the only ways to determine the acceptability of the emission control equipment proposed are to determine the acceptability of the predicted ambient concentration impacts and to examine emission standards for other similar industrial projects. The ambient impacts are discussed in Section D.4 and the emission standards for other industries have been considered in the design of the project. For the purpose of this study, it is assumed that the project can comply with the Best Available Control Technology (BACT) provisions of the PSD regulations.

The existing air pollution sources within a 25 km radius of the proposed plant are summarized in Section II and Table II-28. Most of the sources would not significantly interact with the proposed plant emissions because of the large distance between these sources and the proposed plant and their relatively small emissions. One exception to this is the Baldwin Power Plant located 14 km to the south, which has very large emissions of SO_2, NO_2 and TSP, and which was therefore included as the only existing source for modeling for compliance with NAAQS. The stack emission parameters and location of the Baldwin Power Plant are presented in Table III-3.

b. Noncriteria Pollutants

The emissions of the noncriteria pollutants were estimated using the trace element analysis of the coal supply and the assumption that 100 percent of the trace elements in the coal would be emitted as air pollutants. It is recognized that this is an extremely conservative assumption (over estimate of emissions); however, no information on the fate of the trace elements in the various plant proceses and control equipment was available. Table III-4 summarizes the trace element analysis of the coal. Table III-5 presents the estimated amounts of trace element emissions, assuming a coal consumption rate of 7,362 TPD.

2. Modeling Methodology

a. Atmospheric Models

Air quality models are used to simulate the transport and dispersion of emissions from new or existing sources. The models predict pollutant concentrations at ground-level in order to determine if the emissions will result in compliance with ambient standards when combined with background concentrations. Because of the variety of dispersion modeling approaches available, regulatory agencies generally accept only dispersion models recommended by the U.S. Environmental Agency (USEPA, 1978; USEPA, 1980) as being appropriate for the particular situation of concern. In keeping with these agency guidelines, standard USEPA dispersion models were chosen for the synfuels plant analysis. This section presents a description of the model used, the receptor grid developed, and the meteorological data input to the model.

The Industrial Source Complex Short-Term Model (ISCST) was used to estimate the ground-level impacts of the particulate emissions. It is a steady-state Gaussian plume model which can be used to assess pollutant concentrations from a variety of sources associated with an industrial source complex. The model can account for settling and dry deposition of particulates; area, volume and point sources; plume rise as a function of distance; separation of point sources; limited terrain adjustments; and both stack tip and building induced downwash. The generalized Briggs (1975) plume rise equations are used to calculate plume rise as a function of downwind distance and the vertical and horizontal dispersion coefficients are derived from Turner (1970). A technical discussion of the model can be found in the Users Guide (Bowers, et al., 1979).

The impacts of SO_2 and NO_2 emissions from the proposed plant on ambient air quality were determined using a version of the USEPA's CRSTER dispersion model. CRSTER is the USEPA model recommended for use where there are no significant meteorological or terrain complexities (USEPA, 1977a). It is a straight-line, steady-state model which incorporates Gaussian diffusion concepts. It calculates ground-level concentrations for each receptor point for each hour of the year using hourly values of surface meteorological variables and twice daily mixing height observations. The wind speed input is adjusted to speeds representative of the stack height where emissions first enter the atmosphere by application of stability-dependent power law relationship. The Briggs (1975) final plume rise formulae are used to calculate plume behavior. The vertical and horizontal dispersion coefficients are derived from Turner (1970) for seven atmospheric stability classes. The top of the mixing layer is treated as a reflecting boundary of the plume until, at some distance downwind, the surface layer is assumed to be uniformly mixed. The version of CRSTER used for this analysis differs from the standard USEPA version in that it allows the consideration of multiple sources at their actual locations rather than assuming that all sources share the same location.

The ISCST and CRSTER models produce tables of annual average concentrations predicted for each input receptor point as well as tables of the highest and second-highest concentrations for each receptor point for various short term averaging periods. Even though the short-term ambient standards are defined by values that are not to be exceeded more than once per year, the highest ground-level concentrations are generally used to compare modeling results to the NAAQS and PSD increments when only one year of meteorological data is used for modeling.

b. Meteorological Data

The hourly meteorological input data required by the ISCST and CRSTER models were derived from two separate meteorological data bases (surface and upper-air) which are considered to be representative of on-site conditions. One data base consisted of hourly surface observations of wind speed, wind direction (resolved to the nearest 10 degrees), temperature and cloud cover observations recorded at Scott Air Force Base, which is located approximately 25 km north of the project site. The second data base consisted of mixing height data based on rawinsonde upper air observations taken at the Columbia, Missouri, rawinsonde station and computed according to the method of Holzworth (1972).

Based on these data, a preprocessor program reformatted the wind and temperature and determined an atmospheric stability class for each hour based on the STAR method developed by Turner (1970). In addition, the reported wind direction (given to the nearest 10 degrees) was randomized to the nearest degree by addition of a random integer between minus four and plus five. This removed the directional bias created by forced wind reporting to the nearest 10 degrees. This procedure also provided a means of simulating natural fluctuations in wind direction. Hourly mixing heights were computed by an interpolation technique which utilized the twice daily upper air observations from the rawinsonde station.

c. Receptor Grids and Modelling Procedures

The receptor grid array used in the CRSTER modeling for SO_2 and NO_2 consisted of points at ten distances along each of 36 radial directions from a center point which is usually chosen as the location of the main pollutant source. For this analysis, runs were made on the one year of meteorological data using a spacing of 0.5 km between points on the radials from 1.0 to 5.5 km from the source. Previous experience on similar sources has indicated that maximum concentrations usually occur in this range. It was assumed for this analysis that the plant boundary extended to approximately 1.0 km from the center of the complex.

The receptor grid array used in the ISCST modeling for total suspended particulates consisted of points at 3 distances along each of 18 radial directions oriented 20 degrees apart. The ISCST model was executed at downwind distances of 1.0, 1.5 and 2.0 km. Because the TSP emissions are either ground releases (coal handling and storage) or released from lower stack heights than the SO_2 and NO_2 emissions, the downwind TSP impacts occur at relatively short distances from the plant.

Both CRSTER and ISCST have the capability to incorporate the effects of uneven terrain in the calculations. However, because of the relatively flat topography surrounding the proposed site, and the insensitivity of the model to small terrain variations, this option was not utilized in the analysis.

3. Compliance with PSD Increments

Current PSD regulations were described in Section II. As indicated, only the Class II increments are applicable for this application.

a. PSD Emissions

For the analysis of PSD increment consumption, all major new sources within the plant area of impact which began construction after January 6, 1975, must be considered. All sources (major and minor) must be considered in the increment consumption analysis if they commenced construction after the "baseline date", which is determined by the submission of the first complete PSD application after August 7, 1977. The Illinois Environmental Protection Agency was asked to provide emissions data for such sources of pollution; however, within the plant area of impact (approximately 25 km radius) there were no sources which have submitted a complete PSD application. Therefore, the proposed plant itself is the only source of emissions used in the PSD increment consumption analysis.

b. Impact on Class II Areas

Results of the dispersion modeling using the emissions described above for the PSD analysis are presented in Table III-6. These results are based on one year (1964) of meteorological data. All predicted concentrations were calculated by the CRSTER model except for the TSP values, which were calculated by the ISCST model.

Predicted annual average SO_2 and TSP concentrations are far below the allowable PSD increments of 20 ug/m^3 for SO_2 and 19 ug/m^3 for TSP. The highest annual levels predicted are 6 ug/m^3 for SO_2 and 1 ug/m^3 for TSP.

The highest 3-hour and highest 24-hour SO_2 concentrations were calculated to be 313 ug/m^3 and 77 ug/m^3, respectively. These were calculated using meteorological data from July 30, 1964, which was the worst-case day for SO_2. These concentrations are predicted to occur at 1.0 km southwest of the proposed plant. The highest 24-hour TSP value predicted is 35 ug/m^3, which was calculated 1.5 km northwest of the plant. This value was calculated using meteorological data from November 3, 1964, the worst-case day for TSP.

Meteorological conditions associated with the "worst-case" days are presented in Tables III-7 and III-8.

4. Compliance with Ambient Air Quality Standards

a. Attainment Areas

As indicated in Section II, the ambient air quality standards established by the State of Illinois are identical to the National Ambient Air Quality Standards (NAAQS). These standards dictate the ground-level pollutant concentrations which must not be exceeded if the public health and welfare are to be protected with an adequate margin of safety from any known or anticipated adverse effects. Thus, they represent total values from the combined influences of new and existing sources and background concentrations.

Section II describes the existing (background) levels of the various criteria pollutants. These background levels (ug/m^3) for those pollutants for which the plant will have a significant impact are summarized below:

	Annual	24-Hour
TSP	50	105
NO_2	15	-

These background values for NO_2 and TSP were added to the results of the dispersion modeling of the proposed power plant sources to estimate the total ambient air quality concentrations for the region. Sulfur dioxide background levels were not added to the modeled values because the modeling included the Baldwin Power Plant along with the proposed plant, which together comprise more than 99 percent of the total SO_2 emissions within a 25 km radius. Therefore, adding a "background" value would, in effect, be double counting the impacts of the Baldwin plant.

The results of the air quality modeling are presented in Table III-9. No results are presented for carbon monoxide, hydrocarbons, ozone or lead since emissions of these pollutants from the proposed plant will be relatively small, and impacts on ambient concentrations are expected to be insignificant. It should be noted that the short-term background values are "worst-case" values, which are not likely to occur more than once or twice per year. The results indicate that operation of the proposed plant will not cause the violation of the annual standards for SO_2 or TSP, even after the addition of background TSP values. The highest annual average SO_2 concentration due to the proposed plant and the Baldwin Power Plant is predicted to be 17 ug/m^3. The maximum annual average NO_2 and TSP levels resulting from the plant are predicted to be 17 ug/m^3 and 1 ug/m^3, respectively. Addition of the background values results in maximum annual average values of 32 ug/m^3 and 51 ug/m^3 for NO_2 and TSP, respectively.

The highest 3-hour and 24-hour SO_2 concentrations are predicted to be 813 ug/m^3 and 168 ug/m^3, respectively. The highest 3-hour and 24-hour SO_2 values were calculated using meteorological data from September 6, 1964 and July 27, 1964, respectively. The highest 24-hour TSP concentration is predicted to be 35 ug/m^3 using meteorological data from November 3, 1964. The SO_2 concentrations are predicted 5.5 km south of the proposed plant and the high TSP concentration is predicted 1.5 km northwest of the plant. These concentrations represent 1 percent, 63 percent and 46 percent of the annual, 3 hour and 24 hour SO_2 standards, respectively. The highest, second-highest 24-hour TSP level, including the short-term background level of 105 ug/m^3, is estimated to be 140 ug/m^3; or 93 percent of the standard. It should also be noted that the TSP background concentrations are due primarily to windblown dust caused by agricultural activities rather than emissions from industrial sources.

Meteorological conditions associated with the "worst-case" days are presented in Tables III-10 and III-11.

b. Nonattainment Areas

The current attainment status of St. Clair and its contiguous counties with respect to meeting national ambient air quality standards as determined by USEPA and the state of Illinois through monitoring and/or other means is previously discussed in Section II and shown in Table II-24. In general, the counties of interest meet the primary and secondary NAAQS for almost all criteria pollutants. The exception is particulates and ozone for which St. Clair County is currently designated as nonattainment with respect to the primary standards. Both Madison and Monroe Counties are also nonattainment, at least in part, for these pollutants as well. Recent conversations with Illinois EPA (Lawler, 1981) have indiated that they are planning to request a redesignation from nonattainment to attainment with respect to both the primary and secondary particulate standards for a portion of St. Clair County which includes the project site. Therefore, the TSP modeling was performed as if the site area was attainment for TSP.Although the ozone status will remain nonattainment, the project will not have significant emissions of VOC and will thus not have a significant impact on the ozone nonattainment area.

5. Impacts of Noncriteria Pollutants

The maximum impacts of the trace element emissions were estimated by multiplying the various trace element emission rates by the ratio of the maximum 24-hour average SO_2 concentration to the SO_2 emission rate. The results are presented in Table III-12. These estimated plant impacts must be added to any existing concentrations (see Section II) before predicting the effects of these values. It should be noted that the predicted concentrations are based on extremely conservative estimates for trace element emissions and are thus over estimates (possibly by orders-of-magnitude) of trace element impacts.

6. Construction Impact

The site presently consists of disturbed areas of soil. All the construction runoff which includes suspended solids contamination would be directed to the final polishing and holding pond where the suspended solids would settle out through gravity separation. The water would be discharged from the final polishing and holding pond to the river. The impact on the river would be insignificant due to this suspended solids removal.

Sanitary wastewater produced during construction would be disposed of offsite in an environmentally acceptable manner and therefore cause no impact to the environment.

E. WATER RESOURCES

1. Surface Water

a. Chemical Discharges

Discharge of effluents from the proposed plant would result in impact to the water quality of the Kaskaskia River. The most significant impact would occur during periods of low river flow and low to normal rainfall. Heavier rainfall, approaching the design storm, would result in greater dilution of treated wastewaters in the final polishing and storage basin before discharge and after discharge to the Kaskaskia River.

As discussed earlier, wastewater generated at the proposed gasification facility will consists of fourteen different types of liquid wastes, which will be segregated to receive appropriate treatment. Each treatment system will be designed to achieve the effluent standard as specified by the Illinois Pollution Control Board Rules and Regulation for water pollution. Effluent from each treatment system will flow to the final polishing and storage basin prior to being discharged as a combined effluent to the river. Runoff from the slag landfill area and non-contaminated methanol storage area will flow directly to the final polishing and storage basin. This runoff is expected to be contaminated with suspended solids only which would be removed in the final polishing and storage basin by gravity separation. The blowdown from the cooling tower will also be discharged to the final polishing and storage basin directly. This stream will be contaminated with residual chlorine. The effluent from the final polishing and storage basin will be dechlorinated prior to discharging to the Kaskaskia River.

Estimated concentrations of constituents resulting from these treatment systems are provided in Table III-3. Also, characteristics of cooling water blowdown, slag landfill runoff and methanol storage area non-contaminated runoff, along with effluent characteristics from the final polishing and storage basin (after dechlorination) are provided in this table.

From the final polishing and storage basin the treated effluent will be discharged at an average rate of 2045 gpm (4.55 cfs). In the near-field area (ie., a zone close to the discharge point) free turbulence created by the shearing action of the discharge with respect to the ambient water causes jet diffusion of the wastewater (or pollutant mass). The major factors affecting the diffusion process include buoyancy (one of the major wastewater flows is heated blowdown from the cooling tower), discharge characteristics (quantity, velocity, type of system, etc) and ambient river geometry and crossflow. This complicated local plant site has been evaluated by using a mathematical model published by National Environmental Research Center in May, 1974 in Environmental Protection Technology Series (EPA-R2-72-005b).

During the evaluation, the above model was mainly used to study the thermal discharge from the proposed plant. Since in the near-field area, the heat dissipation to the atmosphere is regligible, the dilution ratios estimated based on temperature are considered also applicable to the other chemicals or pollutants. Based on this assumption, 7 day 10 year low river flow and average effluent discharge rate the following dilution factors (or ratios) were calculated:

Dilution Factor	Distance from the discharge point along the centerline of the jet (feet)
4	21
13	257

Based on these dilution factors, impact of the plant effluent discharge on the water quality of the Kaskaskis River in the near field area of the discharge point were analyzed. Results of this analysis are provided in Table III-14.

As indicated in the table, the parameters with relatively high concentrations in effluent are TDS, nitrate, calcium, magnesium, potassium, sodium, chloride and sulfate. Only these parameters can contribute measurable concentrations to the ambient river water quality in the immediate vicinity of the discharge. At a distance of 20 to 257 ft from the discharge point most of the parameters present in the effluent would practically approach the ambient river concentrations except TDS, nitrate, chloride and sulfate. For these four parameters the concentration increases can still range respectively, from 92 to 300 mg/l, from 9 to 30 mg/l, from 25 to 83 mg/l and from 46 to 151 mg/l.

Also in Table III-14, a comparison was made with the Kaskaskia River water quality standards. Results of this analysis indicate that all parameters would be within stated water quality standards beyond 20 feet from the discharge point except ammonia and iron for which maximum ambient river water concentrations are above the standard.

The site presently consists of disturbed areas of soil. All the construction runoff which includes suspended solids contamination would be directed to the final polishing and holding pond where the suspended solids would settle out through gravity separation. The water would be discharged from the final polishing and holding pond to the river. The impact on the river would be insignificant due to this suspended solids removal.

Sanitary wastewater produced during construction would be disposed of offsite in an environmentally acceptable manner and therefore cause no impact to the the environment.

b. Thermal Discharges

The purpose of the present study is to examine: (1) the site feasibility based on hydrothermal considerations, and (2) whether the heated effluent discharged to the Kaskaskia River from the proposed coal gasification plant will meet applicable Water (Thermal) Quality Standards of the State of Illinois under critical ambient condition.

The analysis includes: (1) the determination of water temperature in the holding pond, (2) the rise of water temperature in the Old River Channel caused by plant discharges, and (3) thermal characteristics of the Kaskaskia River due to discharges of warm water from the holding pond. The analysis is made essentially for winter plant operational conditions and for the 1 in 10 year minimum average 7 consecutive day low flow condition of the river. These conditions are considered to be the representative critical conditions.

The results of the present study indicate that: (1) the warm water when discharged into the Old River Channel would have restricted dilution and thus could create an environmentally unacceptable situation; (2) the warm water when discharged into the Kaskaskia River from the holding pond will be diluted sufficiently and would not cause any significant increase in water temperature of the river, thus, will comply with the Illinois water temperature standards; (3) as an outcome of these considerations the proposed site is judged feasible from hydrothermal considerations.

i) Regulatory Requirements

According to Illinois Water Quality Standards, the applicable thermal regulations are:

(1) The maximum temperature rise above natural temperature shall not exceed 5° F.

(2) The water temperature shall not exceed 60° F for December, January, February and March, and 90° F for the rest of the months during more than one percent of the hours in the 12-month period ending with any month. Moreover, at no time shall the water temperature exceed indicated values more than 3° F.

In the application of the above rules, whenever a water quality standard is more restrictive than its corresponding effluent standard, then an opportunity shall be allowed for the mixture of an effluent with its receiving waters (mixing zone). The above thermal criteria must be met at every point outside of the mixing zone. The size of the mixing zone cannot be uniformly prescribed. However, the following requirements are to be met:

(1) No single mixing zone shall exceed the area of a circle with a radius of 600 feet.

(2) The mixing zone shall not contain more than 25% of the cross-sectional area or volume of flow of the stream except when the dilution ratio of the stream is less than 3:1.

ii) Discharge rate and the Initial Temperature of the Effluent

The sources of heated effluent consist of cooling tower blowdown and effluent from various waste treatment systems. The types of effluents and corresponding flow rates and temperatures are listed below:

Type	Bio-Oxidation	Physical & Chemical Treatment	Sanitary	Oily Waste	Cooling Tower Blowdown	Methanol Runoff, Gasoline Storage, Slag Runoff
FLow Rate (gpm)	1074	156	10	5	773	27
Temperature (^{o} F)	90-95	Ambient	Ambient	Ambient	85	Ambient

The total flow rate is 2045 gpm (4.56 cfs). This amount of effluent will be assumed continuously discharged into the holding pond. In order to determine the mixed temperature of the effluent the "ambient" temperature denoted in the table is assumed to be the same as the ambient temperature of the Kaskaskia River.

Based on available water temperature data obtained at Venedy Station, approximately 40 miles up river from the plant site, it is found that the average mean temperature during winter (December, January, February) is 35.40^{o}F (1.89^{o}C) and during summer (June, July, August), 77.98^{o}F (25.54^{o}F).

The calculated mixed temperatures of the effluent, accordingly, are 84.14^{o}F (28.97^{o}C) for winter, and 88.26^{o}F (31.25^{o}C) for summer, respectively.

iii) Cooling Capability of the Holding Pond

The proposed holding pond is approximately 200 feet wide and 4400 feet long and oriented in north-south direction. The average depth of the pond is approximately 15 feet.

This holding pond was studied for its cooling capability. The outlet is assumed to be located at the northern end of the pond. To maximize the cooling capability, the inlet structure and location should be designed in such a way that the entire pond volume is utilized in cooling. The short circuiting of flow between the pond inlet and pond outlet is to be avoided. Although accurate numerical methods of estimating outlet temperature, including variable surface heat exchange coefficient, are available, a one-dimensional plug type flow is considered sufficient for the present purpose of a feasibility study.

In the following analysis, the plant discharge at the pond inlet will be assumed to spread across the entire width (200 feet) instantaneously and proceed toward the pond outlet. The only mode of temperature reduction process will be assumed through the heat loss to the atmosphere. Two representative inlet locations are considered. Case 1 considers the inlet to be located at the southern end of the pond. The pond outlet being at the other extreme end, the use of the pond is maximized. Case 2 considers the inlet to be located at 1/3 distance of the pond length from the pond outlet. At this location, the shortest pipeline from the plant is expected. However, only about 1/3 of the cooling pond is utilized under this scheme.

The pond effluent temperature, Tp, can be calculated according to the following equation[3]:

$$\frac{Tp - Te}{To - Te} = \exp \quad - \frac{KeA}{PCpQ}$$

where

To = pond inlet temperature
Te = ambient (equilibrium) temperature
Ke = surface heat exchange coefficient
Q = effluent flow rate
P = water density
Cp = specific heat of water
A = surface area

As described in the previous section, To and Te are 84.14°F and 35.40°F for winter, while for summer they are 88.26°F and 77.98°F, respectively; Q is 4.56 cfs.

The values for Ke are assumed to be 75 and 145 Btu/Ft^2-Day-$^{\circ}$ F for winter and summer, respectively. The value of PCp is approximately 62.4 Btu/Ft^3-$^{\circ}$F.

Based on the above information, pond effluent temperatures and temperature rises are estimated and tabulated below.

	Winter		Summer	
	Tp ($^{\circ}$F)	Tp ($^{\circ}$F)	Tp ($^{\circ}$F)	Tp ($^{\circ}$F)
Case 1	3.33	38.73	0.06	78.04
Case 2	19.92	55.32	1.82	79.80

in which Tp = Tp - Te.

The result indicates that if the inlet and outlet are located at the opposite ends of the pond (Case 1), the plant discharge excess temperature will be reduced to a value lower than 3.4°F above the natural water temperature. Both regulations on the maximum excess temperature (5°F) and the maximum temperature (60°F for winter and 90°F for summer) are met. Consequently, the thermal effluent from the holding pond outlet may be discharged to the Kaskaskia River, directly, without violating the thermal standards of the State of Illinois. However, the discharge of effluent into the Old River Channel is not desirable. The reason for this will be described in a later section. For Case 2 situation, the excess temperature will be as high as 20°F. The subsequent plume characteristics in the Kaskaskia River will be considered in the following sections.

iv) Waterbody Characteristics of the Kaskaskia River and the Old River Channel

Kaskaskia River

For navigational purposes, the reach of the Kaskaskia River near the proposed plant site will be maintained a minimum water depth of 9 feet through upper river basin controlled reservoirs (Carlyle and Shelbyville Reservoirs) and down stream elevation manipulation at the lock and dam facility. The channel bed width is 225 feet and the surface width corresponding to a water depth of 9 feet is 300 feet(4). The 1 in 10 year minimum average 7 consecutive day low flow is 93 cfs(5). The mean velocity under such flow conditions is estimated to be 0.04 ft/sec.

Old River Channel

The average width of the Old River Channel is approximately 150 feet and the average length is 11,200 feet. The maximum depth of the channel is about 13 feet. However, near the northern and western ends the depth is about 4 to 5 feet(4).

An earth retaining-wall situated across the northern (upstream) end of the channel prevents water from the Kaskaskia to enter the channel under normal conditions. Under flooding conditions, however, river flow may top over the retaining-wall and enter the channel. The downstream juncture between the channel (western end) and the Kaskaskia River remains open. Therefore, for most of the time the water elevations in the river and in the channel will be the same. If the heated effluent from the holding pond is discharged nto the channel with a rate of 4.56 cfs, it will induce a flow velocity of no more than 0.01 ft/sec at the western opening.

v) Thermal Effects of Discharges Into the Old River Channel

Except under flooding situations, the water elevation in the Kaskaskia River and the Old River Channel can be considered the same for all practical purposes. The Old River Channel would behave as a stagnant pool of water most of the time with very little flow velocity and natural flushing action. Thus, the effluent will be discharged into a stagnant pool with very little naturally induced dilution. Continuous discharge of the heated effluent will result in a heat buildup in the Old River Channel. Furthermore, with an increase in water surface elevation in the Kaskaskia River, the thermal effluent discharged into the Old River Channel has a tendency to traverse upstream (toward the northern end) which may not be flushed into the Kaskaskia River for considerable length of time. Thus the waste (heat) assimilating capacity of the Old River Channel is very limited. Because of this restricted dilution, the discharge of effluent into the Old River Channel is considered not feasible.

vi) Thermal Effects of Discharges into the Kaskaskia River

The plant effluent when discharged as a surface jet into the Kaskaskia River entrains the ambient water and is diluted. Within a distance of only 40 feet from the point of discharge, a dilution ratio of 4 (corresponding to a temperature rise of 5°F above ambient, stipulated in Illinois Water Quality Standards) will be achieved. The maximum surface and cross-sectional areas of the 5°F isotherm is less than 350 ft^2 and 20 ft^2, respectively. Maximum thickness of the 5°F isotherm is less than 2 feet. The plume does not reach the river shoreline or the bottom. Thus the plant discharges are expected to comply with applicable Water (Thermal) Quality Standards of the State of Illinois at all times. As the plume traverses further downstream, it will continue to mix with the ambient water and when fully mixed the discharged effluent will have been diluted 20 times and the temperature rise will be less than 1°F which is within the diurnal variation of the natural water body temperatures.

The above discussion holds under critical river flows conditions. As the river flow increases, the dilution increases, resulting in reduced extent of the 5°F isotherm. The fully mixed temperature will also decrease as the ambient river flow increase.

As an outcome of all these considerations, the site is considered feasible when discharges are made to the Kaskaskia River.

c. Groundwater

There is no use of groundwater planned for plant construction or operation. Accordingly, there are no water use impacts anticipated for this plant.

The solid waste disposal facilities at the site will be constructed, in accordance with state requirements, with a 10 foot thick clay liner. All leachate from the fly ash/sludge storage area will be retained within the liner. No impacts on the groundwater are anticipated from the solid waste disposal area.

A total of seven wastewater treatment and storge ponds will be constructed at the Clark Oil facility. The locations of these ponds are shown on Exhibit II-2. The equalization pond will be concrete lined. No discharge from this facility is anticipated. The final holding pond and clean fly ash/sludge runoff pond will contain water meeting the discharge standards and therefore will not require lining. No water quality impacts are anticipated from these facilities. The quantity of percolating water should not have a major impact on groundwater levels or flow patterns. The oily waste pond, coal pile runoff pond, biological treatment pond, and non-clean fly ash/sludge runoff pond will each be lined with approximately 1 foot of 1x 10^{-7} cm/sec clay to achieve a percolation rate of 500 gallons per day per acre at a water depth of 6 feet.

Water percolating from these facilities will migrate in accordance with the groundwater flow regime existing at the time of operations. At present, groundwater below the site moves in a generally northeasterly direction and is drawn into the mine pit area. However, the impact of mine dewatering activities on flow patterns decreases with distance from the active mine pit. In the area of the final holding pond groundwater levels appear to be slightly below the normal river elevation. However, because of the limited data available the direction of groundwater flow in this area is of greater uncertainty. As the mining operation proceeds east away from the site groundwater flow directions will reestablish in their natural direction towards the Kaskaskia River. Under either regime groundwater from the site does not travel off site to affect surrounding groundwater supply sources.

Wastewater percolating from the retention ponds will be subject to attenuation, dispersion, and dilution. Many dissolved species, particularly metals, can undergo sorption-desorption processes, such as ion exchange with clay minerals in the soil, during the processes of transport through the soil and groundwater flow system. Such phenomena tend to retard the rate of transport of waste constituents relative to the average rate of groundwater flow. Once entering the groundwater contaminants will be transported downgradient with attenuation of concentrations as a result of hydrodynamic dispersion. Considering the heterogeneity of the spoil mass and the lack of site specific hydrologic data it is not possible at present to quantitatively determine the rate of transport or concentration of waste constituents at the point of discharge.

As a result of dewatering, wastewater constituents will be further diluted by mixing with groundwater from surrounding areas drawn towards the mine and pumped from the mine pit into settling ponds. In addition, if elevated levels of waste constituents are detected in the ponds the water can be treated prior to discharge into the Kaskaskia River.

At the cessation of mining waste constituents within the groundwater will migrate towards and discharge into the river. The same process of attenuation, dispersion and dilution with river water would all aid in reducing the impact on the river water quality.

F. IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

1. Introduction

The socioeconomic impact analyses, presented here deleniates the affects the proposed facility and its induced immigrant worker population will have upon the existing socioeconomic environment during the construction and operational phases. The construction phase for the proposed facility is assumed to be from 1984 to 1987 the operational life of the proposal plant is assumed to be 30 years. The impact analysis focuses on the same five components which comprised the baseline analysis: land-use, economy, demographic, infrastructure and cultural resources.

The land use component evaluates the effects the proposed facility will have upon the existing land-uses, which comprise the site and adjacent areas. The economy component discusses the new levels of basic or primary employent, as well as additional income, pertaining to image and salary, by the proposed facility. The demographic component presents the level of workers required for the project (immigrant workers) and their settlement patterns, during both the construction and operational phases. This component, also includes the immigrant worker induced population effects for both St. Clair County and the Village of New Athens. The infrastructure discusses the impact the immigrant population and proposed facility will have upon local intrastructure.

2. Land-Use

a. Site

The proposed site consists of approximately 625 acres of formerly strip and subsurfaced mined land (Pasture/Inactive mine acreage). The major features of the plant are the conversion plant, the gasifiers, and the waste storage areas. The major plant equipment including gasifiers will occupy approximately 53 acres. The waste areas will occupy approximately 159 acres. The fly dust storage areas will occupy 112 acres and the slag storage areas will occupy 47 acres.

St. Clair County and the Township of New Athens have not adopted a land use plan for the future development of land in their respective jurisdictions. Thus the development of the plant will not be in conflict with any future land use plans.

St. Clair County, however has adopted a zoning ordinance which applies to the proposed project. The site is currently zoned A-Agriculture which permits mineral extraction by special permit. Even though the proposed plant will be linked with a mining operation it must be rezoned to "I-2" General Industrial District in order to be in conformance with the St. Clair County zoning ordinance.

Coal will be supplied to the facility by the Peabody Coal Company from the active strip mine, located east of the proposed site. The coal will be stored on an eight acre area located between the main plant facilities and the active strip mine.

The site has not been utilized for any other uses since it was mined. The use of the site is limited, due the previous use of the land. The construction and operation of the proposed facility will pre-empt any future alternative use of the 625 acre site.

b. Adjacent Land Uses

The development of the site as a synthetic fuels plant will significantly alter the land use mix within the Township of New Athens. Currently less than two percent (450 acres) of New Athens Townships total land area is classified as developed, which includes industrial development (Illinois EPA, 1980). Construction of the plant will more than double developed acreage within the township to 1073 acres and increases its percentage of the total land area to 4.7 percent.

Some impacts can also be expected to occur to adjacent land uses. The site is bordered on the north by the Kaskaskia River, on the east by an active strip mine, on the south by agricultural land and the west by the Village of New Athens. Land use impacts will occur to residential uses in New Athens and recreational uses along the Kaskaskia River.

The nearest residential use to the site is located about one-half mile southwest of the proposed plant. Numerous residential structures are located in this area which is the eastern edge of New Athens Village. These structures are located on the main access road to the office of the Peabody Coal Company. Roadways leading from the office are unpaved and are utilized daily by heavy mining equipment, in addition to employee and visitor traffic. Dust and noise created by construction of the plant will not represent significantly greater impacts than already exist.

The long term effects of the operation of the plant would be to decrease the desirability of the area for residential development. The major impact will be the physical presence of the plant with its massive dimensions. The area between the plant and New Athens Village is relatively flat, with little vegetation, resulting in the plant being highly visible from residential areas.

Recreational uses along the Kaskaskia will also be impacted by operation of the plant. Currently only limited recreational activity exists along the Kaskaskia, in the vicinity of the plant, due to the shallow depth of the river. The Army Corps of Engineers is proceeding with plans to dredge the channel and construct improvements upriver which will prevent rapid siltation of the river. Once the channel is dredged recreational activity is expected to dramatically increase. The presence of the plant, adjacent to the river, is expected to visually impact users of the river. However, the plant can be effectively screened from most users of the river by a landscape buffer.

3. Economy

a. Employment

The new levels of employment (basic) that would occur during the construction and operational phases are presented in Table III-15. The New employment opportunities provided by the project are expected to have a beneficial impact on the high level of unemployment in this area. During the first year of the construction phase (1984), the proposed facility is expected to create 375 new jobs. By the second year of the construction phase, the proposed facility is expeced to create an additional 1,092 new jobs for a total employment level of 1,467 jobs.

During the peak construction year of 1986, the proposed facility is expected to generate a total of 2,014 new jobs (construction and operational). In the final year of the construction phase employment is expected to decline by 859 jobs to a level of 1,155 jobs.

During the operational phse (1988 to 2007), the proposed facility is expected to create about 455 new jobs.

b. Income

The additional income that will be generated by the basic employment sectors during the construction and operational phases is illustrated in Table III-16, and is expected to be a substantial benefit of the plant. During the first year of the construction phase (1984), the proposed facility is expected to inject about $11.1 million in additional income into the local economy. Annual income during the construction phase (1984 to 1987) is expected to peak in 1986, with the generation of approximately $58.5 million in additional income. The cumulative income effect of the proposed facility for the entire construction phase is projected to be in excess of $142.2 million.

The additional income that would be injected into the local economy during the first year of the operational phase (1988) is expected to be about $8.2 million. This level of income attributable to the plant will remain constant throughout the operational phases. The cumulative effect of the proposed facility on the local economy during to complete operational phase is expected to be about $164.2 million, resulting in a total income effect of approximately $306.4 million for both the construction and operational phase.

4. Demographic

As shown in Table III-17 almost all the immigrant workers throughout the construction phase (1984 to 1987) are expected to settle within a six (6) county area. During the peak construction employment year of 1986, when immigrant workers would reach 394 workers, which is 20 percent of the total work force, about 52 percent (206 workers) of the total work force would relocate to St. Louis County (Missouri), while about 22 percent (88 workers) of the total work force would settle in St. Clair County. Throughout the construction phase between 19.4 to 26.7 percent of the total immigrant work force can be expected to relocate with St. Clair County. These percentages were derived from a model developed by Argonne National Laboratories (Stenechjem and Metzger, 1976).

The projected population effects for both St. Clair County and the Village of New Athens attributable to the construction phase are illustrated in Table III-18. During the peak construction year of 1986, the level of immigrant population that would reside within St. Clair County is expected to be 225 persons of which 46 are expected to be school-age children. The Village of New Athens is expected to receive about 43 percent of the County's total immigrant population during the peak construction year (1986) which amounts to 95 persons and 19 school age children.

5. Infrastructure

a. Public Services

All the public service functions, which were discussed in previous sections will have the ability to absorb the immigrant population's demand for public services during the construction and operational phases.

b. Transportation

The construction and operational workforce will generate additional vehicle trips per day along State Route 13, which is the main access road for the proposed facility. Table III-19, indicates that during the first year of construction (1984), an additional 576 vehicles trips per day will occur on Route 13.

The level of vehicles trips per day will peak in 1986, in which it is estimated that the proposed facility will induce an additional 3,098 trips per day along State Route 13 which is almost double the current traffic level. During the construction phase it is expected that the daily level of trips geneated by the proposed facility will be about 700 vehicles trips per day.

Additional rail traffic will also result from the construction of the proposed facility. A railroad spur will be constructed off the main Illinois Central Gulf Railroad (ICG) line (East St. Louis - DuQuoin Line) to the proposed facility. This expected increased in rail traffic will raise existing noise levels in adjacent areas as well as induce additional highway - rail conflicts.

The northbound rail traffic on the ICG tracks bisects the Village of New Athens and some residential neighborhoods. The increase in rail traffic can be expected to increase the ambient noise levels in this area. This same area that is bisected by the northbound tracks can also be expected to create same additional highway - rail conflicts. The area north of ICG track is accessible by only one route from the southern part of New Athens. This area, currently contains approximately 50 rsidences, 3 commercial structures and a recreation area. An increase in rail traffic, in this area, will result in additional time delays to highway users who are traveling to this part of the Village.

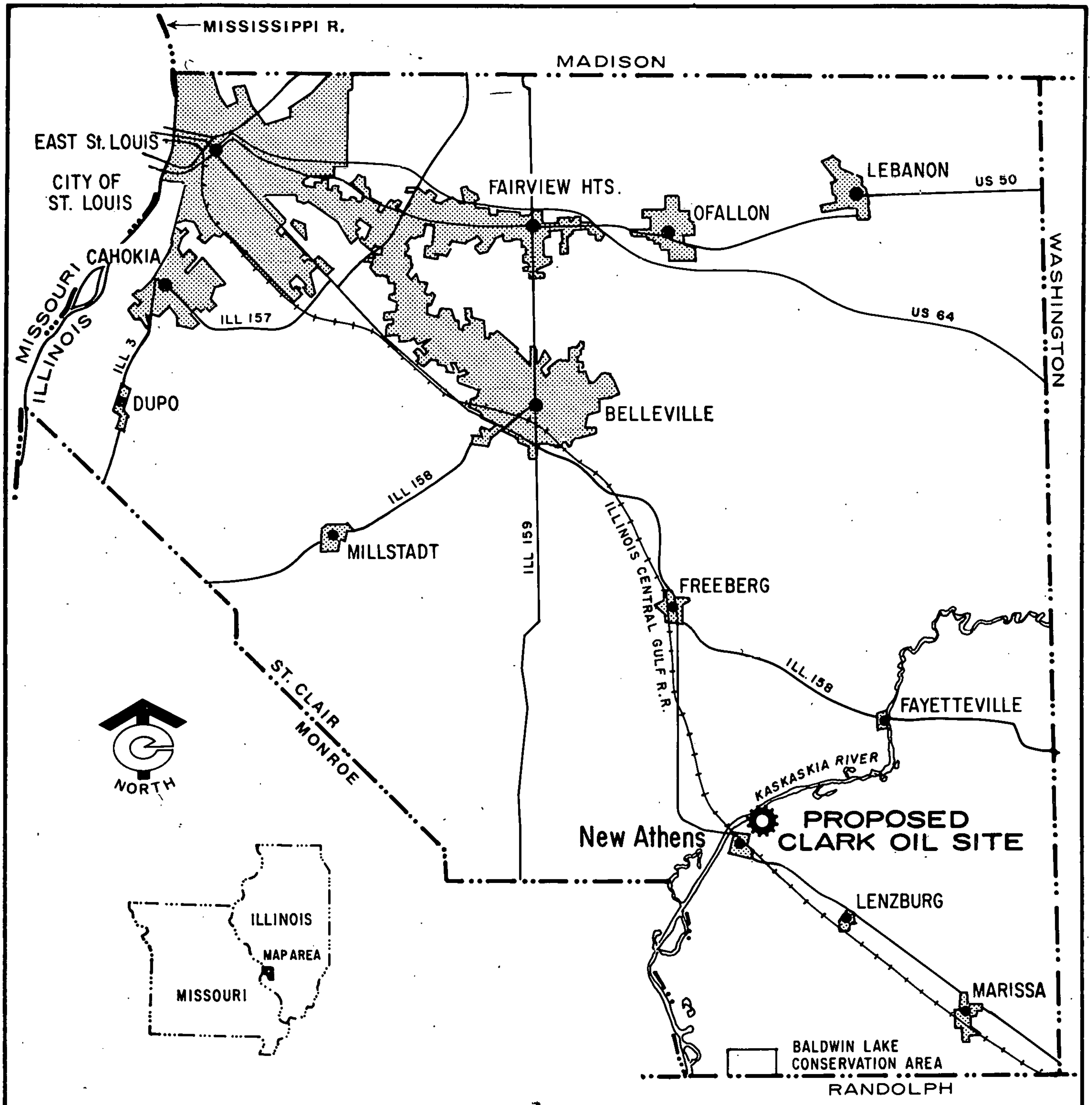
The proposed facility is not expected to generate any additional traffic. The coal that will be supplied to the proposed plant will be on-site and the final products will be either transported by pipeline to Clark Oil's Wood River Refinery (gasoline) or by truck for the elemental sulfur.

c. Housing

The projected housing supply and its ability to absorb the immigrant demand for the Village of New Athens during the construction phase (1984 to 1987) presented in Table III-20. During this phase, there will be a sufficient number of vacant housing units to absorb the immigrant population's demand for housing.

d. Cultural Resources

There are no historical sites, buildings, or districts listed on the National Register of Historical Places on the site. The nearest such site is located in Belleville, 15 miles north of the site. An archaeological site located just beyond the boundaries of the proposed site has the potential to be nominated to the National Register. The proposed plant is not expected to have any adverse impact on any historic or archaeological site in the area.



CLARK OIL AND REFINING CORPORATION

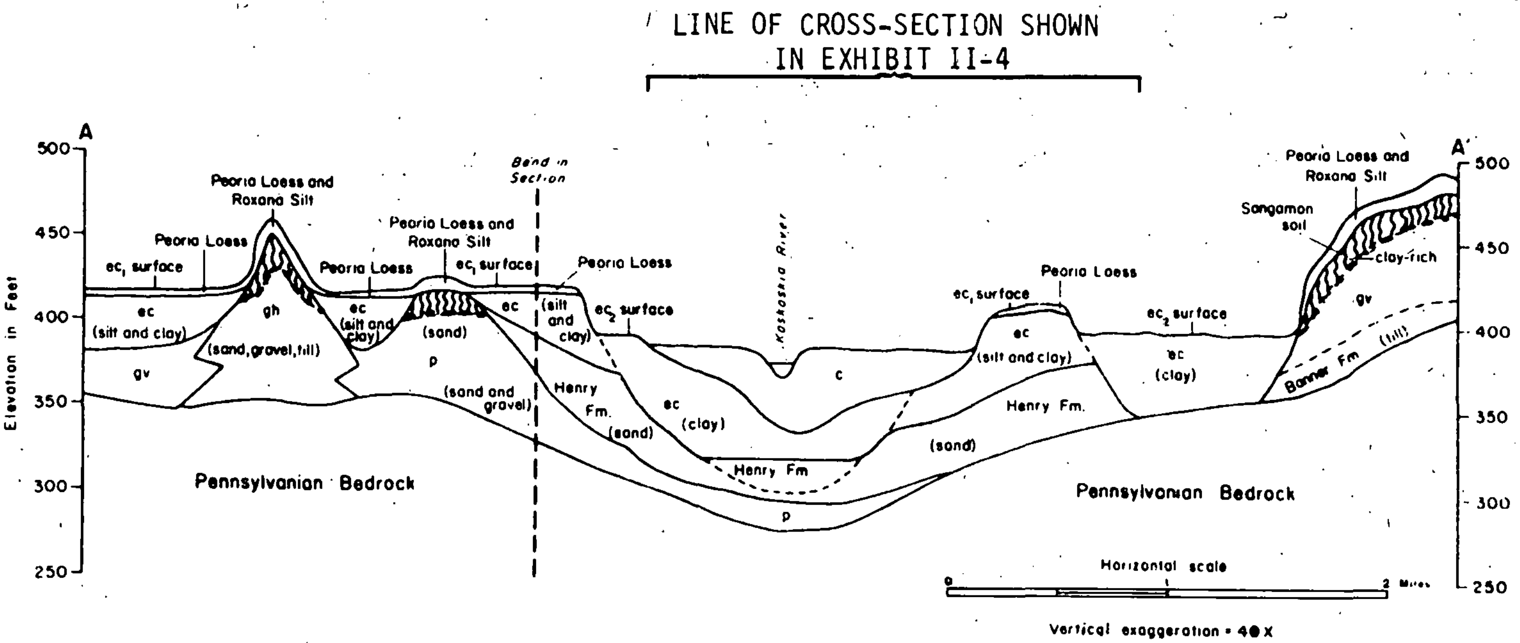
GASOLINE FROM COAL FEASIBILITY STUDY

SITE LOCATION MAP

EXHIBIT I-1

envirosphere company

A DIVISION OF EBASCO SERVICES INCORPORATED



c = Cahokia Alluvium

ec_1, ec_2 = Equality Formation, Carmi Member

gv = Glasford Formation, Vandalia Member

gh = Glasford Formation, Hagarstown Member

Source: Illinois State Geological Survey

CLARK OIL AND REFINING CORPORATION

GASOLINE FROM COAL FEASIBILITY STUDY

GEOLOGIC CROSS SECTION
CLARK OIL SITE AREA

EXHIBIT II-5

envirosphere company
A DIVISION OF EBASCO SERVICES INCORPORATED

RECORD for
NORTHERN ILLINOIS COAL CORPORATION

Date Sept. 16, 1953 *Method* F 24 *PROSPECT No.* 1644

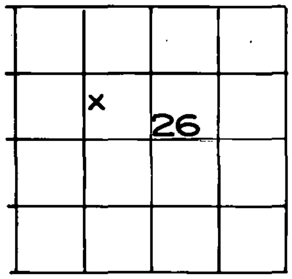
LOCATION

Land of Fred Hesse (1630-N)

Sec. 26 *T.* 2S *R.* 7W *of* 3rd. P.M.

County ST. CLAIR *State* ILLINOIS

H. Rogers
Drillers



Surf. Elev. 425.63
Co-ord N 21 748.90
W 8 004.98
El Coal Top 341.71
Cover 83.92
Coal 7' 2"
Ratio

L.H.C.
Engineer

L O G

FROM	TO	THICKNESS	ELEV. BOT'M OF STRATA	STRATA (MOISTURE, HARDNESS, SIZE, COLOR, ETC.)
0'	1' 0"	1' 0"		Soil
1' 0"	23' 10"	22' 10"		Clay
23' 10"	43' 8"	19' 10"		Sand, Clay & Gravel
43' 8"	50' 4"	6' 8"		Limestone
50' 4"	65' 3"	14' 11"		Gray Shale
65' 3"	69' 3"	4' 0"		Limestone
69' 3'	72' 3'	3' 0'		Gray Shale
72' 3"	74" 11"	2' 8"		Limestone
74' 11"	79' 4"	4' 5"		Gray Shale, dark
79' 4"	82' 10"	3' 6"		Black Rock
82' 10"	83' 11"	1' 1"		Black Shale
83' 11"	91' 1"	7' 2"		COAL HARD
91' 1"	92' 10"	1' 8"		Gray Clay
	Total	92' 10"		

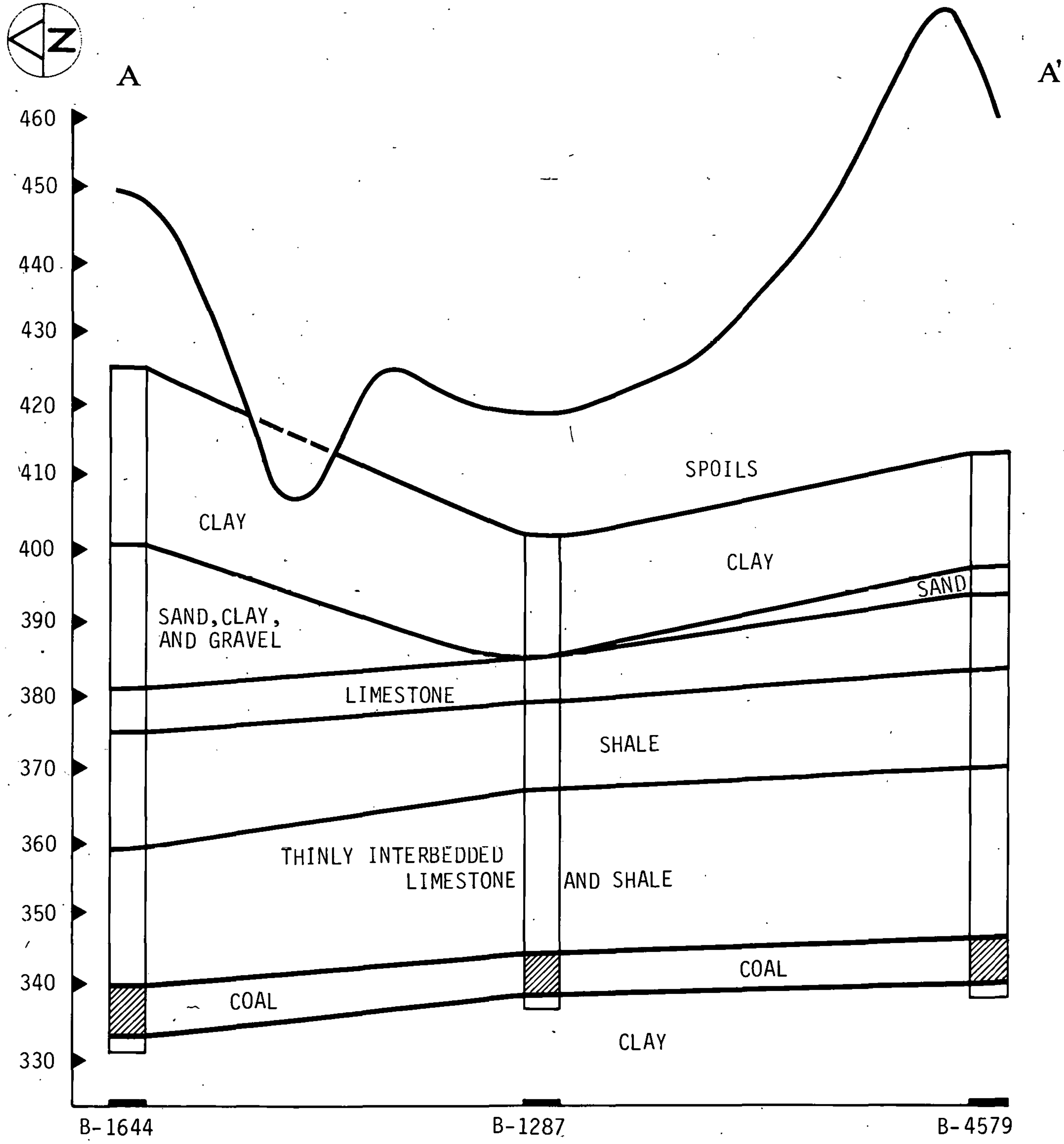
CLARK OIL AND REFINING CORPORATION

GASOLINE FROM COAL FEASIBILITY STUDY

SAMPLE PROSPECT LOG
SHOWING PRE-MINING GEOLOGY
AT CLARK OIL SITE

EXHIBIT II-6

envirosphere company
A DIVISION OF EBASCO SERVICES INCORPORATED



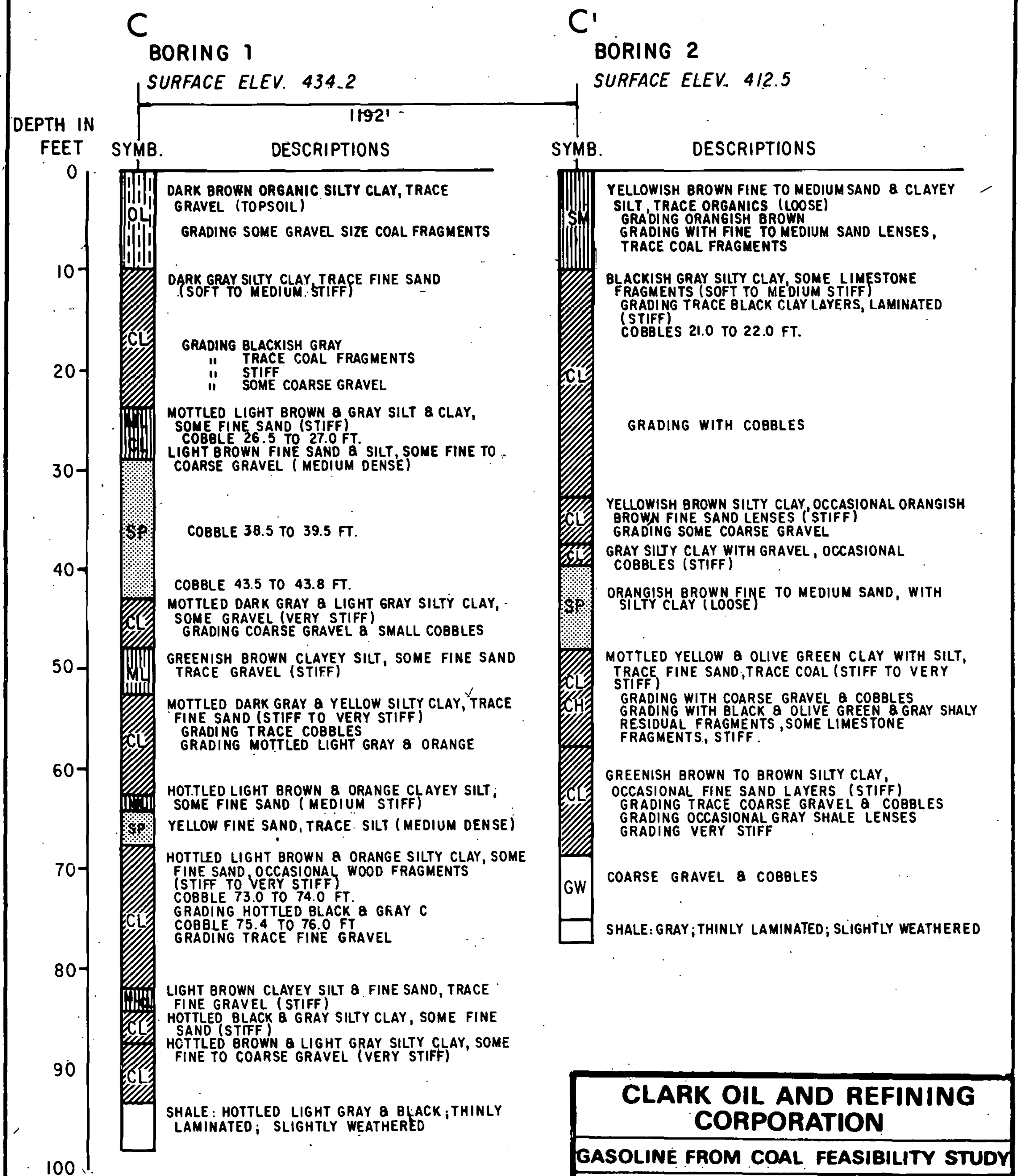
CLARK OIL AND REFINING CORPORATION

GASOLINE FROM COAL FEASIBILITY STUDY

GEOLOGIC CROSS SECTION
BELOW PLANT SITE

EXHIBIT II-7

envirosphere company
A DIVISION OF EBASCO SERVICES INCORPORATED



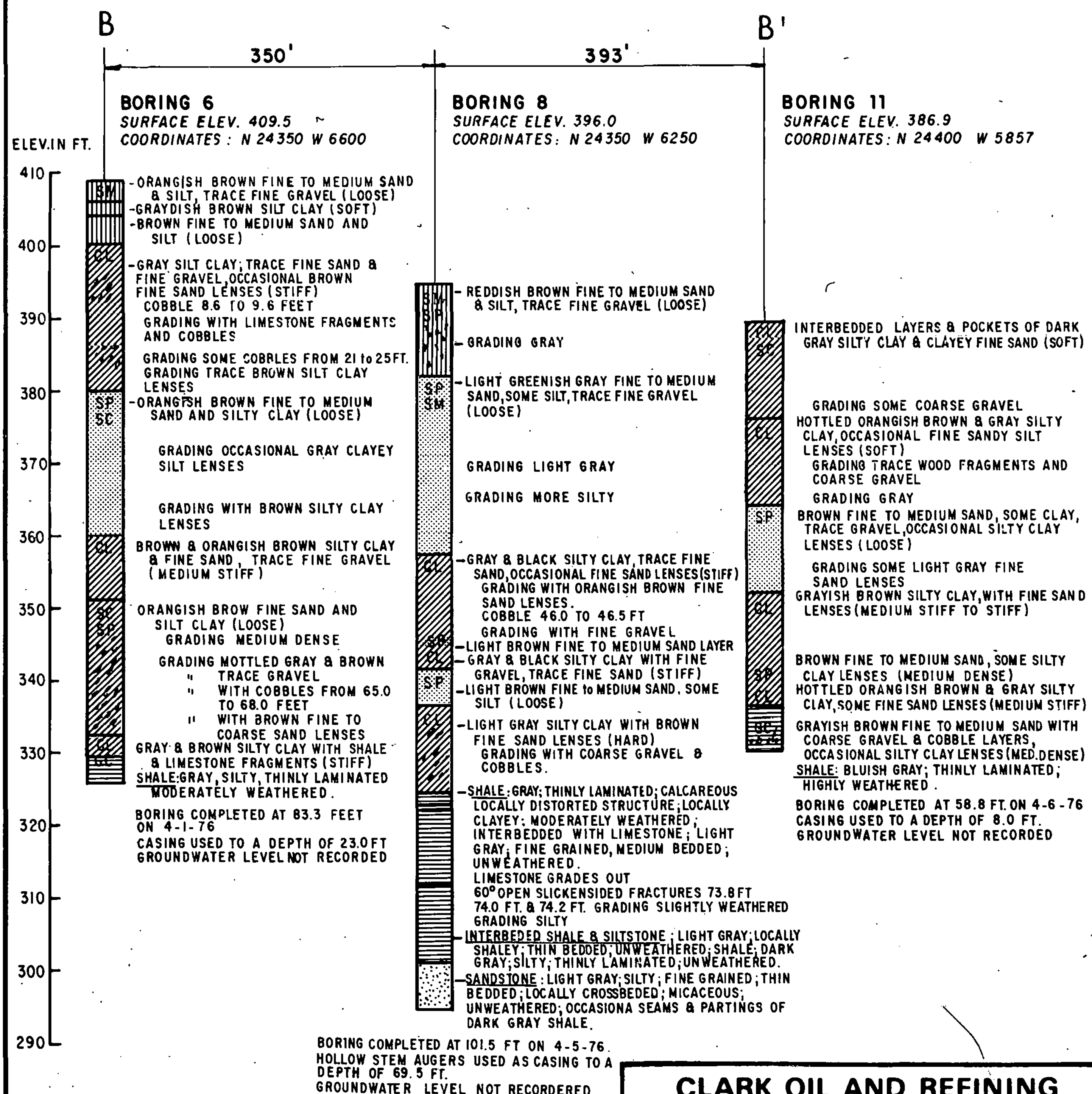
CLARK OIL AND REFINING CORPORATION

GASOLINE FROM COAL FEASIBILITY STUDY

POST-MINING SITE
GEOLOGY
BORINGS I AND 2

EXHIBIT II-9

envirosphere company
A DIVISION OF EBASCO SERVICES INCORPORATED



CLARK OIL AND REFINING CORPORATION

GASOLINE FROM COAL FEASIBILITY STUDY

POST MINING SITE
GEOLOGY
BORINGS 6,8 AND 11

EXHIBIT II-10

envirosphere company
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TABLE II-1

EPICENTERS WITHIN 32 KILOMETERS (20 MILES) OF THE PROPOSED SITE*

Date	Location (Lat - Long)	Mercalli Intensity	Distance from Site (Km)
1909	38.3N 90.2W	---	32
1939	38.5N 89.9W	V	19
1939	38.216N 90.066W	V	24
1940	38.216N 90.066W	VI	24
1955	38.116N 89.800W	VI	23
1974	38.228N 89.729W	IV	14

*Based on data from the National Oceanographic and Atmospheric Administration.

Source: Roy F. Weston, 1977, Environmental Analysis Report for the Coalcon Clean Boiler Fuel Demonstration Program.

TABLE II-2

UNCONSOLIDATED GEOLOGIC FORMATIONS IN THE CLARK OIL SITE AREA

Age	Formation	Description	Topographic Setting
Holocene	Man-made deposits	Spoils from strip mining	Scattered, occurrence dependent on coal exacavation
Recent	Cahokia Alluvium	Silt, clay, clayey and with compressible organic beds. Deposited by running water	Floodplain of Kaskaskia River between 380 and 390 feet
Wisconsinan	Peoria Loess	Silt (loess) deposited by wind	Caps upland till plain, higher terraces, and hills and till ridges
	Robein Silt	Peat and organic silt wood fragments. Deposited in still water	Locally present on Roxanna silt
	Roxanna Silt	Silt (loess) Deposited by wind	Present with Peoria loess on sand hills, till ridges and upland till plain
	Equality Formation (2)	Alluvial clays and silts usually lacking a loess cover-mostly clay. Deposited in still water (lake)	Forms higher flood plain between 390 and and 400 feet
	Equality Formation (1)	Alluvial silts with inter-bedded sands and clays, deposited in still water (lake)	Forms terrace topography between 400 and 425
	Henry Formation	Medium-grained sand deposited by running water	Does not outcrop in area but it present under Equality Fm. Henry present at depths between 15 and 90 feet below surface. May be absent under areas of Equality (2)

TABLE II-2 (Cont'd)

Age	Formation	Description	Topographic Setting
Sangamonian	Sangamon Soil	Reddish brown and bluegray clay formed by weathering	Present under Peoria and Roxanna silt on uplands, sand hills and till ridges
Illnoian	Pearl Formation	Sand, and gravel; becomes coarser with depth. Deposited by running water	Outcrops or is near surface in sand hill areas. Present at depth under terraces and floodplain areas. Best aquifer in area
	Glasford Formation (Hagerstown Member)	Glacial till, sand and gravel, overlain by to 10 feet of loess. Deposited by ice	Unit is restricted to till ridges
	Glasford Formation (Vandalia Till Member)	Glacial till with some beds of sand and silt Deposited by ice	Forms upland till plain. May be present at depth under or near near land forms.

*Modified after Illinois State Geological Survey.

TABLE II-3

ENGINEERING RATINGS FOR SOILS OF THE CLARK OIL SITE AND VICINITY

Soil Series	Erosion Hazard (K)	Permeability inches/hr	Depth to Water (ft)	Shrink-Swell Potential	Subsidence Potential	Moisture Holding Capacity (in/in)	Corrosion Potential
Alford	.37 - .49	.6 - 2.0	6	Low	-	.18 - .21	Moderate to High
Darmstadt	.45 - .55	.6 - 0.2	1 - 3	Low to Moderate	-	.09 - .24	Low to High
Ebbert	.17	.06 - 0.2	0 - 2	Low to Moderate	-	.14 - .24	Low to High
Herrick	.17	.2 - 2.0	1 - 3	Moderate to High	-	.17 - .24	Low to High
Hurst	.32 - .43	.06 - 0.6	1 - 3	Moderate to High	-	.10 - .22	High
Iva	.43	.06 - 2.0	1 - 3	Low to Moderate	-	.18 - .24	Moderate to High
Okaw	.32 - .49	.06 - 0.6	0 - 2	Low to Moderate	-	.09 - .24	High
Orthents	Highly Variable	Highly Variable	0 - 76	Low to High	Unstable Fill	.09 - 24	Low to High
Piasa	.17	.06 - 0.6	0 - 2	Moderate to High	-	.10 - .24	Low to High
Wakeland	.17	.6 - 2.0	1 - 3	Low	-	.20 - .24	Low to High
Weir	.17	.06 - 0.2	0 - 2	Low to High	-	.18 - .24	Moderate-High

Source: R F Weston, 1977, Coalcon Clean Boiler Fuel Demonstration Plant Program.

TABLE II-4

SOILS LABORATORY TEST RESULTS

Soil Type	Location[1]	Compaction Data[2] for Permeability Tests	Permeability, k[3] cm/sec	Max Dry Unit Wt PCF	Optimum Water Content %	Natural Water Content %	Liquid Limit	Plastic Limit
Silty Clay/Clay (CH)	15 ft Deep Active Incline	95.0% Maximum Density @ Optimum Moisture	1.2×10^{-7}	96.0	24.5	33.1	60.0	22.8
Silty Clay (CL)	Middle Incline	95.2% Maximum Density @ Optimum Moisture	2.3×10^{-7}	106.5	18.0	24.1	41.5	23.4

[1]15 ft Deep Active Incline sample representative of unmined clay soils, Middle Incline sample representative of clay spoil material.

[2]Both samples were 4 in. in diameter and 4.6 in. in height.

[3]Used maximum differential head of 6 ft on samples, average permeability over 3 time increments shown.

TABLE II-5

MAMMALS LIKELY TO OCCUR IN THE REGION OF THE PROPOSED SITE

Species	Regional Status	On Site Occurrence	Preferred Habitat
Virginia Opossum	C	X	Forest edge
Eastern Mole	C	X	Loose, well-drained soils
Least Shrew	UC	X	Grasslands
Short-tailed Shrew	C	X	Floodplain forest
Little Brown Myotis	C		Near Water
Southeastern Myotis	UC		Near quiate water, coves
Gray Myotis	R,E,e		Caves
Keen's Myotis	R		Near wooded streams
Indiana Myotis	R,E,e		Caves, cavities
Small-footed Myotis	UC		Structures, cavities
Eastern Pipistrelle	C	X	Forest edges
Big Brown Bat	C	X	Structures, forest
Evening Bat	C		Structures, cavities
Silver-haired Bat	R		Near woodland ponds
Hoary Bat	R		Forests
Red Bat	C	X	Forests
Rafinesque's Big-eared Bat	UC		Structures, forest edges
Raccoon	A	X	Woodlands near water
Longtail Weasel	FC	X	Brushlands, streambanks
Mink	FC	X	Near water
River Otter	R,t		Near water
Striped Skunk	C	X	Open land, forest edge
Badger	R		Prairies
Red Fox	C	X	Open farmlands
Gray Fox	UC	X	Hardwood forests
Coyote	UC	X	Open brushlands
Woodchuck	C	X	Forest edge, fields
Eastern Chipmonk	UC		Woodlands
Thirteen-lined Ground Squirrel	UC	X	Grasslands
Eastern Gray Squirrel	C	X	Forests
Eastern Fox Squirrel	FC	X	Open Woodlands
Southern Flying Squirrel	C		Woodlands
Plains Pocket Gopher	C		Prairies
Beaver	FC	X	Aquatic
Deer Mouse	C	X	Grasslands, weedy fields
White-footed Mouse	A	X	Numerous
Southern Bog Lemming	UC		Dense grass
Prairie Vole	A	X	Grasslands
Pine Vole	C	X	Grassland, woodland
Muskrat	C	X	Aquatic

TABLE II-5 (Cont'd) Sheet 2 of 2

MAMMALS LIKELY TO OCCUR IN THE REGION OF THE PROPOSED SITE

Species	Regional Status	On Site Occurrence	Preferred Habitat
Norway Rat	A	X	Outbuildings
House Mouse	A	X	Buildings, fields
Meadow Jumping Mouse	R	X	Moist grasslands
Eastern Cottontail	C	X	Fields, forests
White-tailed Deer	UC	X	Forests
Bobcat	UC,t		Forests

Key:

A = Abundant in suitable habitat

C = Common in suitable habitat

UC = Uncommon in suitable habitat

R = Rare in suitable habitat

E = On U S Fish and Wildlife Service Endangered Species list

X = Recorded on site

e = On Illinois State Endangered Species List

t = On Illinois State Threatened Species List

Source:

Burt and Grosenheider (1964).
Coalcon (1977).

BIRDS LIKELY TO OCCUR IN THE REGION OF THE PROPOSED SITE

Common Name	Regional Status	On Site Occurrence	Preferred Habitat
Common Loon	UC		Lakes and rivers
Horned Grebe	UC		Lakes, ponds
Red-necked Grebe	R		Large ponds and lakes
Pied-billed Grebe	UC	X	Shallow, ponds, marshes
Double-crested Cormorant	R,e		Lakes, rivers
Canada Goose	C		Lakes, open fields
Snow Goose	C		Rivers and impoundments
Pintail	C		Ponds, marshes
Blue-winged Teal	C	X	Ponds, marshes
Green-winged Teal	UC		Ponds, marshes
Mallard	C	X	Ponds, marshes,
Black Duck	FC		Ponds, lakes
Gadwall	UC		Ponds, flooded fields
American Wigeon	FC	X	Marshes' ponds, lakes,
Northern Shoveler	FC		Ponds, mudflats, marshes
Wood Duck	C	X	Woodland near streams, and ponds
Lesser Scaup	C		Lakes, ponds,
Redhead	C	X	Ponds, lakes
Ring-necked Duck	C	X	Woodland ponds, streams
Greater Scaup	R		Larger bodies of water
Canvasback	UC		Ponds, rivers, lakes
Bufflehead	UC		Lakes, rivers
Common Goldeneye	C		Lakes, rivers
Oldsquaw	R		Large bodies of water
Ruddy Duck	UC		Lakes, ponds, rivers
Hooded Merganser	C		Wooded lakes, streams, swamps, ponds
Common Merganser	FC		Rivers, creeks
Red-breasted Mergenser	FC		Small streams, ponds, large water bodies
Turkey Vulture	C	X	Field and roadside (scavenger)
Black Vulture	R		Fields, rocky ledges, cliffs, forests
Mississippi Kite	R,e	X	Riparian areas
Cooper's Hawk	UC,e		Woods, woodland edge
Sharp-shinned Hawk	U		Woodland and wood edges
Marsh Hawk	FC,e	X	Grasslands, marshes
Rough-legged Hawk	U		Fields
Red-tailed Hawk	C	X	Nests in woodlands, feeds in open country
Red-shouldered Hawk	R,e		Moist woodlands, floodplains, forests
Broad-winged Hawk	C		Woodlands, hills, forests

BIRDS LIKELY TO OCCUR IN THE REGION OF THE PROPOSED SITE

Common Name	Regional Status	On Site Occurrence	Preferred Habitat
Northern Bald Eagle	R,E,e		Near large bodies of water
Osprey	C,e		Rivers, lakes
Merlin	R		Grassland, woodland openings, borders of quiet water
Peregrine Falcon	R,E,e		Mountains, woods, large streams
American Kestrel	C	X	Tree cavities, open farm land
Bobwhite	C	X	Brushland, abandoned fields
Great Blue Heron	C	X	Farm ponds, lakes, large streams
Little Blue Heron	C	X	Freshwater marshes, swamps
American Bittern	FC,e		Tall vegetation, wet meadows, marshes
Green Heron	C	X	Ponds, lakes, wooded streams, marshes
Snowy Egret	U,e		Marshes
Cattle Egret	R		Marshes, fields
Great Egret	C,e		Streams, ponds, marshes, mudflats
Least Bittern	UC		Tall freshwater grasses and sedges
Black-crowned Night Heron	C,e		Freshwater swamps, ponds, along streams
American Coot	C	X	Freshwater ponds
Common Gallinule	R,t		Marshes,
Sora	UC		Marshes,
King Rail	UC		Freshwater marhses
Virginia Rail	R		Marshes
Black-bellied Plover	UC		Artic tundra,
American Golden Plover	UC	X	Fields, pastures, mudflats, marshes
Piping Plover	UC		Sandy beaches, sand bars, mudflats, rocky shores
Semipalmated Plover	UC	X	Beaches, mudflats
Killdeer	C	X	Cultivated fields, cropped pastures, sand bars, mudflats
Ruddy Turnstone	R		Coasts, rocky tidal shores
Spotted Sandpiper	C	X	Ponds, streams
Upland Sandpiper	C,e		Grasslands, short grasses
Sanderling	R	X	Sandbars, and mudflats
Western Sandpiper	R		Sandbars, mudflats
Dunlin	R		Mudflats, sandbars,

TABLE II-6 (Cont'd) Sheet 3 of 8

BIRDS LIKELY TO OCCUR IN THE REGION OF THE PROPOSED SITE

Common Name	Regional Status	On Site Occurrence	Preferred Habitat
Baird's Sandpiper	R	X	Marshes, shores and mudflats
Least Sandpiper	C	X	Sandy shores
White-rumped Sandpiper	R		Shore habitats, flooded fields
Pectoral Sandpiper	C	X	Grassy mudflats, wet meadows
Semipalmated Sandpiper	UC	X	Sandy shores and mudflats
Short-billed Dowitcher	UC	X	Mudflats, sandbars,
Stilt Sandpiper	R	X	Mudflats, sandbars,
Lesser Yellowlegs	C	X	Marshes' sandbars, mudflats,
Greater Yellowlegs	FC	X	Marshes, sandbars, mudflats,
Solitary Sandpiper	C	X	Streams, swamps,
Common Snipe	UC	X	Flooded fields, marshes
American Woodcock	R	X	Moist woodlands,
Herring Gull	UC		Lakes, rivers
Ring-billed Gull	UC		Lakes, large rivers
Franklin's Gull	UC		Fields, lakes
Bonaparte's Gull	UC		Lakes, large rivers
Black Tern	UC,e	X	Lakes, fresh marshes
Caspian Tern	R		Lakes, ponds
Forster's Tern	UC,e		Marshes
Common Tern	UC,e		Rivers, lakes
Rock Dove	A	X	Farm yards, city parks
Mourning Dove	C	X	Fields, pastures, farms
Yellow-billed Cuckoo	C	X	Woods, brush
Black-billed Cuckoo	UC	X	Woodlands
Barn Owl	R,e		Woods and farmlands
Screech Owl	C		Open woodlands
Great Horned Owl	C	X	Woodland, dry forested uplands
Barred Owl	C	X	Moist bottomland forests
Saw-whet Owl	UC		Conifers, low-lying woods
Short-eared Owl	UC,e		Open country, marshes
Long-eared Owl	R,e		Deciduous or coniferous woods near open country
Chuck-wills-widow	C		Dry woods
Whip-poor-will	C		Forest
Common Nighthawk	C	X	Open country and rooftops
Chimney Swift	C	X	Chimneys, hollow trees,
Ruby-throated Hummingbird	C	X	Woodlands, farmlands

BIRDS LIKELY TO OCCUR IN THE REGION OF THE PROPOSED SITE

Common Name	Regional Status	On Site Occurrence	Preferred Habitat
Belted Kingfisher	C	X	Along streams, ponds, lake margins
Common Flicker	C	X	Edges and openings in mature forests
Pileated Woodpecker	FC	X	Deciduous, mixed forests
Red-bellied Woodpecker	C	X	Farmlands, scattered trees on floodplains
Downy Woodpecker	C	X	Woodlands
Hairy Woodpecker	FC	X	Woodlands
Red-headed Woodpecker	C	X	Open woodlands, forest edges
Yellow-bellied Sapsucker	C	X	Open woodlands, orchards
Eastern Kingbird	C	X	Widely spaced trees
Black-capped Chickadee	UC	X	Woodlands
Carolina Chickadee	C	X	Woodlands
Tufted Titmouse	C	X	Deciduous woodlands along streams
Red-breasted Nuthatch	UC		Woodland
White-breasted Nuthatch	C	X	Woodland
Brown Creeper	C,e		Woodlands, mature forests,
Short-billed Marsh Wren	R		Sedge meadows, hay fields
Long-billed Marsh Wren	R		Cattail marshes,
Bewick's Wren	UC,t		Farmyards, brush, fence rows
Carolina Wren	C	X	Thick underbrush, woodlands,
House Wren	UC	X	Shrubbery, brush
Winter Wren	C		Undergrowth, bottomland forests,
Gray Catbird	C	X	Dense shrubbery
Mockingbird	C	X	Open trees, dense shrubbery
Brown Thrasher	C	X	Brush, forest edges
American Robin	C	X	Lawns, wood edges,
Veery	UC	X	Woods and edges,
Hermit Thrush	C	X	Woodlands,
Gray-cheeked Thrush	UC	X	Brush, wooded hillsides,
Wood Thrush	C	X	Woodlands
Swainsons' Thrush	C	X	Woodlands
Eastern Bluebird	C	X	Open country, orchards
Blue-gray Gnatcatcher	C	X	Moist forests

BIRDS LIKELY TO OCCUR IN THE REGION OF THE PROPOSED SITE

Common Name	Regional Status	On Site Occurrence	Preferred Habitat
Ruby-crowned Kinglet	C		Forests,
Golden-crowned Kinglet	C		Woodlands, conifers
Water Pipit	UC		Muddy shores, plowed fields
Cedar Waxing	C	X	Berry-bearing trees, shrubs
Loggerhead Shrike	UC,t	X	Open hedgerows and scattered trees
Starling	C	X	Farmland, cities
Yellow-throated Vireo	C	X	Clearings near water, mixed pine-deciduous woods
Warbling Vireo	UC	X	Tall, deciduous shadetrees
White-eyed Vireo	C	X	Deciduous thickets, wood margins, hedgerows
Bell's Vireo	U	X	Thickets
Red-eyed Vireo	C	X	Deciduous forests
Philadelphia Vireo	UC	X	Deciduous shrubs, wood margins
Solitary Vireo	C		Northern hardwoods, conifers, dry open woods
Worm-eating Warbler	UC		Deciduous slopes, mixed mesophytic forests
Black-and-white Warbler	C	X	Deciduous woods,
Prothonotary Warbler	C	X	Wooded swamps along streams
Golden-winged Warbler	UC		Brushy old fields
Blue-winged Warbler	R		Brushy areas
Northern Parula	C	X	Mature woods, swamps
Tennessee Warbler	C	X	Aspen-spruce woods
Nashville Warbler	C	X	Open second-growth deciduous woods
Orange-crowned Warbler	U		Thickets, brushy woods
Yellow-rumped Warbler	C	X	Open woods, conifers
Magnolia Warbler	C	X	Mixed woods
Yellow Warbler	C	X	Willow thickets, shrubbery
Cape May Warbler	UC		Conifers,
Black-throated Blue	R		Brushy forest understory
Bay-breasted Warbler	C	X	Conifers,
Cerulean Warbler	C		River bottoms, mixed forests
Prairie Warbler	C	X	Old fields, pine-oak woods
Yellow-throated Warbler	C	X	Pines and sycamores
Blackburnian Warbler	C	X	Conifer & Mixed forests,

BIRDS LIKELY TO OCCUR IN THE REGION OF THE PROPOSED SITE

Common Name	Regional Status	On Site Occurrence	Preferred Habitat
Palm Warbler	C		Forest clearings, and open ground
Chestnut-sided Warbler	C	X	Deciduous brush,
Pine Warbler	R		Pines
Blackpoll Warbler	C	X	Coniferous woodlands
Black-throated Green Warbler	C	X	Woodlands
Common Yellowthroat	C	X	Thickets, marshes, overgrown meadows,
Yellow-breasted Chat	C	X	Deciduous thickets, old fields,
Ovenbird	C	X	Deciduous woods,
Louisiana Waterthrush	C		Streamside woodlands,
Northern Waterthrush	C		Swamps, flooded forests
Connecticut Warbler	R	X	Moist dense woodland understory,
Kentucky Warbler	C	X	Moist mixed forest
Mourning Warbler	C	X	Woodland thickets
American Redstart	C	X	Mixed forests
Canada Warbler	C	X	Forest underbrush
Hooded Warbler	R		Moist deciduous woods
Wilson's Warbler	UC		Thickets,
House Sparrow	A	X	Farms, suburbs, cities
European Tree Sparrow	C		City parks, farms
Red-winged Blackbird	C	X	Marshes, lowlands, meadows
Brewer's Blackbird	R,t		Farmland
Bobolink	C	X	Hay, alfalfa, and clover fields
Rusty Blackbird	FC		Wooded swamps
Brown-headed Cowbird	C	X	Farmland, woodland edges
Common Grackle	C	X	Farms, evergreens, parks, moist woods
Eastern Meadowlark	C	X	Fields, grasslands, meadows,
Western Meadowlark	R		Grasslands,
Northern Oriole	C	X	Forest edges, parks,
Orchard Oriole	C	X	Orchards, parks wood margin
Scarlet Tanager	C	X	Deciduous woods
Summer Tanager	C	X	Open woodland, parks
Cardinal	C	X	Woodland edges, open forest understory,

BIRDS LIKELY TO OCCUR IN THE REGION OF THE PROPOSED SITE

Common Name	Regional Status	On Site Occurrence	Preferred Habitat
Rose-breasted Grosbeak	C	X	Deciduous woods,
Evening Grosbeak	R		Conifers
Blue Grosbeak	U	X	Hedgerows, forest edge
Indigo Bunting	C	X	Hedgerows, forest edge
Purple Finch	C		Woodlands
Pine Siskin	UC		Conifers, open woodlands,
American Goldfinch	C	X	Brush, old fields
Rufous-sided Towhee	C	X	Overgrown fields, wood margins
Dickcissel	C	X	Grain fields, weed patches, grasslands
Grasshopper Sparrow	C	X	Hayfields, weed patches, grasslands
Lark Sparrow	R	X	Dry fields near trees or brush
Savannah Sparrow	C	X	Short grass, weedy fields, meadows
Le Conte's Sparrow	R		Tall marsh grass, uncommonly in dry fields
Henslow's Sparrow	R,t		Fields, wet meadows
Vesper Sparrow	UC		Open, well-grazed pasture
Dark-eyed Junco	C	X	Thickets' conifers, wood margins
Chipping Sparrow	C	X	Sparse grasslands with scattered trees
Tree Sparrow	C	X	Weedy fields, fence rows, woodland edges
Field Sparrow	C	X	Fields, tall grass, shrubby meadows
Harris Sparrow	R		Hedgerows, wood margins
White-throated Sparrow	C	X	Dense undergrowth,
White-crowned Sparrow	C	X	Thickets, wood margins,
Fox Sparrow	UC	X	Dense conifer thickets, deciduous brush

BIRDS LIKELY TO OCCUR IN THE REGION OF THE PROPOSED SITE

Common Name	Regional Status	On Site Occurrence	Preferred Habitat
Swamp Sparrow	C	X	Fields, marshes, bogs
Lincoln's Sparrow	UC	X	Bogs, brush, old fields, forest edges
Song Sparrow	C	X	Moist areas, brush, wood margins,
Snow Bunting	UC	X	Bare fields and shores
Lapland Longspur	UC		Bare fields and shores

Key:
- A = Abundant in suitable habitat
- C = Common in suitable habitat
- FC = Fairly common in suitable habitat
- UC = Uncommon in suitable habitat
- R = Rare in suitable habitat
- X = Recorded on site
- E = On U S Fish and Wildlife Service Endangered Species list[13]
- e = On Illinois State Endangered Species List
- t = On Illinois State Threatened Species List

Source:

Robbins, C S, B Brunn and H S Zim, (1966).
Peterson, R T, (1980).
Coalcon (1977).

REPTILES OF POTENTIAL OCCURRENCE IN THE REGION OF THE PROPOSED SITE

Species	Regional Status	On Site Occurrence	Preferred Habitat
Turtles			
Snapping Turtle *Chelvdra serpentina*	C	X	Ponds, rivers
Alligator Snapping Turtle *Macroclemys temmincki*	R		Large rivers
Stinkpot *Sternotherus odoratus*	C	X	Mud bottomed ponds and creeks
Box Turtle *Terrapene carolina*	A	X	Woodlands
Ornate Box Turtle *Terrapene ornata*	UC	X	Prairies
Map Turtle *Graptemys geographica*	UC		Large rivers
False Map Turtle *Graptemys pseudogeographica*	R		Large rivers
Painted Turtle *Chrysemys picta*	A	X	Ponds, sloughs
Pond Slider *Chrysemys scripta*	A	X	Larger ponds
Smooth Softshell Turtle *Trionyx muticus*	UC	X	Clear rivers
Spiny Softshell Turtle *Trionyx Spinifer*	C	X	Streams, large ponds
Lizards			
Fence Lizard *Sceloporus undulatus*	UC		Dry, open woodlands
Ground Skink *Lygosoma laterale*	A		Moist woods
Five-lined Skink *Eumeces fasciatus*	C		Abandoned dwelling, debris woodlands

REPTILES OF POTENTIAL OCCURRENCE IN THE REGION OF THE PROPOSED SITE

Species	Regional Status	On Site Occurrence	Preferred Habitat
Lizards			
Broad-headed Skink Eumeces laticeps	C		Woodlands
Six-lined Racerunner Cnemidophorus sexlineatus	UC		Sparce vegetation
Slender Glass Liazard Ophisaurus attenuatus	R		Dry, brushy uplandfields and woodlands
Snakes			
Worm Snake Carphophis amoenus	A		Woodlands
Ringneck Snake Diadophis punctatus	C		Woodlands
Hognose Snake Heterodon platyrhinos	C		Woodland edges
Rough Green Snake Opheodrys aestivas	C		Woods and woodland edges
Black Racer Columber constrictor	C	X	Woods and fields
Rat Snake Elaphe obsoleta	UC	X	Woodlands and fields
Prairie Kingsnake Lampropeltis calligaster	A		Old fields and grasslands
Kingsnake Lampropeltis getulus	UC		Dry woods and pastures
Milk Snake Lampropeltis triangulum	UC		Woods and fields
Scarlet Snake Cemophora coccinea	UC		Woodlands
Flat-headed Snake Tantilla gracilis	R		Dry, rocky slopes

REPTILES OF POTENTIAL OCCURRENCE IN THE REGION OF THE PROPOSED SITE

Species	Regional Status	On Site Occurrence	Preferred Habitat
Snakes			
Western Ribbon Snake *Thamnophis sauritus*	UC		Near water
Garter Snake *Thamnophis sirtalis*	C		Woodlands and fields
Earth Snake *Virginia valeriae*	UC		Woodlands
Brown Snake *Storeria dekayi*	UC		Ubiquitous
Red-bellied Snake *Storeria occipitomaculata*	UC		Woodlands
Red-bellied Water Snake *Nerodia erythrogaster*	UC		River bottom swamps
Graham's Water Snake *Nerodia graphami*			Sluggish water bodies
Diamond-backed Water Snake *Nerodia rhombifera*	C		Streams, rivers and lakes
Common Water Snake *Nerodia sipedon*	A	X	Flowing water and ponds
Copperhead *Agkistrodon contortrix*	UC		Woodlands
Rattlesnake *Crotalus horridus*	UC		Dry, rocky woodlands

Key:

A = Abundant in suitable habitat

C = Common in suitable habitat

UC = Uncommon in suitable habitat

R = Rare in suitable habitat

Source: Conant (1975).
Smith (1961).
Coalcon (1977).

TABLE II-8

AMPHIBIANS OF POTENTIAL OCCURRENCE IN THE REGION OF THE PROPOSED SITE

Species	Regional Status	On Site Occurrence	Preferred Habitat
Siren *Siren intermedia*	C		Swamps, sloughs
Small-mouthed Salamander *Ambystoma texanum*	A	X	Woods near streams
Marbled Salamander *Ambystoma opacum*	C		Low woodlands
Spotted Salamander *Ambystoma maculatum*	C		Near woodlands pools
Tiger Salamander *Ambystoma tigrinum*	C		Burrows
Newt *Notophthalmus viridescens*	C		Woods and ponds
Slimy Salamander *Plethodon glutinosus*	UC		Woodlands
Long-tailed Salamander *Eurycea longicauda*	UC		Rocky streams, shale banks
Mudpuppy *Necturus maculosus*	C		Slow streams
Bullfrog *Rana catesbeiana*	C	X	Permanent water
Green Frog *Rana clamitans*	UC		Standing water
Leopard Frog *Rana pipiens*	A	X	Wetlands, meadows
Pickerel Frog *Rana palustris*	UC		Clear waterbodies
Wood Frog *Rana sylvatica*	UC		Woodlands

TABLE II-8 (Cont'd)

AMPHIBIANS OF POTENTIAL OCCURRENCE IN THE REGION OF THE PROPOSED SITE

Species	Regional Status	On Site Occurrence	Preferred Habitat
Crawfish Frog _Rana areolata_	C		Burrows
American Toad _Bufo americanus_	A		Ubiquitous
Fowler's Toad _Bufo woodhousei_	A	X	Ubiquitous
Cricket Frog _Acris crepitans_	A	X	Ponds and rivers
Spring Peeper _Hyla crucifer_	C	X	Woodlands
Gray Treefrog _Hyla versicolor_	C		Woodlands
Chorus Frog _Pseudacris triseriata_	A	X	Grasslands

Key:

A = Abundant in suitable habitat

C = Common in suitable habitat

UC = Uncommon in suitable habitat

Source: Conant (1975).
Smith (1961).
Coalcon (1977).

TABLE II-9

FISH SPECIES COLLECTED IN THE PROJECT VICINITY
(From: Peabody, 1977, 1980)

Name		Location	
SCIENTIFIC	COMMON	OXBOW	CHANNEL
Ichthyomyzon castaneus	Chestnut lamprey	X	
Polyodon spathula	Paddlefish		X
Lepisosteus platostomus	Shortnose gar	X	X
Lepisosteus osseus	Longnose gar	X	X
Lepisosteus oculatus	Spotted gar	X	
Amia calva	Bowfin	X	X
Dorosoma cepedianum	Gizzard shad	X *	X *
Dorosoma petenense	Threadfin shad	X *	X
Alosa chrysochloris	Skipjack herring	X	X
Hiodon alosoides	Goldeye		X
Cyprinus carpio	Carp	X *	X *
Pimephales vigilax	Bullhead minnow	X	X
Pimephales notatus	Bluntnose minnow		X
Notropis atherinoides	Emerald shiner	X *	X
Notropis buchanani	Ghost shiner	X	
Notropis lutrensis	Red shiner		X
Notropis shumardi	Silverband shiner		X
Notemigonus crysoleucas	Golden shiner		X
Carpiodes carpio	River carpsucker	X	X
Carpiodes cyprinus	Quillback carpsucker	X	X
Ictiobus bubalus	Smallmouth buffalo	X	X
Ictiobus niger	Black buffalo	X	X
Ictiobus cyprinellus	Bigmouth buffalo	X *	X
Ictalurus melas	Black bullhead	X *	X
Ictalurus natalis	Yellow bullhead	X	
Ictalurus nebulosus	Brown bullhead	X	
Ictalurus punctatus	Channel catfish	X *	X *

*Dominant.

TABLE II-9 (Cont'd)

FISH SPECIES COLLECTED IN THE PROJECT VICINITY
(From: Peabody, 1977, 1980)

Name		Location	
SCIENTIFIC	COMMON	OXBOW	CHANNEL
Ictalurus furcatus	Blue catfish		X
Ictalurus catus	White catfish		X
Pylodictus olivaris	Flathead catfish	X	X
Lota lota	Burbot (FW cod)		X
Fundulus notatus	Blackstripe topminnow	X	X
Gambusia affinis	Mosquito fish	X	
Labidesthes sicculus	Brook silversides	X	X
Aplodinotus grunniens	Freshwater drum	X	X
Morone chrysops	White bass	X	X
Morone mississippiensis	Yellow bass	X	X
Pomoxis annularis	White crappie	X *	X *
Pomoxis nigromaculatus	Black crappie	X *	X
Micropterus salmoides	Largemouth bass	X	X
Centrarchus macropterus	Flier	X	
Lepomis macrochirus	Bluegill	X *	X
Lepomis gulosus	Warmouth	X	
Lepomis cyanellus	Green sunfish	X	X
Lepomis megalotis	Longear sunfish	X	x
Lepomis humilis	Orangespot sunfish	X	X
Stizostedion vitreum	Walleye		X

*Dominant.

TABLE II-10

COMPOSITE TAXONANIC LIST OF BENTHIC SPECIES COLLECTED IN PEABODY COAL COMPANY STUDIES
(From: Peabody, 1977)

Coleoptera

Dubiraphia sp. (Elmidae)
Stenelmis vittipennis (Elmidae)
Dineutus sp. (Gyrinidae)
Cyphon (Helodidae)
Berosus peregrinus (Hydrophilidae)
Tropisternus sp. (Hydrophilidae)

Trichoptera

Cyrnellus fraternus (Polycentropodidae)
Cheumatopsyche pettiti (Hydropsychidae)
Cheumatopsyche campyla (Hydropsychidae)
Hydropsyche bidens (Hydropsychidae)
Hydropsyche orris (Hydropsychidae)
Potamyia flava (Hydropsychidae)
Nectopsyche candida (Leptoceridae)
Triaenodes flavescens (Leptoceridae)
Oecetis cinerascens (Leptoceridae)
Oecetis sp. (Leptoceridae)
Unidentified pupae

Megaloptera

Corydalus sp. (Corydalidae)

Ephemeroptera

Caenis sp. (Caenidae)
Stenacron sp. (Heptageniidae)
Stenonema sp. (Heptageniidae)
Heptagenia sp. (Heptageniidae)

Ephemeroptera

Hexagenia limbata (Emphemeridae)
Hexagenia bilineata (Emphemeridae)
Hexagenia sp. (Emphemeridae)
Unidentified nymphs

TABLE II-10 (Cont'd)

COMPOSITE TAXONANIC LIST OF BENTHIC SPECIES COLLECTED IN PEABODY COAL COMPANY STUDIES
(From: Peabody, 1977)

Odonata

Argia sp. (Zygoptera: Coenagrionidae)
Enallagma sp. (Zygoptera: Coenagrionidae)
Somatochlora tenebrosa (Anisoptera: Corduliidae)
Gomphurus vastus (Anisoptera: Gomphidae)
Gomphurus fraternus (Anisoptera: Gomphidae)
Gomphus sp. (Anisoptera: Gomphidae)
Stylurus plagiatus (Anisoptera: Gomphidae)
Aeshna sp. (Anisoptera: Aeshnidae)
Macromia sp. (Anisoptera: Macromiidae)
Perithemis sp. (Anisoptera: Libellulidae)
Coenagrionidae, unidentified nymphs
Gomphidae, unidentified nymphs

Plecoptera

Perlesta placida (Perlidae)
Perlidae, unidentified nymphs

Diptera

Palpomyia complex (Ceratopogonidae)
Aedes sp. (Culicidae)
Chaoborus (Sayomyia) punctipennis (Chaoboridae)
Chaoborus sp. (Chaoboridae)
Chironomus attenuatus (Chironomidae: Chironominae)
Chironomus riparius (Chironomidae: Chironominae)
Chironomus sp. (Chironomidae: Chironominae)
Cryptochironomus fulvus (Chironomidae: Chironominae)
Cryptochironomus sp. (Chironomidae: Chironominae)
Cryptotendipes sp. (Chironomidae: Chironominae)
Dicrotendipes sp. (Chironomidae: Chironominae)
Glyptotendipes (Phytotendipes) lobiferus (Chironomidae: Chironominae)
Glyptotendipes (Phytotendipes) barbipes (Chironomidae: Chironominae
Glyptotendipes sp. (Chironomidae: Chironominae)

Harnischia sp. (Chironomidae: Chironominae)
Parachironomus nr. pectinatellae (Chironomidae: Chironominae)
Parachironomus schneideri (Chironomidae: Chironominae)
Phaenopsectra (Tribelos) jucundus (Chironomidae: Chironominae)
Phaenopsectra (Tribelos) sp. (Chironomidae: Chironominae)
Polypedilum sp. (Chironomidae: Chironominae)
Tanytarsus sp. (Chironomidae: Chironominae)

TABLE II-10 (Cont'd)

COMPOSITE TAXONANIC LIST OF BENTHIC SPECIES COLLECTED IN PEABODY COAL COMPANY STUDIES
(From: Peabody, 1977)

Diptera (Cont'd)

Cladotanytarsus sp. (Chironomidae: Chironominae)
Cricotopus sp. (Chironomidae: Orthocladiinae)
Nanocladius sp. (Chironomidae: Orthocladiinae)
Procladius (Procladius) sp. (Chironomidae: Tanypodinae)
Procladius (Psilotanypus) bellus (Chironomidae: Tanypodinae)
Ablabesmyia (Ablabesmyia) mallochi (Chironomidae: Tanypodinae)
Albadesmyia sp. (Chironomidae: Tanypodinae)
Coelotanypus sp. (Chironomidae: Tanypodinae)
Coelotanypus sp. (Chironomidae: Tanypodinae)
Tanypus (Apelopia) neopunctipennis (Chironomidae: Tanypodinae)
Tanypus sp. (Chironomidae: Tanypodinae)
Chironominae, unidentified larvae (Chironomidae)
Orthoclaiinae, unidentified larvae (Chironomidae)
Pentaneurini, unidentified larvae (Chironomidae: Tanypodinae)
Chironomidae unidentified pupae
Chrysops sp. (Tabanidae)

Class Clitellata, Subclass Oligochaeta
(after Brinkhurst, 1976)

Lumbriculidae, unidentified (Lumbriculida: Lumbriculidae)
Haplotaxis gordiodes (Haplotaxida: Haplotaxidae)
Branchiura sowerbyi (Haplotaxida: Tubificidae)
Limnodrilus cervix (Haplotaxida: Tubificidae)
Limnodrilus hoffmeisteri (Haplotaxida: Tubificidae)
Limnodrilus udekemianus (Haplotaxida: Tubificidae)
Limnodrilus maumeensis (Haplotaxida: Tubificidae)
Tubifex tubifex (Haplotaxida: Tubificidae)
Unidentifiable immatures with capilliform chaetae
(Haplotaxida: Tubificidae)
Unidentifiable immatures with capilliform chaetae
(Haplotaxida: Tubificidae)

Hemiptera

Trichocorixa sp. (Corixidae)

Class Hirudinea (After Klemm, 1972)

Actinobdella sp. (Rhynchobdellida: Glossiphoniidae)
Helobdella sp. (Rhynchobdellida: Glossiphoniidae)
Placobdella montifera (Rhynchobdellida: Glossiphoniidae)
Glossiphonia sp. (Rhynchobdellida: Glossiphoniidae)
Unidentified Glossiphoniidae (Rhynchobdellida)

TABLE II-10 (Cont'd)

COMPOSITE TAXONANIC LIST OF BENTHIC SPECIES COLLECTED IN PEABODY COAL COMPANY STUDIES
(From: Peabody, 1977)

Phylum Nematoda

Unidentified nematodes

Amphipoda

Hyalella azteca (Talitridae)

Isopoda

Asellus sp. (Asellidae)

Decopoda

Orconectes virilis (Astacidae: Cambarinae)
Unidentified Astacidae
Palaemonetes (Palaemonetes) Kadiakensis (Palaemonidae)

Acarina

Unidentified Acarina (water mites)

Pelecypoda

Spahaerium sp. (Sphaeriidae)
Unidentified Pelecypoda

Gastropoda

Lymnaea sp. (Pulmonata: Basommatophora: Lymnaeidae)
Unidentified Gastropoda

TABLE II-11

ATMOSPHERIC TEMPERATURE (°F) AT ST. LOUIS, MISSOURI
1941 - 1970

Month	Averages			Extremes	
	Daily Max.	Daily Min.	Mean	Highest	Lowest
JAN	39.9	22.6	31.3	76	-14
FEB	44.2	26.0	35.1	85	-5
MAR	53.0	33.5	43.3	88	-5
APR	67.0	46.0	56.5	92	22
MAY	76.0	55.5	65.8	92	31
JUN	84.9	64.8	74.9	98	43
JUL	88.4	68.8	78.6	106	51
AUG	87.2	67.1	77.2	105	47
SEP	80.1	59.1	69.6	100	36
OCT	69.8	48.4	59.1	94	23
NOV	54.1	35.9	45.0	81	1
DEC	42.7	26.5	34.6	76	-10
ANNUAL	65.6	46.2	55.9	106	-14

Source: U.S. Department of Commerce, 1977.

TABLE II-12

MEAN MONTHLY AND ANNUAL RELATIVE HUMIDITY (%)
AT ST. LOUIS, MISSOURI
1961 - 1977

	Hour of the Day (LST)			
Month	0000	0600	1200	1800
JAN	77	82	65	69
FEB	76	80	61	64
MAR	74	81	58	58
APR	70	79	54	53
MAY	76	83	56	55
JUN	79	84	57	56
JUL	78	86	57	56
AUG	81	89	57	59
SEP	83	91	61	63
OCT	77	85	55	61
NOV	78	84	62	68
DEC	81	85	69	75
ANNUAL	78	84	59	61

Source: U.S. Department of Commerce, 1977.

TABLE II-13

LONG-TERM AVERAGE WIND CONDITIONS
AT ST. LOUIS, MISSOURI

Month	Average Speed (mph) (1950-1977)	Most Common Direction (1964-1977)	Fastest Mile (1959-1977)
JAN	10.3	NW	41
FEB	10.9	NW	46
MAR	11.8	WNW	45
APR	11.3	WNW	45
MAY	9.3	S	42
JUN	8.6	S	60
JUL	7.7	S	40
AUG	7.4	S	48
SEP	7.9	S	39
OCT	8.5	S	48
NOV	9.9	S	41
DEC	10.3	WNW	44
ANNUAL	9.5	S	60

Source: U.S. Department of Commerce, 1977.

TABLE II-14

AVERAGE MONTHLY PRECIPITATION AT ST. LOUIS, MISSOURI

Month	Mean (inches) (1941-1970)	Maximum (inches) (1958-1977)	Minimum (inches) (1958-1977)
JAN	1.85	5.38	0.22
FEB	2.06	4.17	0.25
MAR	3.03	6.28	1.09
APR	3.92	9.09	0.99
MAY	3.86	7.25	1.02
JUN	4.42	8.65	0.47
JUL	3.69	7.81	0.60
AUG	2.87	6.44	0.08
SEP	2.89	6.21	0.76
OCT	2.79	5.77	0.21
NOV	2.47	5.74	0.44
DEC	2.04	6.50	0.32
ANNUAL	35.89	9.09	0.08

Source: U.S. Department of Commerce, 1977.

TABLE II-15

CALCULATED MAXIMUM POINT PRECIPITATION
AT PROPOSED SITE AREA
(inches)

Rainfall Period	Return Period (Years) 1	2	5	10	25	50	100
30 Minutes	1.1	1.3	1.6	1.8	2.1	2.3	2.5
1 Hour	1.3	1.6	2.0	2.3	2.6	2.9	3.2
2 Hours	1.7	1.9	2.4	2.8	3.2	3.5	3.9
3 Hours	1.8	2.1	2.7	3.1	3.5	3.9	4.2
6 Hours	2.2	2.6	3.2	3.7	4.1	4.7	5.1
12 Hours	2.6	3.1	3.8	4.4	4.9	5.5	6.0
24 Hours	3.0	3.5	4.4	5.0	5.7	6.4	7.0

Source: Hershfield, 1961.

TABLE II-16

FREQUENCY DISTRIBUTION OF STABILITY CLASS
AT ST. LOUIS, MISSOURI
1960 - 1964

Pasquill Stability Class	Percent Frequency by Season Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Annual
A-Extremely Unstable	0	0	2	0	1
B-Unstable	1	4	11	5	5
C-Slightly Unstable	5	10	18	11	11
D-Neutral	65	64	32	46	52
E-Slightly Stable	14	12	15	15	14
F-Stable	10	7	14	13	11
G-Extremely Stable	5	3	8	10	6

Source: U.S. Department of Commerce, 1974.

TABLE II-17

AVERAGE MIXING HEIGHTS AND EPISODES OF LIMITED DISPERSION
AT COLUMBIA, MISSOURI
1960 - 1964

	Morning		Afternoon	
	Average Mixing Height(m)	Average Mixing Layer Wind Speed(m/s)	Average Mixing Height(m)	Average Mixing Layer Wind Speed(m/s)
Winter	390	6.0	797	7.0
Spring	409	6.6	1523	8.4
Summer	294	4.7	1689	5.6
Fall	317	5.5	1349	6.5
Annual	352	5.7	1339	6.9

Number of Episodes Lasting Two or More Days

Mixing Height(m)	Wind Speed(m/s)		
	2	4	6
500	0	0	4
1000	0	2	15
1500	0	7	29

Source: Holzworth, 1972.

TABLE II-18

MONTHLY MEAN AND EXTREME TEMPERATURES (°F) MEASURES AT THE ON-SITE MONITORING FACILITY VERSUS MONTHLY MEAN TEMPERATURES MEASURES AT ST. LOUIS LAMBERT AIRPORT

	On-Site Monitoring Facility			St. Louis
Month	Highest	Lowest	Mean	Long-Term Mean
FEB	77.4	-4.3	41.4	35.1
MAR	86.9	24.8	50.0	43.3
APR	87.6	36.1	63.6	56.5

Source: Envirosphere, 1981.
U.S. Department of Commerce, 1977.

TABLE II-19

MONTHLY MEAN RELATIVE HUMIDITY (%) MEASURED AT THE ON-SITE MONITORING FACILITY DURING 1981

	Hour of the Day (LST)			
Month	0000	0600	1200	1800
FEB	69	81	54	53
MAR	59	67	32	31
APR	58	66	38	40

Source: Envirosphere, 1981.

TABLE II-20

MONTHLY WIND SPEED AND DIRECTION
MEASURED AT THE ON-SITE MONITORING FACILITY AND
AT THE ST. LOUIS INTERNATIONAL AIRPORT

	On-Site Monitoring Facility (1981)		St. Louis Airport (1964-1977)	
Month	Most Frequent Direction	Speed (mph)	Most Frequent Direction	Speed (mph)
FEB	SSE	6.8	NW	10.9
MAR	N	7.4	WNW	11.8
APR	S	8.4	WNW	11.3

Source: Envirosphere, 1981.
U.S. Department of Commerce, 1977.

TABLE II-21

MONTHLY PRECIPITATION TOTALS
MEASURED AT THE ON-SITE MONITORING FACILITY
AND ST. LOUIS LAMBERT INTERNATIONAL AIRPORT

Month	ON-SITE (1981) (inches)	ST. LOUIS AIRPORT (1941-1970) (inches)
FEB	1.81	2.06
MAR	1.31	3.03
APR	3.31	3.92

Source: Envirosphere, 1981.
U.S. Department of Commerce, 1977.

TABLE II-22

FIRST SAMPLING QUARTER FREQUENCY DISTRIBUTION OF STABILITY CLASSES AS DETERMINED BY WIND SIGMA

Stability Class	Sigma Range (Degrees)	Percent Frequency (Feb-Apr, 1981)
A-Extremely Unstable	22.5	3.8
B-Unstable	17.5 - 22.4	4.0
C-Slightly Unstable	12.5 - 17.4	12.8
D-Neutral	7.5 - 12.4	46.3
E-Slightly Stable	3.8 - 7.5	20.2
F and G-Stable to Extremely Stable	3.8	12.9

Source: Envirosphere, 1981.

TABLE II-23

NATIONAL AND ILLINOIS AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Primary (g/m^3)	Secondary (g/m^3)
Sulfur Dioxide	Annual	80	
	24-Hour[a]	365	
	3-Hour[a]		1,300
Particulates	Annual[b]	75	60[c]
	24-Hour[a]	260	150
Nitrogen Oxides	Annual	100	100
Carbon Monoxide	8-Hour[a]	10,000	10,000
	1-Hour[a]	40,000	40,000
Ozone	1-Hour[a]	235	235
Nonmethane Hydrocarbons[c]	3-Hour[a]	160	160
Lead	3-Month	1.5	1.5

[a]Not to be exceeded more than once per year.

[b]Geometric mean.

[c]Only a guide.

Sources: 40 CFR 50, 1980.
Swinford, 1981.

TABLE II-24

ATTAINMENT STATUS OF ST. CLAIR AND NEARBY COUNTIES WITH RESPECT TO THE NATIONAL AMBIENT AIR QUALITY STANDARDS

County	TSP	SO_2	O_3	NO_x	CO
St. Clair	1	4	1	3,4	3,4
Clinton	4	4	3,4	3,4	3,4
Monroe	1*,2	4	1	3,4	3,4
Madison	1*,2	3*,4	1	3,4	3,4
Randolph	4	4	3,4	3,4	3,4
Washington	4	4	3,4	3,4	3,4

Code: 1 Does not meet primary standards
2 Does not meet secondary standards
3 Cannot be classified
4 Better than national standards
3,4 Cannot be classified or better than national standards

Source: Federal Register, March 3, 1978.
January 30, 1980.

*Portions of County

TABLE II-25

ALLOWABLE PSD INCREMENTS

Pollutant	Class I (ug/m^3)	Class II (ug/m^3)	Class III (ug/m^3)
Sulfur Dioxide			
Annual Arithmetic Mean	2	20	40
24-Hour Maximum[a]	5	91	182
3-Hour Maximum[a]	25	512	700
Particulates			
Annual Geometric Mean	5	19	37
24-Hour Maximum[a]	10	37	75

[a]Not to be exceeded more than once per year.

Source: Federal Register, June 19, 1978.

TABLE II-26

SULFUR DIOXIDE LEVELS AT THE PROPOSED SITE

	Max. 3-Hour (ug/m^3)	2nd Max. 3-Hour (ug/m^3)	2nd Max. 24-Hour (ug/m^3)	2nd Max. 24-Hour (ug/m^3)	Annual (ug/m^3
Clark Oil Monitoring Station-New Athens[1] (Feb-Apr, 1981)	542	444	105	88	17
Illinois Power-Lenz[1] Station, Lenzburg (1979)	684	590	131	126	26
Illinois Power New Athens Station[2] (1979)	700	579	157	131	16
Illinois EPA Projected Levels[3] (1980)	-	600	-	190	40

Sources: 1 Envirosphere, 1981.
2 Illinois EPA, 1979.
3 Illinois EPA, 1980.

TABLE II-27

TOTAL SUSPENDED PARTICULATE LEVELS

	Clark Oil Monitoring Station, New Athens[1] (Feg-Apr, 1981)	Illinois EPA Projected Levels[2] (1980)
Maximum 24-Hour	105 ug/m^3	120 ug/m^3
Second Maximum 24-Hoour	72 ug/m^3	-
Annual Geometric Mean	52 ug/m^3	50 ug/m^3

Source: 1 Envirosphere, 1981.
2 Illinois EPA, 1980.

TABLE II-28

EMISSION INVENTORY* FOR 25KM RADIUS
(tons/year)

Source	TSP	SO_2	NO_x	HC	CO	X-Coord. (KM)	Y-Coord. (KM)
Autocrat Corporation New Athens	14.9	74.6	3.9	16.7	6.5	248.5	4246.0
Baldwin Power Plant Baldwin	6545.6	285,237.2	112,404.0	780.5	2588.7	250.0	4232.2
Carling Brewing Company Belleville	31.8	158.7	69.8	4.8	9.6	761.5	4267.5
City of Red Bud Power Plant	12.0	10.9	169.0	12.9	35.4	237.6	4233.9
H.H. Hall Construction Co., Plant #2, New Athens	65.6	-	-	-	-	248.1	4244.3
Quality Stone Company Waterloo Quarry	288.2	-	-	-	-	752.0	4241.8
St. Elizabeth Hospital Belleville	11.2	57.7	26.2	0.4	11.0	239.4	4266.6
Scott Air Force Base	18.3	201.7	130.2	3.5	7.6	251.0	4269.5

*Only sources with greater than 50 tons/year total emissions for either TSP, SO_2 or NO_x.

Source: Illinois EPA, 1981.

TABLE II-29

THE WATER QUALITY OF THE KASKASKIA RIVER
(miligrams/liter)

Parameters*	Approximately 3 Miles Down River			Approximately 30 mi Up River near Venedy Station at 71 Mi			Approximately 35 mi Down River at Roots, Illinois at Mi 4			Illinois Standards
	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	mg/l
Total Organic Carbon				20.0	9.19	4.1				
Fluoride	.20	.20	.20	.40	.22	.10	.23	.23	.23	1.4
Total Hardness (as $CaCO_3$)	316	209.79	76	320	180.56	110	120	120.00	120	
Lead				.320	.034	0.0	.800	.0315	0.0	0.1
Magnesium				66.0	18.85	7.4	19	19	19	
Manganese	.180	.180	.180	.960	.296	.010	.790	.255	.070	1.0
Mercury (ug/l)										.0005
Nickel (ug/l)				4.0	3.33	3.0	0	0	0	1.0
Potassium				8.6	3.62	2.4	3.9	3.35	2.3	
Phenol (ug/l)										0.1
Selenium (ug/l)(Diss)				1.0	.19	0.0				1.0
Silver (ug/l)				2.0	.21	.0	10.0	3.3	0.	.005
Silicon Dioxide				8.2	3.81	.4	4.8	4.8	4.8	
Sodium				67.0	20.9	8.5	26	24	22	
Sulfate	240	59.28	5	100	46.73	16	675	73.4	28	500
Sulfide										
Zinc (ug/l)				210	47.1	0	50	9.4	0	1.0
Iron				15	3.3	.51	8.9	1.61	10	1.0
Oil & Grease										
Specific Conductance (umhos/cm)	1000	489.6	130	750	445.1	139	879	425.7	188	

*All values are in mg/l except where noted.

TABLE II-30

GROUNDWATER ELEVATIONS
DAMES & MOORE GEOTECHNICAL INVESTIGATION -1976

Boring No.*	Depth to** Groundwater	Groundwater Elevations Borehole Measurements	Monitoring Wells***
1	NR	-	355.8'
2	NR	-	
3	NR	-	
4	NR	-	
5	64	341'	
6	NR	-	
7	NR	-	
8	NR	-	
9	NR	-	
10	50'	338'	
11	NR	-	
12	NR	-	
13	30'	355'	
14	30'	355'	355.6'
15	19'	361'	
16	34'	351'	
17	NR	-	
18	13'	363'	361.5'
19	NR	-	371.3'
20	NR	-	

*Borings 1, 4, 18 and 19 converted to monitoring wells.
**Depth to groundwater below land surface as noted on boring logs during drilling. NR - not recorded.
***Average elevation based on measurements between August 1976 through November 1976.

TABLE II-31

GROUNDWATER ELEVATION*
PEABODY COAL CO MONITORING PROGRAM

Monitoring Well	Depth (feet)	Type**	Ground Surface Elevation	Groundwater Elevation	Depth to Groundwater
1	125	BR	417.9	389.1	28.8
2	92	BR	400.1	384.1	16.0
3	99	BR	399.9	371.3	28.6
4	107	BR	422.3	389.3	33.0
5	53	UD-BR	417.9	395.7	22.2
6	43	UD-BR	399.7	387.9	11.8
7	48	UD	399.8	373.5	26.3
8	36	UD	422.5	411.6	10.9
9	72	UD-BR	378.7	371.3	7.4
10	75	UD-BR	383.7	370.0	13.7
11	81	UD-BR	410.3	367.6	42.7
12	77	UD-BR	396.4	372.7	23.7

*Sampled 12/10/80.

**UD - unconsolidated deposits.
BR - bedrock.

TABLE II-32

REGIONAL GROUNDWATER QUALITY

Well No.*	Depth (ft)	Type**	TDS (ppm)	Hardness (ppm)	Chloride (ppm)	Fe (ppm)	Fl (ppm)
1	36	UD	364	272	5	Tr	-
2	45	UD	145	94	12	0.4	-
3	30	UD	793	440	43	0.2	-
6	65	UD	483	364	7	2.2	-
5	80	BR	2092	1040	195	0	-
4	1100	BR	2376	48	970	Tr	-
7	314	BR	580	26	-	0.0	3.8
8	304	BR	642	3	-	0.0	1.8
Drinking Water Standard			500	-	250	0.3	1.4 - 2.4

*Nos. 1-6 - from Jacobs, Alan M, 1971, Geology for Planning in St Claire County, Illinois, Illinois State Geological Survey, Circular 465.

Nos 7 and 8 - Village of Hecker, Public Water Supply Wells.

**UD - unconsolidated deposits.
BR - bedrock.

TABLE II-33

GROUNDWATER QUALITY*
MINIMUM, MAXIMUM, AND MEAN

CONSTITUENT	MONITORING WELL #1 MINIMUM	MAXIMUM	MEAN	MONITORING WELL #2 MINIMUM	MAXIMUM	MEAN	DRINKING WATER STANDBY PRIMARY	SECONDARY
Arsenic (As)	0.001	0.004	0.003	0.001	0.009	0.004	.05	
Barium (Ba)	0.30	0.40	0.38	0.30	0.50	0.40	1.0	
Cadmium (Cd)	0.002	0.005	0.003	0.002	0.003	0.002	0.01	
Calcium (Ca)	40	59	53	6	20	11		
Chromium (Cr)	0.002	0.03	0.02	0.02	0.08	0.04	0.05	
Copper (Cu)	0.002	0.03	0.02	0.02	0.03	0.02		1.0
Iron (Fe)	0.04	0.09	0.07	1.5	12.4	5.2		0.3
Lead (Pb)	0.002	0.02	0.02	0.002	0.04	0.02	0.05	
Magnesium (Mg)	30	38	33	3	7	5		
Manganese (Mn)	0.03	0.04	0.04	0.02	0.12	0.05		0.05
Mercury (Hg)	0.00002	0.00006	0.00003	0.00011	0.00054	0.00020	0.002	
Potassium (K)	4	11	7	3	9	6		
Nickel (Ni)	0.02	0.02	0.02	0.02	0.08	0.04		
Selenium (Se)	0.001	0.002	0.001	0.001	0.007	0.003	0.01	
Silver (Ag)	0.002	0.013	0.005	0.003	0.001	0.005	0.05	
Sodium (Na)	56	68	63	255	340	301		
Zinc (Zn)	0.02	0.06	0.03	0.02	0.07	0.04		5
Chloride (Cl)	4	8	6	26	45	36		250
Fluoride (F)	0.48	0.66	0.55	2.32	4.10	3.33	1.4-2.4	
Nitrate (N)	0.22	1.0	0.7	.46	8.7	2.2	10.0	
Acidity, as $CaCO_3$								
Alkalinity (bicarbonate)	360	396	380	-366	-667	-490		
Alkalinity (carbonate)	360	396	377	562	703	637		
Total Hardness ($CaCO_3$)	248	302	266	-	-	-		
Sulfate (SO_4)	12	27	17	19	1861	65		250
Total Dissolved Solids	420	483	445	747	2014	1198		500
Conductivity (micromohs)	656	721	684	1070	1350	1192		-
pH @ 25° C (pH units)	7.4	7.8	7.6	8.2	8.8	8.5		6.5-8.5
Temperature (°C)	13	16	14	13	16	15		

*Monthly sampling July 1980 through Dec 1980.
All measurements given in mg/l except as shown.

TABLE II-34

LAND USE PATTERNS - ST. CLAIR COUNTY

Category	Acres
Developed	41,482
	(9.7)
Agricultural	229,504
	(53.5)
Pasture/Inactive Mine	101,615
	(23.6)
Open Space/Forest	38,286
	(8.9)
Mining	2,717
	(0.6)
Barren	4,911
	(1.1)
Water	8,965
	(2.1)
Uncategorized	2,212
	(0.5)
Total	429,692
	(100.0)

Note: 1. The numbers in parenthesis represent the percentages of the total.

Source: Illinois Environmental Protection Agency, 1980.

TABLE II-35

SUMMARY OF RECREATION FACILITIES IN ST. CLAIR COUNTY

Type of Facility	No.	Acres
Regional	2	1,899.4
Metropolitan	6	1,425.0
District	6	287.0
Neighborhood	37	277.9
Vest Pocket	14	7.5
Special Facility	0	-
Tot Lots	1	0.7
Conservation Area	2	4,234.4
Total	68	8,131.9

Source: East-West Gateway Coordinating Council, 1979.

TABLE II-36

LAND USE PATTERNS - NINE TOWNSHIP AREA
(in acres)

Township	Developed	Agricultural	Pasture/ Inactive Mine	Open Space/ Forest	Mining	Barren	Water	Uncategorized	Total
Engelmann	11	13,758	4,592	4,711	28	277	97	75	23,549
Fayetteville	415	13,398	6,023	2,866	118	322	282	65	23,489
Freeburg	570	11,679	6,236	3,233	230	91	801	110	22,950
Lenzburg	136	10,014	5,286	2,272	71	119	1,628	72	19,598
Marissa	597	12,410	6,738	1,220	482	311	1,398	92	23,248
New Athens	450	11,272	6,061	3,568	354	247	927	70	22,949
Prairie duLong (St. Clair County)	60	15,574	5,523	741	187	511	305	108	23,009
Praire duLong (Monroe County)	141	13,972	5,152	2,833	80	402	228	82	22,896
Smithton	261	14,301	6,577	515	78	289	402	110	22,533
Total	2,641 (1.3)	116,378 (57.0)	52,188 (25.5)	21,959 (10.7)	1,634 (0.8)	2,569 (1.3)	6,068 (3.0)	784 (0.4)	204,221 (100.0)

Note: 1. The numbers in parenthesis represent the percentages of the total.

Source: Illinois Environmental Protection Agency, 1980.

TABLE II-37

RECREATION FACILITIES WITHIN THE NINE TOWNSHIP AREA

Park	Location	Type	Acres	Distance from Site (miles)
Village Square	Freeburg	Neighborhood	1.0	7.0
Turner Park	Smithton	Neighborhood	4.0	9.0
Village Square	Fayetteville	Neighborhood	4.0	6.0
Khoury League	Marissa	Neighborhood	8.0	8.0
Old High School	Marissa	Neighborhood	12.0	8.0
Village Park	Marissa	Neighborhood	4.0	8.0
Old Town Park	Marissa	Vest Pocket	1.0	8.0
Unnamed	New Athens	Neighborhood	12.0	2.0
Village Park	New Athens	Neighborhood	2.5	1.5
Village Park	St. Libory	Neighborhood	4.0	9.0
Marissa Recreational Center	S.E. of Marissa	Metropolitan	178.0	10.0
Baldwin Lake	Baldwin	Conservation Area	234.4	10.0
Kaskaskia Fish and Wildlife Area	Near Baldwin	Conservation Area	4000.0	-
Total			4,464.9	

Source: East-West Gateway Coordinating Council, 1979.

TABLE II-38

REGIONAL EMPLOYMENT BY INDUSTRIAL DIVISION

Division/Year	1969	1979	Percent Change
Agriculture	1,302 (1.2)	1,688 (1.4)	29.6%
Mining	1,540 (1.4)	3,004 (2.6)	94.3
Construction	6,438 (6.1)	6,902 (5.9)	7.2
Manufacturing	20,533 (19.3)	16,709 (14.2)	-18.6
TCPU	10,556 (9.9)	7,556 (6.4)	-28.4
Wholesale Trade	2,928 (2.8)	4,520 (3.8)	54.4
Retail Trade	15,144 (14.2)	18,461 (15.7)	21.9
FIRE	3,354 (3.1)	3,859 (3.3)	15.1
Services	17,557 (16.5)	22,645 (19.3)	29.0
Government	27,173 (25.5)	32,149 (27.4)	18.3
Total	106,525 (100.0)	117,493 (100.0)	10.3

Notes: 1. The numbers in parenthesis represent percentages of the total.
2. Definitions: Agriculture includes farm, agricultural services fisheries, and forestry employment; TCPU is for Transportation, Communication and Public Utilities and FIRE is for Finance, Insurance and Real Estate.

Source: U.S. Bureau of Economic Analyses, 1981.

TABLE II-39

FIVE COUNTY EMPLOYMENT BY INDUSTRIAL DIVISION
1969

Division/County	St. Clair	Clinton	Monroe	Randolph	Washington	Total
Agriculture	362	400	162	189	189	1,302
	(27.9)	(30.7)	(12.4)	(14.5)	(14.5)	(100.0)
Mining	753	66	37	639	45	1,540
	(48.9)	(4.3)	(2.4)	(41.5)	(2.9)	(100.0)
Construction	4,748	460	389	701	140	6,438
	(73.8)	(7.1)	(6.0)	(10.9)	(2.2)	(100.0)
Manufacturing	15,060	1,569	46	3,088	770	20,533
	(73.3)	(7.6)	(0.2)	(15.0)	(3.8)	(100.0)
TCPU	8,875	633	313	587	148	10,556
	(84.1)	(6.0)	(3.0)	(5.5)	(1.4)	(100.0)
Wholesale Trade	2,297	246	133	162	90	2,928
	(78.5)	(8.4)	(4.5)	(5.5)	(3.1)	(100.0)
Retail Trade	11,762	924	661	1,247	550	15,144
	(77.7)	(6.1)	(4.4)	(8.2)	(3.6)	(100.0)
FIRE	2,782	158	116	228	70	3,354
	(82.9)	(4.7)	(3.5)	(6.8)	(2.1)	(100.0)
Services	14,185	1,279	484	1,105	504	17,557
	(80.8)	(7.3)	(2.7)	(6.3)	(2.9)	(100.0)
Government	21,338	2,002	759	2,299	775	27,173
	(78.5)	(7.4)	(2.8)	(8.5)	(2.8)	(100.0)
Total	82,162	7,737	3,100	10,245	3,281	106,525
	(77.1)	(7.3)	(2.9)	(9.6)	(3.1)	(100.0)

Notes: 1. The numbers ion parenthesis represents percentage of the total.

2. Definitions: Agriculture includes form, agricultural services, fisheries and forestry employment; TCPU is for Transportation Communications and Public Utilities and FIRE is for Finance, Insurance and Real Estate.

Source: U.S. Bureau of Economic Analysis, 1981.

TABLE II-40

FIVE COUNTY EMPLOYMENT BY INDUSTRIAL DIVISION
1979

Division/County	St. Clair	Clinton	Monroe	Randolph	Washington	Total
Agriculture	501	291	353	274	269	1,688
	(29.7)	(17.3)	(20.9)	(16.2)	(15.9)	(100.0)
Mining	2,174	45	54	676	55	3,004
	(72.4)	(1.5)	(1.8)	(22.5)	(1.8)	(100.0)
Consruction	5,411	412	399	501	179	6,902
	(78.4)	(6.0)	(5.8)	(7.2)	(2.6)	(100.0)
Manufacturing	11,359	923	110	3,987	330	16,709
	(68.0)	(5.5)	(0.6)	(23.9)	(2.0)	(100.0)
TCPU	5,894	474	121	912	155	7,556
	(78.0)	(6.3)	(1.6)	(12.1)	(2.0)	(100.0)
Wholesale Trade	3,157	445	230	334	354	4,520
	(69.8)	(9.9)	(5.1)	(7.4)	(7.8)	(100.0)
Retail Trade	14,789	1,164	711	1,351	446	18,461
	(80.1)	(6.3)	(3.9)	(7.3)	(2.4)	(100.0)
FIRE	2,979	259	161	310	150	3,859
	(77.2)	(6.7)	(4.2)	(8.0)	(3.9)	(100.0)
Services	18,581	1,705	544	1,297	518	22,645
	(82.1)	(7.5)	(2.4)	(5.7)	(2.3)	(100.0)
Government	25,483	2,360	820	2,618	868	32,149
	(79.3)	(7.3)	(2.6)	(8.1)	(2.7)	(100.0)
Total	90,328	8,078	3,503	12,260	3,324	117,493
	(76.9)	(6.9)	(3.0)	(10.4)	(2.8)	(100.0)

Notes: 1. The numbers in parenthesis represent percentages of the total.

2. Definitions: Agriculture includes farm, agricultural services, fisheries and forstry employment; TCPU is for Transportation, Communications and Public Utilities and FIRE is for Finance, Insurance and Real Estate.

Source: U.S. Bureau of Economic Analysis, 1981.

TABLE II-41

REGIONAL DISTRIBUTION OF PERSONAL INCOME

(000)

County/Year	1969	1979	Percent Change
St Clair	$610,651	$1,340,933	119.6%
	(78.0)	(75.5)	
Clinton	49,726	116,530	134.3
	(6.4)	(6.6)	
Monroe	23,457	60,346	157.3
	(3.0)	(3.4)	
Randolph	75,503	173,878	156.8
	(9.6)	(10.9)	
Washington	23,268	63,738	173.9
	(3.0)	(3.6)	
Total	782,605	1,775,425	126.9
	(100.0)	(100.0)	

Note: 1. The numbers in parenthesis represent percentages of the total.

Source: U.S. Bureau of Economic Analysis, 1981.

TABLE II-42

FIVE COUNTY REGIONAL POPULATION TRENDS:

1970 to 2010

County/Year	1970	1980	1990	2000	2010
St. Clair	285,591 (75.6)	264,177 (72.0)	266,935 (71.6)	271,721 (70.9)	279,231 (70.3)
Clinton	28,315 (7.5)	32,256 (8.8)	33,019 (8.9)	33,548 (8.8)	34,689 (8.7)
Monroe	18,831 (5.0)	19,982 (5.4)	20,573 (5.5)	22,964 (6.0)	25,060 (1.3)
Randolph	31,379 (8.3)	35,295 (9.6)	36,548 (9.8)	39,137 (10.2)	41,910 (10.6)
Washington	13,780 (3.6)	15,337 (4.2)	15,685 (4.2)	15,871 (4.1)	16,060 (4.1)
Total	377,895 (100.0)	367,047 (100.0)	372,759 (100.0)	383,241 (100.0)	396,950 (100.0)

Note: 1. For the projected levels of 1990 to 2010, adjustments were made to State of Illinois, Bureau of Budget projections.

Sources: U.S. Bureau of Census, 1980, State of Illinois, 1977 and Envirosphere Company.

TABLE II-43

NINE TOWNSHIP STUDY AREA POPULATION TRENDS

1970 to 2010

County/Year	1970	1980	1990	2000	2010
Engelmann	499 (3.1)	549 (3.1)	549 (2.9)	549 (2.8)	549 (2.7)
Fayetteville	1,607 (10.1)	1,552 (8.7)	1,649 (8.9)	1,746 (9.0)	1,746 (8.8)
Freeburg	3,678 (23.1)	4,399 (24.7)	4,636 (24.9)	4,756 (24.9)	4,756 (23.9)
Lenzburg	654 (4.1)	884 (4.9)	888 (4.8)	888 (4.6)	888 (4.4)
Marissa	2,818 (17.7)	3,091 (17.3)	3,091 (16.6)	3,198 (16.6)	3,304 (16.6)
New Athens	2,570 (16.1)	2,493 (19.0)	2,825 (15.1)	2,909 (15.1)	3,324 (16.7)
Praire du Long (St. Clair County)	838 (5.3)	843 (4.7)	843 (4.5)	843 (4.4)	843 (4.2)
Praire du Long (Monroe County)	1,340 (8.4)	1,370 (7.7)	1,240 (6.7)	1,240 (6.4)	1,240 (6.2)
Smithon	1,925 (12.1)	2,656 (14.9)	2,910 (15.6)	3,162 (16.4)	3,288 (16.5)
Total	15,929 (100.0)	17,837 (100.0)	18,631 (100.0)	19,291 (100.0)	19,938 (100.0)

Note: 1. For the projected levels of 1990 to 2010, adjustments were made to the Southwestern Illinois Metropolitan and Regional Planning Commission projections.

Sources: U.S. Bureau of Census, 1980, Southwestern Illinois Metropolitan and Regional Planning Commission, 1980, and Envirosphere Company.

TABLE III-1

FINAL POLISHING AND HOLDING POND EFFLUENT WATER QUALITY AND ILLINOIS STATE STANDARDS

	Effluent (mg/l)	Water Quality Standard (mg/l)
Flow	4.56 cfs	-
pH	709.0	6-9.0
TDS	1233.0	1000.0
TSS	5.5	-
BOD5	5.4	-
COD	26.3	-
Oil & Grease	0.02	-
Silica	32.2	-
Ammonia-N	1.05	1.5
NO3-N	118.5	-
Cyanide	0.013	0.025
Aluminum	0.061	-
Calcium	70.2	-
Copper	0.038	0.02
Iron	0.068	1.0
Magnesium	41.67	-
Manganese	0.114	1.0
Potassium	32.55	-
Sodium	275.3	-
Chloride	330.95	500.0
Phosphate	33.7	-
Sulfate	605.5	500.0
Arsenic	0.018	1.0
Barium	0.038	5.0
Cadmium	0.014	0.05
Chromium	0.055	0.050
Lead	0.08	0.10
Selenium	0.005	1.0
Silver	0.004	0.005
Beryllium	0.006	-
Nickle	0.017	1.0
Zinc	0.158	1.0

TABLE II-36

LAND USE PATTERNS - NINE TOWNSHIP AREA
(in acres)

Township	Developed	Agricultural	Pasture/ Inactive Mine	Open Space/ Forest	Mining	Barren	Water	Uncategorized	Total
Engelmann	11	13,758	4,592	4,711	28	277	97	75	23,549
Fayetteville	415	13,398	6,023	2,866	118	322	282	65	23,489
Freeburg	570	11,679	6,236	3,233	230	91	801	110	22,950
Lenzburg	136	10,014	5,286	2,272	71	119	1,628	72	19,598
Marissa	597	12,410	6,738	1,220	482	311	1,398	92	23,248
New Athens	450	11,272	6,061	3,568	354	247	927	70	22,949
Prairie duLong (St. Clair County)	60	15,574	5,523	741	187	511	305	108	23,009
Praire duLong (Monroe County)	141	13,972	5,152	2,833	80	402	228	82	22,896
Smithton	261	14,301	6,577	515	78	289	402	110	22,533
Total	2,641 (1.3)	116,378 (57.0)	52,188 (25.5)	21,959 (10.7)	1,634 (0.8)	2,569 (1.3)	6,068 (3.0)	784 (0.4)	204,221 (100.0)

Note: 1. The numbers in parenthesis represent the percentages of the total.

Source: Illinois Environmental Protection Agency, 1980.

TABLE III-2

CRITERIA EMISSION SOURCES SUMMARY

Source Name	SO_2 (g/s)	NO_2 (g/s)	TSP (g/s)	CO (g/s)	VOC (g/s)	Stack Ht. (m)	Stack Dia. (m)	Exit Vel. (m/s)	Stack Temp. (°X)
Main Boiler[1,7]	269.4	5.3	-	.3	-	83.82	1.60	20.32	505.0
Acid Gas Removal (vented)	-	-	-	32.4	-	76.20	1.68	18.30	-
Acid Gas Removal (treated)	-	-	-	-	-	38.10	.61	18.30	-
Superheater[7]	-	2.2	-	.2[2]	-	38.10	2.13	20.32	-
Gas Synthesis Area 450 (flare)	-	3.1[2]	-	.5[2]	.4[2]	76.20	.20	38.40	1089.0
Gas Synthesis (Regneration)	-	.71[3]	-	4.7[3]	-	45.70	1.07	15.24	611.0
Dust Collection System[5]	-	-	.8	-	-	30.48	1.52	10.15	298.2
Surge Bin Exhaust[4]	-	-	.18	-	-	25.91	.46	10.16	298.2
Pulverized Coal Bin[4]	-	-	.25	-	-	36.58	.56	11.18	366.3
Recycke Gas Bag Exhaust[4]	-	75.6	.14	.1	.4	30.48	1.88	11.18	366.3
Coal Feeding[6]	-	-	.2	-	-	25.35	.56	11.18	344.3
Coal Storage (6.5 acres)	-	-	.12	-	-	-	-	-	-
Flare Stack (Gas Cooling)[7]	.6	.4	-	-	-	91.44	.36	4.10	1197.0

[1]Assumes emissions are resulting from start-up configuration.

[2]63 hours per year.

[3]66 hours per year.

[4]20 hours per day, 350 days per year.

[5]19 hours per day, 350 days per year.

[6]17 hours per day, 350 days per year.

[7]24 hours per day, 350 days per year.

TABLE III-3

BALDWIN POWER PLANT SO_2, NO_2 AND TSP EMISSION RATES

Dist. from Plant (km)	Dir. from Plant (Deg)	SO_2 (g/e)	NO (g/s)	TSP (g/s)	Stack Ht. (m)	Stack Dia. (m)	Exit Vol. (m/s)	Stack Temp. (°g)
14.4	188	12845.	3234	188.	184.0	5.90	36.6	424.7

TABLE III-4

TRACE ELEMENT ANALYSIS OF COAL

Dry Whole Coal Basis	ppm
Mercury	0.06
Flourine	69
Baron	73
Selenium	1.6
Arsenic	1.5
Antimony	0.3
Lithium	6.5
Beryllium	1.1
Vanadium	31
Chromium	21
Manganese	38
Nickel	12
Copper	10
Zinc	61
Cobalt	0.48
Cadmium	0.5
Lead	6

TABLE III-5

POTENTIAL TRACE ELEMENT CONCENTRATIONS

Pollutant	Emission Rate (lbs/hr)	Emission Rate (g/s)
Mercury	3.68×10^{-2}	4.64×10^{-3}
Fluorine	42.3	5.33
Boron	44.8	5.64
Selenium	9.81×10^{-1}	1.24×10^{-1}
Arsenic	9.20×10^{-1}	1.16×10^{-1}
Antimony	1.84×10^{-1}	2.32×10^{-2}
Lithium	3.99	5.02×10^{-1}
Beryllium	6.75×10^{-1}	8.50×10^{-2}
Vanadium	19.0	2.39
Chromium	12.9	1.62
Manganese	23.3	2.93
Nickel	7.36	9.28×10^{-1}
Copper	6.13	7.73×10^{-1}
Zinc	37.4	4.72
Cobalt	2.94×10^{-1}	3.71×10^{-2}
Cadmium	3.07×10^{-1}	3.86×10^{-2}
Lead	3.68	4.64×10^{-1}

TABLE III-6

COMPARISON OF MAXIMUM PREDICTED SO_2 AND TSP CONCENTRATIONS DUE TO THE PROPOSED PLANT TO APPLICABLE PSD INCREMENTS

Pollutant	Averaging Time	Highest Conc. (ug/m^3)	Distance[1] (km)	Direction[1] (degrees)	Class II PSD Increments ug/m^3)
SO_2	Annual	6.	3.0	360.	20.
	24-Hour	77.	1.0	240.	91.
	3-Hour	313.	1.0	240.	512.
TSP	Annual	1.	1.5	360.	19.
	24-Hour	35.	1.5	340.	37.

[1]From center of proposed plant.

TABLE III-7

PREPROCESSED HOURLY MET DATA FOR DAY 212 1964 (July 30)
(Highest 3-Hour and 24-Hour SO_2 PSD Impacts)

HR	DIR Degrees	Speed (M/S)	Stability Class	Mix Hts (M)	Temp (Deg K)
1	69.	1.0	7	984.	291.
2	43.	1.0	7	998.	290.
3	58.	1.0	7	1012.	289.
4	62.	1.0	7	1025.	289.
5	60.	1.0	7	1039.	286.
6	62.	1.0	6	122.	288.
7	55.	1.5	5	252.	291.
8	60.	2.1	4	382.	294.
9	122.	2.1	3	512.	296.
10	116.	1.0	2	643.	298.
11	65.	1.0	1	773.	300.
12	56.	1.0	1	903.	301.
*13	62.	1.0	1	1033.	302.
*14	64.	1.0	1	1163.	303.
*15	80.	2.1	2	1163.	304.
16	174.	1.5	2	1163.	304.
17	165.	1.5	2	1163.	304.
18	165.	1.0	3	1163.	303.
19	56.	1.0	3	1163.	300.
20	96.	1.5	4	1174.	298.
21	118.	1.5	5	1186.	298.
22	117.	1.0	6	1198.	295.
23	117.	1.0	7	1210.	295.
24	118.	1.0	6	1222.	295.

TABLE III-8

PREPROCESSED HOURLY MET DATA FOR DAY 308 1964 (Nov. 3)
(Highest 24-Hour TSP Ambient and PSD Impacts)

HR	DIR Degrees	Speed (M/S)	Stability Class	Mix Hts (M)	Temp (Deg K)
1	169.	1.0	7	1521.	285.
2	173.	1.0	7	1507.	284.
3	168.	1.0	7	1493.	284.
4	172.	1.0	7	1479.	283.
5	170.	1.0	7	1464.	283.
6	162.	1.5	6	1450.	284.
7	205.	2.1	5	84.	285.
8	180.	1.0	4	263.	286.
9	172.	2.1	4	442.	289.
10	176.	2.6	4	621.	290.
11	135.	2.1	3	800.	293.
12	176.	2.1	2	979.	295.
*13	182.	4.1	3	1158.	296.
*14	164.	4.1	4	1337.	296.
*15	170.	3.1	3	1337.	296.
16	174.	2.6	4	1337.	295.
17	155.	1.5	5	1340.	294.
18	155.	1.0	6	1368.	293.
19	126.	2.1	6	1395.	291.
20	156.	1.0	7	1422.	289.
21	158.	1.0	7	1450.	286.
22	157.	1.0	7	1477.	285.
23	157.	1.0	7	1505.	284.
24	158.	1.0	7	1532.	282.

TABLE III-9

COMPARISON OF MAXIMUM PREDICTED POLLUTANT CONCENTRATIONS DUE TO THE EXISTING BACKGROUND SOURCES AND PROPOSED PLANT WITH APPLICABLE AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Highest Conc. (ug/m^3)	Distance[1] (km)	Direction[1] (degrees)	Background Conc. (ug/m^3)	Total Conc. (ug/m^3)	Standard (ug/m^3)	Standard Type
SO_2	Annual	17.	3.5	360	-	17[2]	80[2]	Primary
	24-Hour	168.	5.5	190	-	168	365	Primary
	3-Hour	813.	5.5	190	-	813	1300	Secondary
TSP	Annual	1.3	1.5	360	52[2]	53[2]	75[3]	Primary
	24-Hour	35.	1.5	340	105	140	150	Secondary
NO_2	Annual	17.	1.0	360	15[2]	32[2]	100[2]	Primary & Secondary

WA - Not Applicable.

[1]From the original stack of the proposed power plant.

[2]Arithmetic mean.

[3]Geometric mean.

TABLE III-10

PREPROCESSED HOURLY MET DATA FOR DAY 250 1964 (Sept. 6)
(Highest 3-Hour SO_2 Ambient Impacts)

HR	DIR Degrees	Speed (M/S)	Stability Class	Mix Hts (M)	Temp (Deg K)
1	358.	1.0	7	1414.	289.
2	357.	1.0	7	1459.	290.
3	3.	1.0	7	1505.	290.
4	2.	1.0	7	1550.	289.
5	5.	1.0	6	1595.	289.
6	4.	1.0	5	94.	189.
7	3.	1.0	4	333.	291.
8	143.	2.1	3	571.	294.
9	165.	3.6	2	810.	297.
10	179.	3.1	2	1049.	300.
11	181.	2.1	2	1287.	301.
12	159.	1.5	2	1526.	303.
*13	188.	4.1	3	1764.	305.
*14	185.	4.6	3	2003.	305.
*15	185.	5.1	3	2003.	305.
16	195.	6.2	4	2003.	306.
17	176.	4.1	3	2003.	305.
18	171.	3.1	4	2003.	303.
19	158.	2.1	5	2017.	301.
20	169.	2.1	6	2036.	300.
21	166.	1.0	7	2055.	299.
22	155.	1.0	7	2074.	297.
23	148.	1.0	7	2093.	296.
24	147.	1.0	7	2113.	296.

TABLE III-11

PREPROCESSED HOURLY MET DATA FOR DAY 209 1964 (July 27)
(Highest 24-Hour SO_2 Ambient Impacts)

HR	DIR Degrees	Speed (M/S)	Stability Class	Mix Hts (M)	Temp (Deg K)
1	46.	1.0	6	1652.	295.
2	50.	1.0	6	1694.	296.
3	50.	1.0	6	1735.	295.
4	47.	1.0	6	1777.	295.
5	50.	1.0	6	1819.	295.
6	51.	1.0	5	240.	295.
7	50.	1.0	4	484.	298.
8	165.	1.5	3	729.	301.
9	188.	2.1	2	973.	303.
10	221.	2.6	2	1218.	305.
11	188.	3.1	2	1462.	306.
12	230.	2.6	1	1707.	305.
13	192.	3.1	2	1951.	307.
14	187.	2.6	2	2196.	309.
15	181.	3.1	2	2196.	308.
16	189.	3.6	2	2196.	309.
17	171.	2.6	3	2196.	308.
18	199.	5.7	4	2196.	305.
19	196.	3.1	4	2196.	303.
20	145.	1.0	5	2136.	301.
21	167.	1.0	6	2065.	301.
22	180.	1.5	7	1993.	299.
23	192.	1.0	7	1922.	299.
24	200.	1.5	7	1851.	298.

TABLE III-12

POTENTIAL TRACE ELEMENT EMISSIONS

Pollutant	Concentration (ug/m^3)
Mercury	1.21×10^{-3}
Fluorine	1.52
Boron	1.61
Selenium	3.45×10^{-2}
Arsenic	3.31×10^{-2}
Antimony	6.62×10^{-2}
Lithium	1.43×10^{-1}
Beryllium	2.42×10^{-2}
Vanadium	6.82×10^{-1}
Chromium	4.62×10^{-1}
Manganese	8.36×10^{-1}
Nickel	2.65×10^{-1}
Copper	2.20×10^{-1}
Zinc	1.34
Cobalt	1.06×10^{-2}
Cadmium	1.10×10^{-2}
Lead	1.32×10^{-1}

TABLE III-13

WASTE TREATMENT SYSTEMS EFFLUENT WATER QUALITY

Parameter	Bio-oxidation Effluent	P/C Treatment	Sanitary	Oily Waste	Cooling Tower Blowdown	Methanol Runoff, Gasoline Storage Slag Landfill Area Runoff	Final Polishing & Holding Pond
Flow	1074	156	10	5 (Avg)	773	27	2045
pH	7-9	8-9	7-9	6-8	8	7-9	7-9
Temp	90-95	Ambient	Ambient	Ambient	85	Ambient	Ambient
TDS	--	1994.7	--	500	2692	--	--
TSS	5	5	30	15	50	30	30
BOD_5	10	--	30	--	--	--	30
COD	50	--	--	--	--	--	26.3
Oil & Grease	--	--	--	10	--	--	.02
Silica	--	15.9	8.2	--	82	--	32.2
Ammonia	2	--	--	--	--	--	1.05
Formate	--	--	--	--	--	--	--
Methanol	--	--	--	--	--	--	--
NO_3-N	201	11.9	2.7	--	27	--	116.7
Acidity	--	0	--	--	--	--	--
Cyanide	.025	.001	--	--	--	--	.0132
Sulfide	Trace	--	--	--	--	--	--
Aluminum	--	0.8	--	--	--	--	.061
Calcium	--	345	12	--	120	--	71.7
Copper	--	.0002	.01	--	0.1	--	.038
Iron	--	0.4	.01	--	.10	--	.068
Magnesium	--	66.6	9.6	--	96	--	41.41
Manganese	--	0.5	.02	--	.20	--	.114
Potassium	--	38	8.6	--	86	--	35.45
Sodium	--	295.9	67	--	670	--	276.2
Chloride	Trace	394.3	82	--	820	--	340.44
Phosphate	--	--	89	--	8.9	--	3.4
Sulfate	--	1161	132.5	--	1325	--	590.1
Arsenic	--	.034	.003	--	.03	--	.014

TABLE III-13 (Cont'd)

Parameter	Bio-oxidation Effluent	P/C Treatment	Sanitary	Oily Waste	Cooling Tower Blowdown	Methanol Runoff, Gasoline Storage Slag Landfill Area Runoff	Final Polishing & Holding Pond
Barium	--	.463	.01	--	.100	--	.073
Cadmium	--	.010	.002	--	0.02	--	.008
Chromium	--	.05	.010	--	0.10	--	.042
Lead	--	.09	.016	--	.16	--	.067
Selenium	--	.007	.001	--	.010	--	.004
Silver	--	--	.001	--	.01	--	.004
Beryllium	--	.004	--	--	--	--	.0003
Nickel	--	.17	--	--	--	--	.013
Zinc	--	.087	.040	--	.40	--	.158
Chlorine Residual	--	--	--	--	--	--	--
Fluorine	--	.02	--	--	--	--	--

TABLE III-14

ESTIMATED EFFLUENT CHARACTERIZATION
AND ITS EFFECT ON THE RIVER WATER QUALITY

Constituent mg/l	Kaskaskia River Water Quality (MAX CONC.)	Estimated Concentration At Discharge Point	Estimated Increase In The Kaskaskia River Concentration At 21 Ft From the Discharge Point	Estimated Increase In The Kaskaskia River Concentration At 257 Ft From the Discharge Point	Estimated Kaskaskia River Concentration At 21 Ft From Discharge Point	Estimated Kaskaskia Concentration At 257 Ft From Discharge Point	Illinois Water Quality Standards	Compliance With Standards
Flow/Cross Section	2700 ft^2	2045 gpm			17 ft^2 (0.6% of total)	138 ft^2 (5.1% of total)		
pH (Units)		7-9					6.5-9	Yes
TDS	414 max (271.79)	1195.95	300.62	95.51	572.41	364.3	1000	Yes
TSS	401	15	4	1	405	402		
BOD_5	8	30	7.5	2.3	15.5	10.3	30	Yes
COD		26.3						
Oil & Grease	-	0.02	.005	.0015	.005	.0015	-	
Silica	8.2	32.2	8.05	2.48	16.25	10.68	-	
Ammonia	1.7	1.05	.26	.08	1.96	1.78	1.5	Ambient exceeds standards
Nitrate	2.7	116.7	29.18	8.98	31.88	11.68		
Cyanide	-	0.0132	.0033	0.001	.0033	.001	0.025	Yes
Aluminum	-	0.061	.015	.005	.015	.005	-	
Calcium	12	71.7	17.93	5.52	29.93	17.52	-	
Copper	0.010	0.038	.0095	..0029	.0195	.0129	0.02	Yes
Iron	2.3	0.068	.017	.005	2.317	2.305	1.00	Ambient exceeds standards
Magnesium	66	41.41	10.35	3.19	76.35	69.19	-	
Manganese	0.96	0.114	.029	.009	.989	.969	1.00	Yes
Potassium	8.6	35.45	8.86	2.73	17.46	11.33	-	
Sodium	67	276.2	69.05	21.25	136.05	88.25	-	
Chloride	82	340.44	85.11	26.19	167.11	108.19	500	Yes
Phosphate	0.89	3.4	.85	.26	1.74	1.15	-	
Sulfate	100	590.1	147.53	45.39	247.53	145.39	500	Yes
Arsenic	0.003	0.014	.0035	.001	.0065	.004	1.0	Yes
Barium	0.100	0.073	.018	.006	.118	.106	5.0	Yes
Cadmium	0.002	0.008	.002	.001	.004	.003	0.05	Yes
Chromium	0.010	0.042	.0105	.003	.0205	.013	0.05	Yes
Lead	0.016	0.067	.017	.005	.033	.021	0.10	Yes
Selenium	0.001	0.004	.001	.0003	.002	.0013	1.00	Yes
Silver	0.001	0.004	.001	.0003	.002	.0013	0.005	Yes
Nickel	-	0.013	.003	.001	.003	.001	1.0	Yes
Zinc	0.040	0.158	.04	.012	.080	.052	1.0	Yes

TABLE III-15

EMPLOYMENT EFFECTS DURING THE CONSTRUCTION AND OPERATIONAL PHASES

Year	Construction	Operational	Total
1984	375		375
1985	1467		1467
1986	1900	114	2014
1987	700	455	1155
1988		455	455
1989		455	455
1990		455	455
1991		455	455
1992		455	455
=			
1997		455	455
=			
2002		455	455
=			
2007		455	455

Source: Envirosphere Company.

TABLE III-16

INCOME EFFECTS DURING THE CONSTRUCTION AND OPERATIONAL PHASES
(in 1980 dollars)

Year	Total	Cumulative
1984	$11,137,125	$ 11,137,125
1985	43,568,433	54,705,558
1986	58,485,116	113,190,674
1987	28,999,320	142,189,994
1988	8,210,020	150,400,014
1989	8,210,020	158,610,034
1990	8,210,020	166,820,054
1991	8,210,020	175,030,074
1992	8,210,020	183,240,094
=		
1997	8,210,020	224,292,194
=		
2002	8,210,020	265,342,294
=		
2007	8,210,020	306,392,394

Source: Envirosphere Company.

TABLE III-17

REGIONAL LOCATIONAL PATTERNS OF IMMIGRANT WORKERS
DURING THE CONSTRUCTION AND OPERATIONAL PHASES

County/Year	1984	1985	1986	1987	1988	to 2007
St Clair (Ill)	15 (20.0)	57 (19.4)	88 (22.3)	41 (26.6)	14 (100.0)	14 (100.0)
Madum (Ill)	7 (9.3)	29 (9.9)	38 (9.6)	14 (9.1)	0	0
Monroe (Ill)	5 (6.7)	18 (6.1)	24 (6.1)	9 (5.8)	0	0
Randolph (Ill)	4 (5.3)	14 (4.8)	18 (4.6)	7 (4.5)	0	0
Washington (Ill)	1 (1.3)	2 (0.7)	3 (0.8)	1 (0.7)	0	0
St. Louis (Mo)	41 (54.7)	159 (54.3)	206 (52.3)	76 (49.4)	0	0
Other	2 (2.7)	14 (4.8)	17 (4.3)	6 (3.9)	0	0
Total	75 (100.0)	293 (100.0)	394 (100.0)	154 (100.0)	14 (100.0)	14 (100.0)

Notes:
1. The numbers in parenthesis represent percentage of the total.
2. For the years 1986 and 1987 St Clair County immigrant worker levels include 14 immigrant operational workers.
3. After 1987, the final year of the construction phase, all immigrant consruction workers (manual and non-manual) are assumed to hae left the area.
4. Level of immigrant worker immigration was determined by survey data and immigrant worker allocation was determined by an a attraction constraned gravity model (Argonne National Laboratories).

Source: Stenehjem and Metzger, 1976 and Envirosphere Company.

TABLE III-18

IMMIGRANT INDUCED POPULATION AND SCHOOL AGE CHILDREN EFFECTS FOR ST. CLAIR COUNTY AND NEW ATHENS DURING THE CONSTRUCTION AND OPERATIONAL PHASES

County/Year	1984	1985	1986	1987	1988	to 2007
St Clair County						
Workers	15	57	88	41	14	14
Population	38	143	225	108	40	40
School Age Children	8	29	46	23	9	9
New Athens (Village)						
Workers	8	29	38	14	0	0
Population	20	73	95	35	0	0
School Age Children	4	15	19	7	0	0

Notes:
1. Assumes immigrant operational workers (14), will not reside within New Athens (Village).
2. Assumes 10 percent of total immigrant workers will locate within the boundaries of the Village of New Athens.
3. School age children are defined as children between the ages of 5 to 18, and attend grades K to 12.

Source: Envirosphere Company.

TABLE III-19

TRAFFIC IMPACTS GENERATED BY THE CONSTRUCTION AND OPERATIONAL WORKFORCE

Year	Average Daily Trips (ADT)
1981	576
1985	2,257
1986	3,098
1987	1,777
1988	700
1989	700
1990	700
1991	700
1992	700
=	
1997	700
=	
2002	700
=	
2007	700

Note: 1. Assumes a vehicle capacity of 1.3 riders.

Source: Envirosphere Company.

TABLE III-20

IMMIGRANT WORKERS IMPACT ON HOUSING IN THE VILLAGE OF NEW ATHENS (1984 to 1987)

Year	Total Housing Units	Vacant	Immigrant Demand	Ability to Absorb
1984	821	41	6	yes
1985	832	42	22	yes
1986	845	43	29	yes
1987	855	43	11	yes

Notes: 1. No immigrant workers will reside in the Village of New Athens township after 1987.

2. Immigrant demand is based upon immigrant worker households requiring houses (owned and rental), apartment (rented), mobile home (rented) and rooms.

3. Assumed vacancy rate of 5.0 percent.

Source: Envirosphere Company.

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APPENDIX IIB

APPENDIX II-B

PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY

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PUBLIC & OCCUPATIONAL HEALTH AND SAFETY

This section describes the types and extent of contaminants expected to be released from the proposed facility and the potential for health effects resulting from exposure to these contaminant levels. The information presentased on available literature and information relative to the process and its potential and on their potential to result in health concern.

At the present time there is limited pool of data available to effectively evaluate the health and safety concerns associated with the conversion of coal to gasoline. However, occupational and public health and safety is not considered to be a constraining factor in development of the proposed project provided reasonable caution is excercised during design, construction and operational phases of the project to minimize releases of detrimental pollutants.

It is anticipated that public exposure may come through trace/low-level pollutants in air or water (including discharges from solid waste disposal sites), or it may come through the presence of higher levels of pollutants resulting from accidental releases. Routine public exposure through the air and water is anticipated to be maintained at the lowest achievable levels through application of control techology and regulation of emissions. Because is is not possible to predict in advance the nature of potential public exposure through accidental releases, efforts must be concentrated on minimizing risk by developing and applying process and handling equipment that will reduce the potential for accidents.

A. POTENTIAL EMISSIONS FROM THE KOPPERS-TOTZEK PROCESS

Over the last few years a significant body of research has been directed toward identification and evaluation of chemical emissions from coal gasification which may be of potential health concern. Despite this effort overall understanding of the chemical processes involved remains incomplete. This is in part due to the variety of different gasification processes which exist and to the significant differences in chemical emissions expected from these processes. To date the bulk of the available information addresses low BTU gasification rather than medium BTU gasification processes such as Koppers - Totzek. However, there does exist a limited body of general information (including EPA supported work) which has provided some initial insight into this process. By examining this information and comparing it to existing information on other types of gasification some indication of the environmental feasibility and concerns pertaining to the proposed facility can be developed.

A considerable number of similarities between the general types of process waste streams exists for the varous gasification processes. However, significant differences exist with respect to the nature and magnitude of the chemical contaminant loadings carried by these streams. These differences primarily result from the effects of variations in gasifier operating conditions (coal type, temperature, etc.) on chemical reaction products.

Table 1 contains a representative listing of some of the chemical constituents which have been identified in gasifier process streams. Since many of the listed classes contain a multitude of constituents of potential health concern, only those contaminant groups which could pose a major health concern (polyaromatic hydrocarbons, trace metals, toxic gases, etc.) are discussed with respect to gasifier operation. A comparison is also presented of the emissions to be expected from a Koppers-Totzek gasifier with those expected from low temperature gasifiers.

Current experimental data suggest that, in general, increases in gasifier temperatures and pressures tend to result in reductions in the types and concentrations of high molecular weight organic compounds found in process waste streams. This trend is potentially important since considerable concern exists with respect to the possible health effects resulting from the release of polyaromatic hydrocarbons. At the temperaure ranges at which existing Koppers-Totzek gasifiers operate (flame temperatures of greater than 3000^{o}F and gas outlet temperatures of greater than 2200^{o}F) by-product tars and oils are not likely to be produced. In addition, there is evidence that fused polyaromatic hydrocarbons tend to break down into simpler low molecular weight organics. As a result, the process waste stream concentrations (particularly aqueous) are likely to be significantly lower than levels found in lower temperature gasification processes.

Measurements of organic chemical contaminants found in certain process waste streams have been made at the Koppers-Totzek gasification facility at Modderfontein, South Africa. Representative values for some of these process streams are included in Table 2. The available data although extremely limited indicates that varying but generally less than 1 ppm levels of fused polycylic hydrocarbons were found in the aqueous process streams which were sampled at the Modderfontein plant. The data also indicate that measurable levels of fused polycyclic hydrocarbons were not found in the wastewater treatment process effluent. However, only a very limited number of process streams were sampled in this study and the overall plant data base regarding the fate of polycylic hydrocarbons remains incomplete.

A second concern from the point of view of chemical contaminant discharges to the waste streams is the possible release of toxic trace metals. Unlike high molecular weight organic compounds, the health effects of trace metals are related to the elements themselves. Changes in temperature may alter the chemical speciation of a given element but may not entirely remove the health risk. At typical Koppers-Totzek process operating temperatures, approximately 50% of the uncombusted coal gasifier residue occurs as a molten slag rather than as discrete ash particles. Experimental evidence suggests that such slags tend to be considerably more resistent to trace metal leaching than do the ash particles produced by the same coals. Such slags may, therefore, effectively immobilize many trace metals within the confines of appropriately designed solid waste disposal sites.

The concentrations of trace inorganic constituents in certain aqueous process streams at the Modderfontein plant have been measured. These measurements provide some indication of the levels and changes in constituent concentrations which may occur at a Koppers-Totzek facility. Table 3 presents a sampling of some of the data gathered for certain constituents. The data suggests that magnitude and direction of change in concentration between input and effluent waters varies depending upon the specific constituent. For certain constituents including Sr,and Ba the limited data suggest some increases in effluent concentrations over input concentrations while for others (Fe, Mn, etc.) the reverse appears to be true. Caution must be exercised in extrapolating these results to the proposed facility. However, the reported effluent concentrations levels of Fe, Cu, Zn, Ba, Cd, Se and Cr are all below the current primary and secondary U.S. drinking water standards for these parameters.

The gaseous products from a gasification facility differ somewhat from those of concern in the aqueous and solid phase waste streams. This is the result of the temperature dependent chemical separations which occur within the combustion portion of the gasifier. The gaseous products consist primarily of a variety of volatile simple inorganic compounds (or elements) as well as low molecular weight organics.

The chemical composition of the product gas and the composition of any gaseous emissions which are actually released to the atmosphere must be differentiated. The former is not intended for direct emission and is a process stream. Actual gaseous emissions may, however, result from onsite product gas combustion, and from tail or vent gas releases.

As indicated by Table 4 the major constituents of the product gas from the Koppers-Totzek process are similar to those of the lower temperature Lurgi process although the relative mole fractions differ considerably. In the Koppers-Totzek process the H_2 and CO concentrations constitute the major fraction of the product gas and are much higher than those in the Lurgi. A possible point of concern with respect to the high temperatures of the Koppers-Totzek process is the potential for increased volatilization of inorganic constituents. Increases in the atmospheric releases of toxic trace metals could have significant environmental health implications. In view of the lack of experimental data in this area, Anderson et al. (1979) attempted a detailed series of theoretical calculations designed to ascertain the probable fate of a number of volatile toxic trace elements (As, Po, Hg, B, Se) of health concern. While emphasizing the theoretical and preliminary nature of their calculations these authors concluded that existing technologies were sufficient to reduce emitted concentrations of these contaminants to environmentally acceptable levels and for many of the contaiminants to levels below those generally emitted by coal fired power plants. They did, however, recommend further study particularly with respect to arsenic chemistry and the possibility of arsine (AsH_3) formation during gasification.

In assessing gasifier emissions the quantitative data provided by evaluations such as that for the Modderfontein facility in many respects are site specific. That is, measured levels of contaminants in the process streams of other Koppers-Totzek gasifiers may vary significantly depending upon specific process operating conditions at a given site. Effluent stream contaminant loadings can be affected by the type of coal used, the gasifier operating temperature, the types of contaminant removal technologies utilized as well as the effects of any additional onsite processes to which the product gas may be subjected.

B. OTHER PROCESS EMISSIONS

The potential chemical emissions from the proposed facility are not limited to only those releases directly related to the gasifier. Emissions of potential health concern may arise from raw material (coal) handling as well as product gas cleanups and any subsequent chemical conversions to which the product gas is subjected.

Coal storage and handling (particularly in the large volumes required for gasification) can present environmental concerns from the perspectives of both air and water emissions. The inhalation of atmospherically released coal dust is a health concern. Depending upon the magnitude of such releases, it may be necessary to institute engineering controls to ensure compliance with existing air quality regulations. It is also probable that aqueous runoff from coal storage areas will contain trace metal concentrations (see the wastewater treatment section) and require treatment. However, currently existing treatment technologies should be capable of effectively reducing both the atmospheric and aqueous coal emissions to levels which are acceptable from the regulatory perspective.

In the case of the proposed facility it is intended that the product gas stream is to be utilized as a starting material for the production of methanol which is subsequently converted to gasoline via the MOBIL-M process. As discussed in the process descriptions, the raw gas will be subjected to a series of chemical processes which include:

a) raw gas cleaning (particulate removal via water spray)

b) raw gas compression

c) gas composition change (CO shift)

d) acid gas removal (H_2S, CO_2)

e) methanol synthesis

f) Mobil-M gasoline synthesis

As indicated in Table 5, there exist a variety of waste streams resulting from the above processes which are potential sources of contamination. The constituents of principal concern will vary from waste stream to waste stream. Among the liquid streams of particular concern from the health perspective would be coal pile runoff (pH and trace metals), slag quench water (trace metals, and organics including polyaromatic hydrocarbons), and all process condensate streams (trace metals and organics including polyaromatic hydrocarbons). Among the solid waste streams of concern the variety of spent catalyst materials which may be discarded are of primary concern. This is in part due to the very high trace metal concentrations of certain catalysts such as that for trace sulfur removal (ZnO) and methanol synthesis (Cu and Zn).

With respect to the atmospheric emissions, it is well recognized that levels of particulates, and major gases (SO_2, H_2S, NO_x) require close scrutiny. However, emissions of trace metals and polyaromatic hydrocarbons also require attention. While concentrations of these constituents are not anticipated to be a serious problem, relatively little quantitative data exists on the actual levels to be expected.

While the processes are typically associated with the raw gas clean-ups occuring at most types of gasification facilities, the product gas to methanol conversion and subsequent methanol to gasoline reaction step (Mobil-M) both involve fundamental chemical changes in the product material similar to those performed in petrochemical operations. As with the raw gas cleanup streams the methanol and gasoline production steps result in a variety of waste streams for most of which the major constituents have been characterized. Given its multi-step organic synthesis nature, the Mobil-M gasoline production step may warrant more detailed environmental review than the methanol conversion process. The Mobil-M step may be summarized in two parts with the first being exothermic dehydration of methanol to dimethyl ether,

$$2CH_3OH = CH_3OCH_3 + H_2O.$$

The second step involves the catalytic conversion of methanol and demethyl ether mixtures to hydrocarbons primarily of C_4-C_{10} chain length.

$$CH_3OH + CH_3OCH_3 = (CH_2)_n + n(H_2O).$$

Available data on the chemical characteristics of the aqueous knockout drum condensate resulting from this process suggest that high levels (greater than 10^3 ppm) of a variety of low molecular weight organics (organic acids, ketones and hydrocarbons) are to be expected. Such concentrations can, however, be reduced to environmentally acceptable levels by appropriately designed biological treatment facilities. As with a number of other process streams detailed characterization of trace contaminant (particularly inorganic) levels may be warranted. In addition, detailed consideration should be given to the possible contaminant releases resulting from handling and regeneration of the zeolite catalysts used in the ether to hydrocarbon conversion step. It is possible that the clay like composition of the zeolite could be an extremely effective sorber of both trace inorganic and trace organic emissions. Such a reaction can provide an effective internal pollutant control process providing that these absorbed contaminants are not released inappropriately.

Existing treatment technologies should be capable of adequately dealing with these process waste streams providing that the overall environmental hazards are completely characterized. For effective identification, more detailed information is required on the potential concentrations of trace inorganic and organic constituents in these specific process streams. Where sufficient experimental data are lacking, the use of conservative mass balance calculations can provide a useful tool in helping to initially identify potential environmental problems requiring correction.

C. CONCLUSIONS AND RECOMMENDATIONS

From the health perspective, a review of existing information indicates that the processes involved in coal gasification may release a variety of contaminants of potential concern. The extent of any health hazard posed by such releases will depend upon the specific contaminants released, their forms, and their concentrations. The preliminary review of the expected emissions from the proposed plant has not identified any factors which would jeopardize its operational feasibility. However, it is suggested that possible problems can be better anticipated through the utilization of a comprehensive health assessment evaluation consisting of three parts. The proposed approach provides a practical and reasonable means of assessing health impacts and can provide useful guidance in developing treatment control strategies to ensure regulatory compliance and minimize health effects.

The first part would comprise a detailed theoretical and analytical survey of waste streams to predict and identify released contaminants by chemical group or individual compound. This would require initial estimation of contaminant releases using experimental data from pilot plants and similar existing facilities to develop mass balance predictions of the fate of contaminants of possible concern a detailed chemical monitoring program designed to assess operational waste stream emissions as part of the overall environmental health evaluation. The parameters monitored in such a program should include not only regulatory requirements but also any parameters of potential concern identified above. Ideally, a monitoring program designed in such manner can provide early indication of any potential health problems and minimize the possibility of adverse effects.

The second part of a comprehensive health analysis consists of several tasks. The initial task would involve ordering the list of released contaminants (the results of part one) according to the magnitude of the potential health hazard each represents a second task which involves evaluation of any existing local health concerns in order to identify problems specific to the site. Such an evaluation can be coupled with the results of the screening stage to single out any potential emissions or pollutants which may warrant special concern.

The third task would address both public and occupational health. The public health assessment should include a review of the toxicological properties of each contaminant identified in the screening and local health studies and an evaluation of whether the plant release of the contaminant is sufficient to warrant additional protective measures. The occupational health evaluation should draw upon the health hazard data of the preceeding stages to identify substances of concern that employees should have limited exposure to under normal operating conditions. A review of occupational health programs in related industries would serve as guidance for development of an effective program for worker protection. A medical surveillance program should be instituted to anticipate long range health problems.

TABLE 1. SUBSTANCES IDENTIFIED IN COAL GASIFICATION AND MOBIL-M PROCESSES

Classes of Compounds	Examples of Constituents of Concern
Aliphatic Hydrocarbons	C_1-C_{10} compounds
Alkyl Halides	CH_3Cl
Ethers	dimethyl ether
Alcohols	methanol
Aldehydes	formaldehyde
Ketones	dimethylketone
Carboxylic Acids	formic acid
Amines	benzidine
Benzene (and substituted benzenes)	benzene, toluene, xylene
Phenols	
Fused Polyclic Hydrocarbons	benzo(a)pyrene, dibenzo(a, h)anthracene, dibenzo(a, g)fluorene
Heterocyclic Compounds (including N, S and O compounds)	pyridine
Nitrogen Compounds	NH_3, HCN, nitriles
Sulfur Compounds	SO_2, mercaptan, thiophene, H_2S, COS, CS_2
Inorganic Elements	Al, As, B, Be, Br, Ca, Cl, Ce, Cr, Cu, F, Fe, Ga, Ge, K, Hg, Mg, Mo, Na, Ni, P, Pb, Se, Si, Sn, Ti, V, Zn, Zr.
Other	Metal carbonyls ($Fe(CO)_5$, $Ni(CO)_4$ process catalysts particulates

TABLE 2. SELECTED POLYCYCLIC HYDROCARBON-MEASUREMENTS - MODDERFONTEIN, S A*

Process Stream	Contaminant	Concentration ug/l
Input Water	none detected	-
Commpressor Condensates	total (2-3 rings)	30
	napthalene	T
Rectisol Condensates	total	up to 1000
	pyrene	97
	chrysene	34
	anthracene	5
	fluorene	1
Settling Pond Effluent	none detected	-

T = trace (less than 1 ug/l).

*Adapted from Zee et.al. (1981).

TABLE 3. INORGANIC CONSTITUENTS IN PROCESS WATERS AT THE MODDERFONTEIN, S.A. KOPPERS-TOTZEK FACILITY - AS DETERMINED BY SPARK SOURCE MASS SPECTROMETRY **

Constituent	Input Water	Aqueous Compressor Condensate	Stream Rectisol Unit	Settling Pond
Sodium	2000	2000	2000	2000
Calcium	10000	10000	10000	10000
Strontium	10000	70	300	8000
Barium	80	100	200	200
Boron	30	1	1	1
Sulfur	4000	6000	2000	4000
Selenium	20	500	50	2
Fluorine	10000	30	400	700
Iron	200	500	10000	50
Nickel	100	4	200	8
Manganese	900	10	50	200
Copper	100	10	50	7
Cadmium	ND	3	1	8
Zinc	2	600	6000	30
Chromium	7	5	3	1

(Concentrations = ug/l).

**Adapted from Zee et.al. (1981).

TABLE 4. MAJOR COMPONENTS OF COAL GASIFICATION PRODUCT GASES*

	Koppers-Totzek	Lurgi
Pressure, At	2-3	20-32
Temperature K	1800-2000	590-1260
Product Gas	mole fraction	
H_2O	0.0801	0.4659
H_2	0.3039	0.2172
CO	0.5428	0.0800
N_2	0.0651	0.0005
CH_4	-	0.0591
C_2-C_5	-	0.0045
H_2S	0.0026	0.0026
CO_2	0.0002	0.0002
NH_3	0.00003	0.0032
HCN	0.00002	0.000002
HCl	0.0001	0.00002

*Adapted from Anderson et. al. (1979).

TABLE 5. REPRESENTATIVE PROCESS WASTE STREAMS FOR THE CLARK OIL FACILITY AS PROPOSED

Liquid Waste Streams	Constituents of Concern
1) Coal Pile Runoff	1) trace metals
2) Slag Quench Water	2) polyaromatic hydrocarbons
3) Steam Generation Blowdown	3) pH
4) Waste Heat Boiler Blowdonw	4) suspended solids
5) Precipitator Wash Waters	5) low molecular weight organics
6) Fly Ash Sluice Waters	6) major cations and anions
7) Gas Cooling Condensates	7) volatile organics
8) Acid Gas Removal Process Condensates	8) volatile inorganics
9) Sulfur Recovery Process Condensates	
10) Mobil-M Knockout Drum Condensates	
Solid Waste Streams	
1) Gasifier Slag	1) leachate concentration of
2) Fly Ash	a) trace metals
3) Clarifier Sludge	b) H^+
4) Spent Catalyst Materials from	c) organics
a) CO shift	2) gaseous degradation products
b) Claus proces	
c) sulfur removal	
d) methanol synthesis	
e) Mobil-M	
Atmospheric Emissions	
1) Coal Dust	1) particulates
2) Raw Gas Cleaning Flares (for vent gases, start ups and upsets)	2) major gases SO_2, H_2S, COS, CO HCN, NH_3, NO_x
3) Boiler Emissions	3) trace metals
4) Mobil-M Flare Gas	4) volatile organics
5) Rectisol Tail Gas	a) C_1-C_{10} hydrocarbons
	b) polyaromatic hydrocarbons

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References

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5. Wyant, C. (Section Chief, Division of Environmental Health and Sanitation, Dept. of Public Health, State of Illinois) personal communication.

APPENDIX IIC

APPENDIX II-C

LICENSING

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LIST OF EXHIBITS*

*Exhibits are located after Section 8.

1. INTRODUCTION

1.1 Purpose and Scope

This licensing strategy sets forth the applicable federal and Illinois environmental regulatory requirements necessary to construct and operate the Clark Oil - coal conversion project (Project). The applicability of each license or permit and its requirements are discussed. Copies of the permit application forms are included in exhibits at the end of this Report. Additionally where possible, proposed regulations are presented together with an approach to meet the requirements of these developing limitations.

1.2 Project Description

Clark Oil Co. is proposing to construct a medium Btu coal-gasification facility designed to produce 12,000 barrels per day of unleaded gasoline. The proposed location of the site will be at New Athens, Illinois on the Kaskaskia River. Discharge and intake structures will be located at the site on the river. Synthetic gasoline is to be produced from coal by essentially the following processing:

- gasisification of coal with oxygen and steam using KBW jacketed type gasifiers
- catalytic hydrogeneration to eliminate NO, SO_2 and O_2 from the raw gas
- CO conversion using sulfided cobalt-molybdenum catalyst to adjust the H_2/CO ratio of the gas
- purification of the gas by the Linde Rectisol process to remove sulfur compounds and excess carbon dioxide
- recovery of sulfur as a marketable product by Claus and SCOT processing
- synthesis of methanol from the purified gas by the ICI Low-Pressure Methanol Process
- conversion of the methanol to a raw gasoline by the Mobil MTG Process using fixed bed reactors
- stabilization of the raw gasoline by fractionation to remove propane and lighter components

The plant facilities are to produce and convert to gasoline 4000 short tons per stream day of methanol (100 percent basis) from about 7360 short tons per stream day of a typical south-western Illinois coal. Conversion of the methanol produces about 15,000 bbl per stream day of stabilized synthetic gasoline (C_4s and heavier) for pipeline transport to Clark's Wood River Refinery where it is anticipated to yield about 12,000 bbl per day of product motor fuel gasoline.

1.3 Pollution Control Guidance Documents

Since the operating experience with coal-gasification facilities has been limited, the Environmental Protection Agency (EPA) has yet to promulgate industry-wide regulatory standards for coal-gasification facilities, including the proposed Clark Oil-coal conversion project. Therefore, regulatory agencies will be using two bases for permit writing: the transfer of pollution control technology from related industries, and the development of Pollution Control Guidance Documents (PCGDs) for each major synfuel technology. The PCGDs will be non-binding, non-regulatory documents to inform industrial designers and permitting officials as to what EPA understands to be the best and most cost effective ways to control pollution from synfuel plants. These guidance documents will be supplanted eventually by rulemaking standards (see description of process at 46 FR 23731 April 27, 1981). The PCGD for medium and high-Btu coal gasification projects are to be issued in June of 1983, and for low-Btu coal gasification in August, 1981. It should be noted that EPA has not yet finalized the definitions of "low-Btu" and "medium-Btu" coal gasification. However, according to EPA staff, the primary distinctions between the two processes are that in low-Btu coal gasification air is injected and Btu values are in the 150-250 Btu range, whereas in medium-Btu coal gasification, oxygen is injected and Btu values may be as high as 500 Btu. Where appropriate, the application of the PCGDs will be addressed in the report.

1.4 Illinois Coordinated Permit Review

Both the Illinois Environmental Protection Agency (IEPA) and the Illinois Institute of National Resources have initiated procedures for coordinating permit review. The Institute, under the authority of Executive Order 3 (1981), has set up a process to coordinate the entire permitting process necessary to license a synfuels facility. The process is voluntary to all concerned, but the Institute is trying to coordinate both federal, state, and local permitting authority. The program is coordinated by George Benda in the state's Institute of Natural Resources (217-785-2800). Mr Benda will designate a manager to coordinate the permitting of this project among all involved agencies.

Jim Philips, of the USEPA synfuels office (312-886-6040) expressed an interest in becoming involved in the permitting, to both lend his expertise and to otherwise expedite the licensing process. Thus, the USEPA will be involved in this process, and Mr. Benda believes that other federal agencies, such as the Army Corps of Engineers, will also become involved.

This process should tend to streamline the processing of the required permits, and may shorten the licensing process to one year or less.

In addition, in 1979, the Illinois Environmental Protection Agency (IEPA) initated procedures for coordinating permit review among the Agency's separate permit programs. The procedures are used for any "significant" project which requires a permit from two or more of the agency's permit programs. For purposes of triggering this process, "significant project" includes (for our purposes) a new facility which will (1) emit 100 tons or more per year of any air pollutant; (2) emit any hazardous or toxic air or water pollutant; and (3) deals with storage, transfer, processing, recovery, incineration or disposal of any waste. Thus, this project will be subject to the coordinated permit procedures.

Although the applicant is still obligated to submit all forms and information required for each necessary permit, the result is that one IEPA permit will be issued which will include all approvals of each involved Agency division. Thus, the Air Pollution Control Division is still responsible for reviewing air quality information in light of its permitting requirements. The Water Pollution Control Division is still responsible for reviewing all water pollution information, etc. However, rather than each division reviewing information in independently, and issuing their respective permits separately, the review procedure coordinates the process and allows one permit to be issued approving the project.

In addition, this procedure encourages applicant contact with each division, designating specific individuals to follow the project through the entire six month procedure. Thus, problems can be worked out informally with each division, making IEPA approval much more likely than it might otherwise have been.

The procedures for implementing this process consists of five steps:

1) Initial contact with IEPA to discuss the overall project - In this step, an agency Project Coordinator, and contact people for each Agency division will be designated.

2) Detailed discussion with each Agency division - Specific requirements for each division's permit are to be discussed at this stage.

3) Submission of project plan to each division - This plan assembles basic information about the project including: preliminary project layout; assumptions and design criteria; a discussion of how environmental regulations and requirements will be met; and the project milestones. The plan should contain at least a discussion of:

   a) The interrelationships among the various aspects of environmental control;
   b) controls selected;
   c) preliminary design considerations for each medium, and for each phase if construction or development will be phased; and,
   d) the timetable for project implementation for each medium.

4) Submission of project application to the Project Coordinator - The coordinator will distribute the application to each agency division. Each division will then review the application, and either approve or deny their section of the application. If denied, the applicant and IEPA may meet to discuss the denial.

5) Final decision on permit issuance - When all divisions have approved their section of the application, the total project will be permitted. If one division has denied its section, the total application will be denied. Requests for supplemental permits to modify or revise a permit previously issued under this procedure are handled in the same manner.

Under this procedure IEPA is mandated to make a final decision within six months of application submittal.

In addition, it should be noted that the state of Illinois does not require that a comprehensive Environmental Impact Statement (EIS)-type document be prepared. However, because of the wide range of information required by IEPA in order to permit the project under its Coordinated Review Process, the state will effectively require as much and as comprehensive data as if they actually required that an EIS document be prepared. Note that an EIS will be required on the federal level, however.

2. SUMMARY

This summary identifies the federal and the Illinois environmental regulations which Clark Oil would be required to comply with for construction of its project. The primary federal laws affecting this proposed project are: the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, the Fuel Use Act, the Toxic Substances Control Act, and the National Environmental Policy Act.

2.1 Summary of Regulatory Requirements

Air Related Requirements

In accordance with the Clean Air Act, this project will be required to comply with the following:

- Primary and Secondary National Ambient Air Quality Standards (NAAQS);
- Prevention of Significant Deterioration (PSD);
- New Source Performance Standards (NSPS);
- National Emission Standards for Hazardous Air Pollutants;
- Interstate pollution control requirements;

Illinois will not allow construction of the facility to commence until a construction permit has been issued. This permit will ensure compliance with applicable federal and state standards, and will require that a prevention of significant deterioration (PSD) review be performed. Because the facility will be located in an area which exceeds NAAQS for both ozone and particulates, the facility will also be subject to non-attainment review for these pollutants.

Under these reviews, the facility will have to demonstrate compliance with NAAQS, national emission standards for hazardous air pollutants (NESHAP), new source performance standards (NSPS) for components of the facility for which NSPS exist (such as coal preparation plants); and will also be subject to best available control technology (BACT)* and lowest achievable emission rate (LAER)** review to control these regulated pollutants.

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* BACT is determined on a case-by-case basis for every PSD permit applicant. BACT must represent the maximum achievable reduction of each applicable pollutant taking into account energy, environmental, and economic impacts and other costs. BACT must be at least as stringent as any applicable NSPS's or NESHAP's.

** LAER is determined on a case-by-case basis during non-attainment review and is defined as the lower of the most stringent emission limitation for that source type which is legally enforceable by any state, or which is actually achieved in practice by that source type. LAER must also be at least as stringent as the applicable NSPS.

Clean Water Act and Rivers and Harbors Act Requirements

Under the requirements of the Clean Water Act, the facility will be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit issued by the Illinois Environmental Protection Agency (IEPA) before commencing construction and operation. The application to the IEPA for these permits is to be based on the conceptual design of the wastewater control systems and will ensure compliance with effluent limitations and water quality standards.

Where effluent limitations are not specified for discharges from certain facilities, limitations on discharges from similar operations should be used to support the application for an NPDES permit. The NPDES permit will also regulate the discharge of toxic pollutants listed on the CWA section 307(a) toxic pollutants list and any other toxics discharged from the plant.

A section 404 permit is required by the Corps for the discharge of dredged or fill material in the navigable waters of the United States. This permit should be obtained concurrently from the Corps with the section 10 permit required under the Rivers and Harbors Act (RHA). Under section 10 of the RHA, any construction activity in a navigable waterway requires a permit from the Corps of Engineers. This permit will be required for the construction of the intake or discharge structures or the barge loading/unloading facilities. It is generally handled in a common permit application submission with the section 404 permit. Application for either of these Corps permits will trigger the NEPA review process.

In addition, the state Department of Transportation requires a permit for construction in state waters. The requirements for the permit are similar to those of the Army Corps of Engineers (Corps) and the permit is used by the state to control downstream flooding.

Solid Waste Related Requirements

Both the state and federal government impose standards which control, to various degrees, the generation, handling, transportation, storage, and disposal of hazardous and non-hazardous solid wastes.

The major federal law governing the handling and disposal of solid waste is the Resource Conservation and Recovery Act of 1976 (RCRA). The most significant sections of RCRA are Subtitle C which deals with hazardous waste management and Subtitle D which deals with non-hazardous waste management.

Regulations pursuant to Subtitle C of RCRA address identification and listing of hazardous waste, standards applicable to generators, transporters and owners and operators of hazardous waste treatment, storage and disposal facilities, and permit requirements for treatment, storage or disposal of hazardous waste. This project will require a permit for disposal of any solid wastes determined to be hazardous by the criteria in the act. Operational practices of the solid waste management facility will also be regulated.

In addition to these federal requirements, the project will also have to meet requirements promulgated by the state. These regulations require that permits be obtained before wastes can be disposed of at an existing disposal site, as well as prior to the construction of a new management of disposal facility.

Toxic Substances Related Requirements

Under the Toxic Substances Control Act (TSCA), a new chemical substance or one with a significant new use will trigger a manufacturer's responsibility to submit a premanufacture notification (PMN) 90 days prior to manufacturing if the chemical is not included on EPA's chemical inventory. The USEPA will be considering the products produced from this facility as new chemicals that must be reviewed under the PMN program before production of the particular chemical or chemicals can begin. However, in addition, the EPA is requesting synfuel manufacturers to submit to the agency in advance of the PMN, a description of the chemical(s) the facility will be producing.

The National Environmental Policy Act of 1969

The Corps should be the lead agency responsible for the preparation of an Environmental Impact Statement (EIS) for the this facility. The requirement for the EIS will be triggered by the necessity for the facility to obtain one or both of the following Corps' permits: a permit for the discharge of fill material into a navigable waterway pursuant to section 404 of the CWA; or a permit for the construction in a navigable waterway under section 10 of the RHA.

2.2 Schedule

This section discusses the licensing schedule which would be associated with constructing this synthetic fuel facility. Because of the state's Consolidated Permit Review process, the schedule contains only the following elements:

1) A RCRA Hazardous Waste Management Facility Permit
2) Army Corps Engineers 404/10 Permit;
3) The NEPA EIS Process;
4) The TSCA Premanufacture Notification (PMN) Process;
5) The State's Coordinated Permit Review Process; and
6) The IEPA's Coordinated Permit Review Process.

We have separated the IEPA's review process from that of the state because of the importance of the IEPA's permits to the licensing of the Project. However, it is important to remember that IEPA's review process will actually take place within the state's overall Coordinated Permit Review process. We have not included in the schedule any data collection or analysis, although under normal circumstances, this could add up to two years to the schedule.

As can be seen in EXHIBIT 2-1, the longest segment on the schedule is the EIS required for the issuance of the Army Corps permits. This EIS will be prepared by the Corps and will usually be issued concurrently with their permits. The overall Corps EIS/permit process will likely take 18 months, although this may be shortened somewhat if the Corps agrees to become involved in the state's review process.

A RCRA Hazardous Waste Management (HWM) facility permit will be required if the Project will treat, store, or dispose of hazardous wastes. The permit, issued by the US Environmental Protection Agency (USEPA), is expected to take from six months to one year to be issued. The longer schedule will apply if a disposal facility will be constructed on site, while the shorter time-frame will apply to the permitting of a treatment or storage facility.

The TSCA PMN review usually begins 3 months before production of the new chemical is scheduled to begin. However, USEPA is requesting synfuel manufacturers to submit to the Agency, in advance of the PMN review, a description of the chemicals that the plant will be producing.

On the state level, by law, the IEPA permit review can only take 6 months. Other required state permits included in the overall state review process will also take 6 months. With respect to PSD Permit, the state requires the applicant to begin construction of the source with 15 months from the date of issuance of PSD Permit.

3. AIR QUALITY RELATED REGULATORY REQUIREMENTS

The Clean Air Act of 1970 as amended by Congress in 1977 (CAA) coordinates state and federal efforts to project the quality of the nation's air. The Act has led to the development of various standards which both new and existing sources of air pollutants must meet in order to be in compliance with the law. Compliance with these standards is ensured for new facilities, through a new source review program. These standards, developed by the USEPA under the authority of the CAA will be discussed first. Following this will be a discussion of additional standards imposed upon new sources by the state of Illinois, as well as a discussion of the new source review administered by Illinois.

3.1 Federal Regulations

With the exception of controls upon sources of interstate pollution, all Clean Air Act pollution control standards and requirements have been delegated to the state of Illinois. These will be discussed in Section 3.2.

Pursuant to CAA section 126, states may petition USEPA to make a finding that a major source from another state emits or would emit an air pollutant that would prevent the attainment or maintenance of a NAAQS or that would interfere with a PSD SIP. If USEPA makes such a finding, it would be a SIP violation (subject to CAA noncompliance provisions) for the relevant source to be constructed or to continue operations without appropriate emission controls. The project, being at least 25 miles from Missouri is unlikely to significantly affect the state's air quality.

3.1 1981-2 CAA Amendments

The CAA is to be amended in 1981-2 to reauthorize certain appropriations. The entire Act is being reconsidered at this time, and Congressional debate is sure to lead to some legislative changes during the reauthorization process. One bill by Representative James Broyhill (HR 3471) could have potential impact on the Clark project since it would make comprehensive changes in the current CAA. Note that the Broyhill bill will undoubtedly undergo extensive changes. EXHIBIT 3-1 outlines some major positions industry in general seem to be taking relevant to the project. In general, as EXHIBIT 3-1 demonstrates, CAA requirements might change so that they are less restrictive, expensive, and time-consuming. EXHIBIT 3-1 addresses the issues of NSPS and pollution control guidance documents (PCGDs).

3.2 Illinois Air Quality Requirements

This Section discusses the state of Illinois' regulatory requirements dealing with air quality which would likely effect this facility. The Illinois Environmental Protection Agency (IEPA) has authority to implement the requirements which are set forth in both Title II of the State's Environmental Protection Act, as well as in the federal CAA.

Under its charter, IEPA has authority to set air quality standards and emission limitations (including adopting federal limitations and standards), as well as authority to issue permits to allow the construction and operation of air pollution sources. These regulations are found in Chapter 2 of the state Pollution Control Board's Rules and Regulations (Rules).

Pursuant to CAA section 110, each state must have a USEPA approved SIP to enforce the NAAQS's within its boundaries, and each of these SIP's must include a permit program to control new sources. See 40 CFR 51.1 and 51.18 for these permit program requirements. Under these regulations, states are required to develop SIP programs for the preventation of significant deterioration (PSD) as well as nonattainment (NA) permit programs. Illinois has an approved PSD and NA program, and this new source review program will be discussed after a discussion of relevant standards.

3.2.1 Primary and Secondary National Ambient Air Quality Standards

Pursuant to the CAA section 110, USEPA has established primary and secondary NAAQS's for the following pollutants: sulfur oxides, particulate matter, carbon monoxide, ozone, hydrocarbons, nitrogen dioxide, and lead. Primary standards are those designed to protect human health. Secondary standards are those designed to protect welfare. The NAAQS's are codified in 40 CFR 50, and are presented in EXHIBIT 3-2. Note, as explained in Section 3.2 of this report, Illinois has adopted the EPA NAAQS's. Currently, the secondary standards are equivalent to the primary standards, except that the secondary standards for sulfur oxides and particulate matter are more stringent than the primary standards for these pollutants. USEPA and Illinois have designated areas of the state where the NAAQS's for a pollutant are currently being attained as attainment areas (AA) for that pollutant, as well as areas of the state where the NAAQS's for a pollutant are currently being violated, called nonattainment areas (NA). Illinois provides for the attainment and maintenance of the NAAQS's by means of its State Implementation Plan (SIP), by providing a permit program for new sources to ensure that they do not cause or contribute to NAAQS violations. See Section 3.2 for the state's requirements in its SIP program.

3.2.2 New Source Performance Standards (NSPS)

Pursuant to the CAA section 111, USEPA has established new source performance standards (NSPS) which must be met by major sources and modifications. The NSPS's, which are specific for different categories of sources, are intended to require use of the best demonstrated system of continuous emission reduction, taking into consideration costs, non-air quality health and environmental effects, and energy impacts. For this project, where it is not feasible to prescribe or enforce a standard of performance, the USEPA may instead promulgate a design, equipment, work practice or operational standard (or a combination of these) which has been determined to adequately demonstrate the best technological system of continuous emission reduction (also taking into account cost, non-air quality health and environmental impact and energy requirements). However, several emissions components in a coal gasification facility would be subject to NSPS. The following discussion addresses each component of the project and the applicability of NSPS to that component.

Coal Preparation Plant

The coal preparation plant NSPS (40 CFR 60 Subpart Y, see EXHIBIT 3-3) applies to any "coal preparation plant" which processes more than 200 tons of coal per day. "Coal preparation plant" means any facility (except on underground mine) which prepares coal by breaking, crushing, screening, wet or dry cleaning, or thermal drying. Coal preparation plant facilities which are covered by the NSPS are: thermal dryers, pneumatic coal-cleaning equipment, coal processing and conveying equipment (including breakers and crushers), coal storage systems (excluding open storage piles), and coal transfer and loading systems.

The coal preparation plant NSPS's include particulate emission limits and opacity limits on thermal dryer gases and pneumatic coal cleaning equipment gases, and a 20% opacity limit for particulate emissions from the other regulated coal preparation plant facilities. These NSPS encompass fugitive as well as non-fugitive discharges.

Coal Gasification Plant

The NSPS for coal gasification plants have not yet been promulgated by the EPA, but are expected to be proposed in April of 1984 and finalized by April of 1985. However, if the coal gasification project is built before NSPS are developed for this process, the EPA would require the application of BACT in order to obtain the PSD permit. A discussion of BACT is contained in Section 3.2.

Methanol Synthesis

Proposed NSPS to limit emissions of synthetic organic chemicals including methanol has been proposed in the January 5, 1981 Federal Register at 46 FR 1136. The standards are designed to reduce fugitive emissions of volatile organic compounds (VOC) (i.e. methanol) from pumps, compressors, valves, sampling, connections, safety/relief valves and open-ended valves in VOC service.

The proposed standards would require: (1) a leak detection and repair program for inline valves in gas and light liquid VOC service; (2) certain equipment for certain fugitive emission sources in VOC service; and (3) no detectable VOC emissions from safety/relief valves in VOC service during normal operation. The proposed standards include a leak detection and repair program that would require monthly monitoring for valves in gas and light liquid service.

For storage of the methanol, the NSPS at 40 CFR 60.110a Storage Vessels for Petroleum Liquids Constructed After May 18, 1978 can be used as a guideline.

Gasoline Synthesis From the Methanol

EPA's synthetic fuel group (Bill Rhodes - 919-541-2851) suggests applying the NSPS for Petroleum Refineries at 40 CFR 60.100. For storage of the unleaded gasoline, the NSPS at 40 CFR 60.110a - Storage Vessels for Petroleum Liquids Constructed After May 18, 1978 can be used as a guideline.

3.2.3 National Emission Standards for Hazardous Air Pollutants (NESHAPS)

Discharges of designated air pollutants which are hazardous and for which no ambient air quality standard is applicable are subject to preconstruction approval under section 112 of the CAA. Currently, the pollutants regulated are mercury, beryllium and vinyl chloride and asbestos. EPA plans to promulgate NESHAP's for radionuclides at some unspecified time in the future. EPA also plans to develop NESHAPS for nickel in 1981. Administration of NESHAPS parallels the PSD permit process. See 40 CFR 61.

3.2.4 New Source Review

In order to ensure that the construction of new sources (and the modification of existing sources) will not lead to the violation of NAAQS and will not significantly deteriorate air quality that now meets NAAQS, the USEPA has authorized the state to conduct PSD and NA review, and to issue permits under these programs.

Prevention of Significant Deterioration Permit (PSD) Program

The PSD permit program is authorized by CAA sections 160-169, and has undergone two major changes since it was established in 1974. First, the 1977 amendments to the CAA mandated more stringent PSD provisions than had existed. Second, the Alabama Power Company v Costle court decision of December 14, 1979, required USEPA to rewrite major provisions of its PSD regulations. USEPA promulgated changes to the program in response to Alabama Power on August 7, 1980 (45 FR 52676). These changes amend many sections of the PSD regulations which are codified at 40 CFR 51.24 and 52.21. Note that the PSD program may be changed again in 1981 or 1982 due to possible CAA amendments. USEPA administers the PSD program, except in states with EPA-approved PSD SIP's, such as Illinois.

Basically the PSD permit program provides that no new major source or major modification of a major source may "commence construction" in any AA without a PSD permit. To "commence construction" means to have obtained all other necessary air quality/air emission approvals (eg Illinois state and local approvals) and to begin continuous construction or to enter into binding agreements or contracts for construction programs which cannot be cancelled or modified without substantial loss. Actually, some site clearance activities can begin and equipment can be purchased before the issuance of a PSD permit, although such activities have to be approved by USEPA (or Illinois) and are at the applicant's own risk.

The PSD program does not apply to emissions of NAAQS pollutants by sources/modifications which would located in NA's for those pollutants, nor to major sources/modifications which would locate in an area designated NA for all the NAAQS pollutants. In these cases, the NA program applies, which is discussed below.

For purposes of the current PSD program, the definition of a major source includes this project, i.e. an unspecified source type which emits 250 tons/year of any air pollutant. A source is defined as all the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person(s).

To obtain a PSD permit, an applicant must demonstrate that the source or modification will comply with the NAAQS, the NSPS, the NESHAPS, and PSD increments, and will apply BACT for CAA-regulated pollutants. In addition, the applicant must conduct analyses relative to the effects of the source/modification on soils, vegetation, visibility, and area growth.

PSD increments are specified maximum allowable increases in the ambient concentrations of SO_x and particulate matter, over the "baseline" concentrations of these pollutants. In general, the baseline concentration means the ambient concentration of each of these pollutants which existed at the time of the first complete PSD permit application after August 7, 1977, in the relevant AA. However, note that concentration increases resulting from major sources on which construction commenced after January 6, 1975, consume increments. See EXHIBIT 3-4 for a listing of these maximum allowable PSD increments.

AA's may be designated as either Class I, II, or III. The significance of these classifications is that the allowable PSD increments increase from Class I to Class III. Therefore, disregarding other considerations, Class I areas are the most restrictive for new industrial growth. The project site is in a Class II area for all CAA-regulated pollutants except ozone and particulates.

The project, being a major source subject to PSD permitting, must also apply BACT to all CAA-regulated pollutants which would be emitted above the de minimis emission levels listed in the second column of EXHIBIT 3-5. In addition, if the project is located within 10 km of a Class I area, BACT must be applied to the emissions of a new source which would have an impact on the area of 1 ug/m3 (24-hr average). BACT is determined on a case-by-case basis for every PSD permit applicant. BACT must represent the maximum achievable reduction of each applicable pollutant taking into account energy, environmental, and economic impacts and other costs. BACT must be at least as stringent as any applicable NSPS or NESHAP. Note that USEPA has issued a document entitled "Compilation of BACT/Lowest Achieveable Emission Rate Determinations" (EPA-450/2-70-003) which includes actual BACT determinations for, among other sources, fossil fuel power plants and coal preparation plants.

The project, being subject to PSD, will be required to conduct air quality analyses for all significant emissions of CAA-regulated pollutants. These analyses are required to determine compliance with the PSD increments and the NAAQS, and to determine the effects of a proposed project on soils, vegetation, and visibility. For NAAQS pollutants, these analyses will generally require modeling and also the collection of continuous monitoring data over a period of a year. However, the IEPA exempts sources from monitoring for a particular pollutant if emissions would cause an air quality impact less than the de minimis concentration listed in the fourth column of EXHIBIT 3-5, or if the concentration of the pollutant in the area of effect is less than that listed in the fourth column of EXHIBIT 3-5. Also, certain of the monitoring requirements which represent new requirements promulgated as a result of the Alabama Power decision are being phased in by USEPA, up until February 9, 1982. For non-NAAQS pollutants, monitoring will generally not be required and modeling will be considered adequate analysis, at least in the near future.

Note that fugitive emissions (eg, fugitive emissions from ships and trains coming to a project site) are excluded when determining if a source's emissions would activate the PSD process and are excluded from BACT. However, secondary emissions are considered in determining compliance with the PSD increments and NAAQ's.

The PSD permitting process can last over two years. Collecting and analyzing mointoring data for and then preparing the permit application can take over a year. Agency review of a "complete" PSD permit application is supposed to take a maximum of 6 months according to the IEPA. However, this deadline can be extended if the IEPA determines that an application formerly determined to be complete is "incomplete" due to further information requests by the agency and/or other reasons. Note that the CAA requires that public hearings be held on PSD permit applications.

Certain CAA-mandated provisions for the PSD program have not yet been implemented. Specifically, CAA section 166 requires that USEPA also develop PSD regulations for hydrocarbons, carbon monoxide, photochemical oxidants (ozone), nitrogen oxides, and lead. These pollutants are sometimes referred to as the Set II PSD pollutants. USEPA published a notice of intent to develop these Set II PSD rules on May 7, 1980 (45 FR 30088). The agency currently plans to propose these Set II PSD rules in 1981 and to finalize such rules in 1982. The CAA does not require that these rules apply the clean air classifications (Classes I, II, and III) and the PSD increment system (which currently applies only to SO_2 and particulates) to these additional pollutants. Note that these PSD Set II rules would be in addition to other existing PSD requirements, i.e., BACT and air analysis requirements, for these Set II pollutants.

Nonattainment Review Program

The Illinois NA SIP includes the following elements for proposed new major sources:

- a permit program to regulate these sources;
- either the requirement that a proposed source reduce other emissions in the general area of the source in order to offset emission increases from the source/modificaton, or an allowance for growth in the SIP so that such offsets are not required;
- the requirement that the proposed source achieve the lowest achievable emission rate (LAER);

- the requirement that all other major sources owned or operated by the company which is proposing the new source, are subject to emission limitations and are in compliance with CAA requirements.

Note that these requirements are very similar to the requirements of USEPA's Emission Offset Interpretive Ruling. The purpose of this Ruling, which is found in 40 CFR 51, Appendix S, is to provide for the attainment of the NAAQS's in areas where these standards are being violated. States, including Illinois, have substantially adopted this ruling as part of their NA SIP's.

Where applicable, the Ruling applies to proposed major sources/modifications which would cause or contribute to a NAAQS violation. A "source" means all the pollutant-emitting activities at a plant site and also any identifiable piece of process equipment. Therefore, contemporaneous decreases elsewhere at the project site would not exempt an individual piece of process equipment from the Ruling if emissions from the equipment would be "major." (However, USEPA proposed a rule on March 12, 1981, 46 FR 16280, which would change the term "source" to mean all the pollutant-emitting activities at a plant site. When finalized, this rule will provide that offsetting decreases at a source can exempt emissions increases from the Ruling). A "major source" is a source which emits or has the potential to emit 100 tons/year of any pollutant subject to regulation under the Act. Note that the only emission rates presented in EXHIBIT 3-5 which are pertinent to the Ruling are those for which NAAQS's exist (and these pollutants' are asterisked in the Exhibit).

According to the Ruling, if the project (ie a proposed major source) contributes to an existing NAAQS violation it must: conduct preconstruction monitoring and modeling; apply controls representing the lowest achievable emission rate (LAER); certify that other sources owned or operated by the applicant in the same state are in compliance with the CAA; demonstrate that controls would represent a net air quality benefit; and, in designated NA's, apply emission reductions (offsets) to existing sources. USEPA has published a document entitled "Compilation of Best Available Control Technology/LAER Determinations" (EPA-450/2-79-003) which includes actual LAER determinations for fossil-fuel power plants. LAER is determined on a case-by-case basis. According to the Ruling LAER must be the more stringent of the following:

- the most stringent SIP emission limitation in any state for the relevant source type, unless such limitation is not achievable; and,

- the most stringent emission limitation ever achieved by the relevant source type.

LAER must also be at least as stringent as the applicable NSPS.

On August 7, 1980 (45 FR 52676) EPA promulgated rules to conform the requirements for NA SIP's to the Alabama Power PSD court decision. The definitions of major source and the applicability of fugitive and secondary emissions are generally consistant between the two programs. However, the definition of source means all the pollutant-emitting activities at the project and also any individual pollutant emitting facilities at the site. Therefore, intra-plant offsets can not exempt a source from NA review. (Note that USEPA proposed a rule on March 12, 1981 46 FR 16280, which would change the term "source" to mean all the pollutant-emitting activities at a plant site. When finalized, this rule will provide that off-setting emission decreases at a source can exempt emission increases from NA review). The NA new source permitting process applies to the project (ie major sources) if it is a major source of the NA pollutants, which for this project are ozone and particulates. Therefore, the project will be subject to NA review for these pollutants and PSD review relative to the other pollutants.

This NA review, as well as the PSD review discussed previously is undertaken when applying for the state's air quality permits, and this is discussed next.

3.2.5 Permits

Part I, Rule 103 of the state's rules requires that a construction permit be obtained before the construction of any new emission source (or air pollution control equipment) can commence. IEPA cannot issue the permit unless the applicant demonstrates that the source will not cause a violation of the CAA or of state law. This permit application form is found in EXHIBIT 3-6. In addition to general information, the forms also request that a process flow diagram and plant plot/map be included. IEPA also requires that specific information forms be used for specific facility types. These additional forms are identified in EXHIBIT 3-7.

Application for the construction permit triggers the PSD and non-attainment review process discussed above. This review will determine the emission limits and methods of pollution control which the facility must meet. If necessary, this process will also set up a compliance program under Rule 104.

The construction permit ensures that the source is in compliance with state air quality standards found in Part III of the Rules. The state has adopted the federal NAAQS found at 40 CFR 50 and discussed previously. This project is located in a non-attainment area for both ozone and particulates and subject to non-attainment review. Also should note potential change in TSP status per NY 6/15/81 memo. For other criteria pollutants, the area has been designated as a Class II area, and is subject to PSD review. It is useful to note that the state is now in the process of attempting to redesignate the area from Class II to Class III for SO_2. If accepted by the USEPA, this redesignation would be less restrictive to the growth of new SO_2 sources. Complaince with NAAQS standards is assured through the PSD and non-attainment review programs discussed in detail above, in Section 3.1. The state has adopted the USEPA's PSD program found at 40 CFR 52.21. This program simply allows increments to be utilized on a first-come, first-served basis, and has been described previously.

This project is located in a non-attainment area for both ozone and particulates. Thus, the project will also be subject to the state's non-attainment review procedure, rules for which were adopted on April 24, 1979 and later revised effective January 16, 1980. These rules, contained in EXHIBIT 3-8 delineate among other things:

- A procedure for determining Lowest Achievable Emission Rate (LAER);
- Conditions for permit issuance to new sources of particulate matter, sulfur dioxide, nitrogen oxides, or carbon monoxide;
- Special conditions for permit issuance to new sources of organic material or carbon monoxide emissions;
- An expanded list of relevant definitions;
- A procedure for determining emission offsets as well as certain alternatives to emission offsets; and,
- Requirements for demonstrating an improvement in air quality.

It is important to note that in most conditions, this review requires that offsets be obtained. However, not only will the state help obtain the offsets, but if offsets cannot be obtained, the project may still be allowed under the SIP's growth allowance provision.

It should be noted that this project will only be subject to non-attainment review if it is a major source of these non-attainment pollutants. To be classified as a "major source", the source must have uncontrolled emissions, equal to or greater than, 100 tons per year.

In addition to a construction permit, Rule 103 also requies that a permit be obtained to allow the operation of any new air pollution source, or air pollution control equipment. This permit is applied for on the same form as is used for the construction permit and is intended to inform IEPA of any changes in the facility's emissions not anticipated in the construction permit.

Because the issuance of these permits is included as part of the state's Coordinated Permit Review Program (discussed in Section 1.4 above) the issuance of the construction permit will take a maximum of six months.

4. WATER QUALITY RELATED REGULATORY ACTIVITIES

4.1 Federal Regulations

This Section of the report discusses the federal water pollution control permits required to license the Clark synfuel project. Also briefly addressed is the regulatory strategy that the USEPA and the IEPA has developed for issuing a national pollutant discharge elimination system (NPDES) permit for the project. The specific regulatory strategy and requirements which will be required by the IEPA will be fully described in Section 4.2 of this Report.

The following federal requirements will now be addressed: (1) the Clean Water Act section 404 permit requirements for the disposal of dredge and fill material; and (2) the Rivers and Harbors Act section 10 permit to construct on a navigable waterway. It should be noted that the Army Corps of Engineers (Corps) issuance of a section 404 dredge and fill permit or Rivers and Harbors Act section 10 permit would activate the NEPA-EIS process.

4.1.1 Clean Water Act

One of the two major federal water permits that the coal gasification project must acquire is the Clean Water Act section 404 permit. The Corps requires this permit where there will be a discharge of dredged or fill material into the navigable waters of the U.S. Since the project, as described in Section 1.2 of this report, will have a surface water intake and discharge structures as well as barge unloading facilities into the Kaskaskia River, a section 404 permit will be required for the dredging and filling associated with the construction of these facilities. This permit should be obtained with the section 10 permit which will be discussed next.

4.1.2 Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act of 1899 (RHA) requires that the Corps issue a permit for any construction activity in a navigable waterway. This permit is generally requested by an applicant for approval to construct intake or discharge structures or barge loading/unloading facilities. Under the RHA, the proposed project will require a section 10 permit if there is any construction activity in a navigable waterway. This permit application to the Corps will trigger the NEPA review process as discussed in Section 6 of this report. This permit is generally handled in a common permit application submission with the section 404 dredge and fill permit discussed above.

It should be noted that the Corps announced, on September 19, 1980 (45 FR 62732), a proposed regulation amending its section 404 and section 10 permit procedures. The revisions, which are due to be finalized in the summer of 1981, would provide a "nationwide permit" for several kinds of dredged and fill material discharges, including such discharges for outfall and associated intake structures where the effluent is permitted under NPDES and where the adverse effects of the structure are minimal.

CWA section 404 permit processing can take 6 months or longer and, for the proposed coal-gasification project, would include public participation, and will require the preparation of an EIS. The Corps permit cannot be issued until the EIS has been finalized. Note that an EIS would not be required for projects subject only to a "nationwide" Corps permit, which has been proposed to apply to certain activities mentioned above.

4.1.3 Delegation of NPDES Authority

Effluent discharges for this project are not allowed into navigable waters of the United States unless a NPDES permit is obtained. The USEPA issues the NPDES permits unless the NPDES program has been delegated to the state. The IEPA has been delegated the NPDES permitting authority from the USEPA. Therefore, the NPDES permit for the permit will be issued by the IEPA. National technology-based effluent limitations called New Source Performance Standards (NSPS) have been developed under the CWA which establish nation-wide base levels of treatment for discharges from new point sources on an industry-by-industry (eg power plants) basis. Where NSPS have not been issued to limit any industry's particular discharge activity, (eg coal gasification facilities) the NPDES permitting authority may issue permits under such conditions as it determines are necessary to carry out the provisions of the CWA. In light of permitting inexperience of agencies in issuing NPDES permits for coal-gasification projects, the USEPA will be providing the IEPA technical assistance to issue the NPDES permit, utilizing federal effluent guidelines and standards which have been adopted by Illinois. The USEPA assistance is part of its strategy for implementing effluent limitations for coal-gasification projects. Since there are no effluent limitations directly applicable to an integrated facility of this type, the USEPA will be recommending a "component approach" in its PCGD's (which are discussed in Section 1.3 of this Report) utilizing effluent limitations which have been or are expected to be developed for various components of a coal-gasification facility. The component approach for effluent limitations are fully addressed in the effluent limitations discussion in the Illinois requirements Section which follows.

4.2 Illinois Regulations

This Section of the report discusses the state of Illinois regulatory requirements pertaining to water pollution control which would impact the licensing of the project. The state regulatory requirements will be presented in the following order: (1) water quality criteria and standards; (2) effluent limitations; (3) the NPDES permit; (4) and the DOT Construction Permit; (5) state certification under section 401 of the CWA.

The agency which enforces the states water regulations is the Illinois Environmental Protection Agency (IEPA). State initiated authority for controlling water pollution stems from the state's Environmental Protection Act, Title III. Authority to implement these regulations are found in Chapter 3 of the Illinois Pollution Control Board Rules and Regulations (Rules). As discussed above, the IEPA has authority delegated from the USEPA to set water quality standards, enforce effluent limitations and to issue pollutant discharge permits under the NPDES permit program.

Water Quality Criteria and Standards

Pursuant to section 304 of the CWA, USEPA has published water quality criteria for individual pollutants used by the states including Illinois in developing water quality standards (which are discussed below). More specifically, in 1976 EPA issued "Quality Criteria for Water" (EPA-440/9-76-023), commonly referred to as the "Red Book", which includes water quality criteria for 48 pollutants. In addition, the National Resources Defense Council v Train settlement required EPA to develop water quality criteria (in addition to effluent limitations) for the 65 toxic pollutants and pollutant classes listed in the agreement, which are listed in EXHIBIT 4-1. The USEPA issued these criteria, some of which revise the criteria for pollutants in the "Red Book", on November 28, 1980 (45 FR 79318). See EXHIBIT 4-2 which shows toxic ("priority") pollutants which have been detected in power plant effluent streams, some of which would be applicable to the project's coal-fired steam generators, as well as to the methanol plant and coal-pile run-off.

In Part III of its Rules, the IEPA has designated certain uses for which particular waters of the state are to be protected. Waters designated for specific uses must meet the most restrictive standard listed in Part II of the rules for each specific use. The three use designations are:

(1) General use waters;
(2) Secondary contact and indigenous aquatic life waters; and,
(3) Public and food processing water supply.

Unless designated otherwise, all waters of the state are designated in both the first and third categories.

Once it has been designated in a certain category, the waters are to meet the standards identified in Part II of the rules. These standards detail the level of various pollutants which cannot be exceeded for the designated use. Because the Kaskaskia River on which this project is to be sited, is not specifically identified as being included in any of the three categories, the river is automatically included in the "General" and "Public/Food Processing Water Supply" categories. The River then must meet the more restrictive requirements of the two Categories. For example, the public water supply category (the generally more restrictive of the two) mandates that the following levels of chemical constituents shall not be exceeded:

Constituent	Concentration (mg/l)
Arsenic (Total)	0.1
Chromium	0.05
Iron (Total)	0.3
Lead (Total)	0.05
Manganese (Total	0.05

Note the above constituents are only illustrative; the actual list of constituents is far more extensive.

Other constituents which the standards address include pH, temperature disolved oxygen, total dissolved solids as well as other specific chemicals. In addition, Part II of the IEPA Rules allows for the creation of a mixing zone "whenever a water quality standard is more restrictive than its corresponding effluent standard."

Effluent Limitations

As discussed in Section 4.1 of this report, all components of the project will be subject to effluent limitation requirements regardless of whether or not NSPS are already in existence for a specific component of the project. Therefore, it would be helpful to review the various components of the project:

- a coal unloading and preparation plant;
- a cooling tower;
- Koppers-Totzek gasifers;
- a methanol synthesis facility; and
- a gasoline synthesis facility.

The application of the component approach to the above facilities will now be addressed. First, however, it should be noted that while different effluent limitation requirements may be applicable to different components of the project, the actual wastewater treatment system utilized to satisfy the standards could be a centralized treatment plant rather than individual treatment systems for each component. The actual determination of the most cost-effective treatment system should be based upon the results of a comprehensive wastewater management study. In the event waste streams are combined for treatment or discharge it will be necessary to demonstrate that each individual waste stream, for which effluent limitations do exist, satisfies that specific effluent limitation regardless of any dilution benefits achieved due to combining flows. It is suggested that for those waste streams which are not subject to nationally promulgated effluent limitations guidelines, that the benefits obtained by dilution should be considered in the waste water management study. Nevertheless, it is advisable that the applicant use best engineering judgement to suggest to the IEPA the methods necessary to minimize impact from these waste streams.

Note that Part IV of the IEPA rules detail the maximum concentrations of various contaminants that may be discharged into state waters, and also place restrictions on the physical, chemical, thermal, biological, and radioactive nature of contaminants which may be discharged. These standards will be used in conjunction with technology based effluent limitations developed by the EPA which will now be discussed.

- Coal Unloading and Preparation Plant

No specific effluent limitations exist for a coal unloading and preparation plant located at the coal gasification facility. However, since the project will be storing and/or processing coal, it will be subject to effluent limitations for coal mines and coal preparation plants (40 CFR 434). "Coal preparation plants" are defined as facilities where coal is crushed, screened, sized, cleaned, dried, or otherwise prepared and loaded for transit to a consuming facility. Discharge limitations for TSS, pH, iron and manganese are required by 40 CFR 434.

For runoff controls from coal piles and construction sites at the facility, the Steam Electric Effluent Limitation Guidelines (Subpart D - Area Runoff Subcategory at 40 CFR 423.40) will provide reasonable guidance.

Some of the limitations contained in 40 CFR 423 have been remanded by the Appalachian Power v Train decision in 1976. However, the USEPA reinstated its effluent limitations for runoff from coal piles on June 3, 1980 (45 FR 7432).

- Gasifier

Effluent limitations for the Koppers-Totzek gasifier do not exist. For this component of the facility the IEPA will not likely use the literature available from their office of Research and Technology in North Carolina. The most desireable approach for the applicant is to document existing data and to develop a wastewater treatment system which will achieve compliance with applicable water quality standards as well as provide acceptable treatment for control of any significant pollutant discharged from the facility.

- Methanol Synthesis Facility

For the methanol synthesis facility, no effluent limitations exist. However, they have been established for the organic chemicals manufacturing industry at 40 CFR 414, which has a similar processes and its standards should be followed.

- Gasoline Synthesis Facility

The process for methanol conversion to gasoline is similar to that of petroleum refining. Therefore, since no effluent limitations are established for a gas cleanup facility, the applicant should utilize those for the petrolium refining point source category at 40 CFR 419.

Best Management Practices

Under CWA section 304(e) the EPA is to publish regulations to control toxic and hazardous substance discharges into surface waters from "ancillary activities" at point sources. Ancillary activities include material storage areas, in-plant transfer, process and material handling areas, loading and unloading operations, plant site runoff, and sludge and waste disposal areas.

Toxic substances include those listed as toxic under CWA section 307 (eg, the Natural Resources Defence Council v Train toxics). Hazardous substances include 297 substances listed as hazardous under CWA section 311 (EXHIBIT 4-3). A coal-gasification facility may dishcarge or store several of these hazardous substances, eg heavy metals, chloroform, PCB's, chlorine, sulfuric acids, sodium hydroxide, calcium oxide, ferric chloride, ferric sulfate, hydrochloric acid, and sodium hypochlorite.

The USEPA has codified rules, called "best management practices" (BMP) rules, to satisfy the CWA section 304(e) requirements, at 40 CFR 125 Subpart K. However, the USEPA has suspended the effective date of these rules until after the finalization of a USEPA BMP technical guidance document. This document is scheduled to be finalized in July 1981. The BMP rules will require applicants for federally issued or state issued NPDES permits which would handle toxic or hazardous substances, to prepare a description of its plant to satisfy the BMP requirements. Basically the BMP plan is to prevent or minimize the potential for the release of toxic and hazardous substances. The plan is intended to consist of procedures and, perhaps, minor construction, although more costly controls may be required in specific cases.

The effective date of the USEPA's BMP rules may be further delayed because USEPA has recently decided to revise these rules. Final revised rules are currently scheduled to be finalized in August 1981 and it is expected that IEPA would adopt them at that time. The revisions may simplify BMP requirements and also provide that the BMP plan would not have to be submitted with the NPDES application (as is the case under the BMP rules currently contained in 40 CFR 125 Subpart K).

Note that even without the Subpart K rules in place, IEPA may still require NPDES applicants to use BMP's, on a case-by-case basis.

National Pollutant Discharge Elimination System Permit

The NPDES permit, is the primary CWA mechanism for ensuring that sources comply with all of the CWA limitations and requirements discussed above. NPDES permits are issued (and renewed) for a maximum period of five years and would be required for both construction and operational stage activities for the project notwithstanding that the IEPA has been delegated NPDES issuing authority, USEPA technical personnel will be assisting state officials in reviewing and processing the state-issued permit because of the state's little experience with licensing synfuel projects.

Subpart A requires that an NPDES permit be obtained before any discharge into waters of the state can take place. In order to avoid the penalties which face a discharger who lacks a valid permit, the potential discharger must notify the state of the need to discharge by completing IEPA's Standard Form C which is supplied by the Agency (EXHIBIT 4-4). The form provides IEPA with all of the required information to enable them to determine the proper terms and conditions which the discharger must meet in order to meet all applicable state and federal requirements. These conditions are detailed in Rule 910 of Part IX and include ensuring compliance with the following federal requirements where applicable as discussed above, including NSPS's pretreatment standards and any more stringent or additional conditions which may be necessary to ensure compliance with federal and state requirements.

Illinois will impose these limitations and standards in order to meet federal and state requirements, including state water quality standards. A permit usually requires monitoring, reporting, and recordkeeping and will, if necessary, establish a schedule for complying with the NPDES permit conditions.

The potential discharger should apply for the permit at least 180 days before the discharge is to take place. However, the state allows a discharger to begin discharging if the permit is not issued within the 180 day period only if the discharger will not be violating any federal or state laws or regulations. Otherwise, the discharger could face court action for discharging in violation of the law.

The NPDES permit, issued in conjunction with the state's Coordinated Permit Review Program, requires the applicant to submit various forms. These include the following forms developed by the USEPA as part of its Consolidated Permit Program. The forms (without EPA issued instructions) set forth in <u>EXHIBIT 4-6</u>.

The exhibit includes:

a) Application Form 1 - Requires the submittal of general information;

b) Standard Form C - This three-section form asks for detailed information describing the applicant and the facility (section I); the basic discharge (section II); as well as information on any implementation schedule(s) which may be already imposed for waste abatement facility construction (section III).

In addition to these general forms, the IEPA also requires the applicant to submit a number of other schedules, depending upon the specific facility conditions.

For purposes of this project, the following additional state forms will likely be required to obtain an NPDES permit. Copies of these forms, as well as instructions which apply to each are set forth in <u>EXHIBIT 4-5</u> and include:

- IEPA Form WPC-PS-1 - This form must be submitted with all permit applications, and requires various certifications by appropriate individuals.

- Schedule J - This form is required for construction or operation permits for industrial treatment or pretreatment works.

- Schedule N - This form is required to illustrate raw waste characteristics, effluent quality, and upstream and downstream retrieving water quality.

The above forms are included as representative of the type of forms and information which the state requires. The IEPA may request addition forms to be completed because of the untypical nature of the project.

The state also requires (in section 910(m) of the Rules) that an NPDES permit be obtained for the disposal of pollutants into wells in order to protect the ground as well as surface waters.

DOT Construction Permit

In addition to the NPDES permit, the division of water resources of the State Department of Transportation (DOT) also issues a permit to allow work in or along state waters. This permit requires the applicant to submit plans, drawings and engineering studies to allow DOT to determine the effect of the proposed action on stream flooding and water flow. Also the DOT will base its decision upon the input provided by other state agencies, who can delay or prevent this permit from being issued. The requirements for the permit are similar to those of the Army Corps. The permit will be processed under the Illinois Coordinated Permit Review Process. This permit takes 60 to 120 days to be issued, depending upon the complexity of the project involved (Rivers, Lakes and Streams Act, Illinois Revised Statute, Chapter 19, paragraph 52-78, June 10, 1981).

State Certification Under Section 401 of the CWA

Under section 401 of the CWA, no federal license or permit to conduct any activity which may result in a discharge into navigable waters (e.g., NPDES or dredged/fill material permits) may be issued until Illinois certifies that the discharge will comply with the CWA and with state water quality law. 40 CFR 121 details the certification process.

5. SOLID WASTE RELATED REGULATORY ACTIVITIES

The generation, transportation, treatment, storage and disposal of solid wastes are regulated to varying degrees by both federal and state authorities. A major force behind this control effort is the Resource Conservation and Recovery Act (RCRA or Act) which was passed by Congress in 1976. This Act addresses the regulation generation, handling, transportation, treatment, storage, and disposal of solid waste and sets up a system for state and federal control of these wastes.

For purposes of this project, it should be noted that the Solid Waste Disposal Act Amendments of 1980 exempted from RCRA regulatory purview certain solid wastes generated (1) by the combustion of fossil fuels; and (2) from the "extraction, beneficiation, and processing of ores and minerals" (including coal). These exemptions were included in the amendments in order to allow EPA to complete a study of the hazards which these wastes pose. However, while EPA's Office of Solid Waste is not extending the fossil fuel combustion exemption to the synfuels industry, they are extending the coal processing exemption to certain aspects of synfuel processes.

In a January, 1981 letter from Alfred Lindsey, Deputy Director of EPA's Division of Hazardous and Industrial Waste, this exemption was described as "extending to any operation... which processes an ore or a mineral."

Mr. Lindsey stated that this would "clearly extend to... the direct gasification and liquefaction of coal and the wastes produced from these operations. (The exemption) even extends to the wastes produced from the process which may not become mixed with the spent (process) ash... provided (the wastes) are unique to the 'ore' processing operation." Mr Lindsey noted that the exemption does not extend beyond those immediate processes which are not associated with the processing of coal. The exemption "also does not apply to hazardous wastes which are not unique to synfuels operations (such as) spent cleaning wastes, cooling tower blowdown," etc.

This exemption is only to last until the required studies have been completed (scheduled for late 1982). At that time, the coverage of RCRA will be greatly clarified. Also at that time, EPA's pollution control guidance documents will be completed (discussed above in Section 1-3), and RCRA's impact on the synfuels industry should be explicitly defined. However, until such a final determination has been made, it is important to remember that this exemption only applies to certain specific synfuel waste streams, and only for a specified period of time. So, even with this exemption, the synfuels industry will still have to meet the requirements of RCRA for some, although not all of its waste streams.

The following, then, presents a discussion of the solid waste-related regulatory requirements which likely will affect this synfuels project. Section 5.1 of this report discusses federal requirements and section 5.2 discusses the requirements of the state of Illinois.

5.1 Federal Regulations

At the federal level, this synfuels project will likely be required to comply with RCRA. The Act is divided into a number of subtitles; the most significant are Subtitles C and D which deal with Hazardous Waste Management and Non Hazardous Waste Management, respectively. The major sections of these two subtitles are as follows:

Subtitle C - Hazardous Waste Management

Section 3001	Identification and listing of hazardous waste.
Section 3002	Standards applicable to generators of hazardous waste.
Section 3003	Standards applicable to transporters of hazardous waste.
Section 3004	Standards applicable to owners and operators of hazardous waste treatment, storage and disposal facilities.
Section 3005	Permits for treatment, storage or disposal of hazardous waste.

Subtitle D - State or Regional Solid Waste Plans (Non-Hazardous Waste Management)

Section 4002	Federal guidelines for development and implementation of plans.
Section 4004	Criteria for sanitary landfills.

Hazardous waste regulations pursuant to subtitle C were promulgated in 1980. These regulations are discussed in section 5.1.1. Non-hazardous solid waste regulations pursuant to Subtitle D were promulgated in 1979. These regulations are discussed in section 5.1.2.

Generally, section 3001 of the Act establishes testing procedures and criteria to be used to determine, on a case-by-case basis, whether the solid wastes generated at a facility should be defined as "hazardous" or "non-hazardous." If a waste is deemed "hazardous," disposal is limited to those disposal sites that comply with hazardous waste disposal criteria promulgated pursuant to Subtitle C in section 3004. Acceptable hazardous waste disposal practices (e.g., surface impoundments) are also defined by the regulations. If a waste were deemed "non-hazardous," disposal in "open dumps" is to be banned under RCRA. EPA is developing Guidelines which states may adopt to aid them in developing programs to control the disposal of non-hazardous wastes. Many states are developing such programs, with or without federal assistance.

5.1.1 Subtitle C - Hazardous Waste Management

Part 260, Appendix I of Title 40 of the Code of Federal Regulations (cited as 40 CFR 260, Appendix I) presents a step-by-step description of the entire hazardous waste control program to aid the public in determining which of the program's regulations they must comply.

In order to determine which section of RCRA is applicable to the various solid wastes to be generated at this synfuels plant, a determination must be made as to whether any wastes are considered hazardous. Pursuant to the regulations found at 40 CFR 260, a waste is deemed hazardous if it is ignitable, corrosive, reactive or toxic, according to specific tests described in the regulations; or if the waste appears on any of the EPA hazardous wastes lists found at 40 CFR 261, Subpart D, which are composed of solid wastes considered hazardous or separate processes which generate hazardous wastes. In addition, 40 CFR 261.4 allows for certain materials to be excluded from the requirements of Subtitle C, and part 261.5 outlines special procedures for persons generating less than 1000 kilograms of hazardous waste per month.

Once a waste is identified as hazardous, it is subject to the remaining hazardous waste program regulations to ensure that the waste is treated, stored, and disposed of only at environmentally sound hazardous waste management (HWM) facilities. Thus, the Act requires all hazardous wastes to be designated for, transported to and treated, stored and disposed of at permitted facilities, and requires such permits to contain EPA-approved requirements for the design, construction and operation of the facility.

These requirements, or standards, apply to hazardous waste generators, transporters, and to hazardous waste treatment, storage, and disposal facilities. Each of these sets of standards will be discussed next, and will be followed by a discussion on the facility permits which these standards allow to be issued.

Standards Applicable to Generators

The purpose of regulations pursuant to section 3002 of the Act is to establish a tracking procedure designed to record the movement of hazardous wastes from the point of generation to the authorized treatment, storage or disposal facility. The requirements of the regulations essentially consist of the maintenance of a manifest document. This document is used to identify the quantity and composition, and the origin, routing, and destination of hazardous waste during its transportation to the point of disposal, treatment or storage. Regulations promulgated pursuant to section 3002 are found at 40 CFR 262. This set of regulations applies to generators of hazardous wastes, and distinguishes between generators who dispose of the wastes on-site, and those who dispose of the wastes elsewhere.

Part 262.11 makes generators of solid waste responsible for determining whether or not their waste is hazardous. If determined to be hazardous, Part 262.12 requires the generator to obtain an EPA identification number for the waste. Finally, Subpart B requires the generator to prepare a manifest, and details the type of information which must be included in this manifest.

Standards Applicable to Transporters

This part details the requirements which a transporter of hazardous waste must follow. These include detailed recordkeeping and an accidental discharge response system. The regulations are promulgated pursuant to section 3003 are found in 40 CFR 263.

Standards Applicable to Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

Section 3004 requires EPA to establish design, construction, and operation standards which are applicable to owners and operators of hazardous waste treatment, storage, and disposal facilities. Because of the complexity of this task, EPA has not been able to issue standards which would apply to new treatment, storage and, disposal facilities at one time. Instead, they first concentrated upon issuing standards which apply to treatment and storage facilities, allowing them to receive permits under RCRA. These standards were issued January 12, 1981 (46 FR 2802).

Disposal facility standards, on the other hand, presented far more difficulty. Because of the complex nature of this task, EPA has not yet issued final standards which would apply to disposal facilities. However, on February 13, 1980 (46 FR 12414), EPA issued temporary standards which allow the permitting of disposal facilities. These temporary standards will remain in effect until the proposed standards, which were issued on February 5, 1981 (46 FR 11126), become final, or until February 13, 1983, whichever is earlier. Although these 40 CFR Part 267 standards are temporary, RCRA permits, valid for periods up to ten years, can be issued under their guidance. Thus, if this facility will dispose of hazardous wastes on site, it will have to comply with the part 267 or the part 264 standards, if they have been finalized.

Standards for treatment or storage facilites include requirements for closure and post-closure (Subpart G); financial requirements (Subpart H); and for use and management of containers (Subpart I). Design and operating standards are also in existance for tanks (Subpart J); surface impoundments (Subpart K); and waste files (Subpart L).

Standards for disposal facilities, either under the temporary part 267, or in the proposed part 264, cover various forms of land disposal methods, including land treatment and land fills. All of these part 264 standards include requirements for recordkeeping, monitoring, inspection, and compliance with both the manifest system and with approved treatment, storage, and disposal facility operating practices; location, design and construction requirements; maintenance and operation requirements, as well as contingency planning.

These standards, which have just been discussed, are used to issue permits to HWM facilities and these permits are discussed next.

Permits for Treatment, Storage or Disposal of Hazardous Waste

Section 3005 requires any person owning or operating a facility for the treatment, storage, or disposal of RCRA listed or identified hazardous wastes to obtain a permit to do so. If hazardous wastes will be treated, stored or disposed of on the site of this project, construction of such a hazardous waste management (HWM) facility cannot begin without the submittal of Parts A and B of the HWM facility permit application and the receipt of a final HWM facility permit. Requirements for obtaining this permit may be found in EPA's Consolidated Permit Program found at 40 CFR 122. Subpart A contains general permitting requirements, while Subpart B contains all the requirements specific to the RCRA program. It is the intent of RCRA that authority for the RCRA permit program be delegated to the states, and this delegation process, as it applies to this project, is discussed more fully in section 5.2 of this report.

It should be noted that owners and operators of hazardous waste management (HWM) facilities which are not yet under construction must submit a complete application to EPA at least six months before physical construction of the HWM facility is expected to commence (see 46 FR 2344). No physical construction can commence until the HWM facility permit is issued. After 7/31/81, EPA will be able to issue permits to HWM facilities (other than land disposal facilities) under regulations issued January 12, 1980 at 46 FR 2801. After 8/13/81, EPA will be able to issue permits to land disposal facilities as well.

Information which must be included in the Part B application includes: a description of facility, chemical and physical analyses of wastes to be handled, a waste analysis plan, security procedures, inspection schedule, contingency plan, facility location information, closure plan, topographic map, and specific descriptions of the design of treatment and storage facilities to show compliance with the applicable technical requirements.

A copy of application Part A is included as Exhibit 5-1. In addition, EPA requires that its General Form 1 be submitted. This form is also used by the state for its permitting process and may be seen in Exhibit 4-6. A Part B application form has not yet been promulgated. Until it is, EPA will assist the applicant as required.

The particular type of HWM facility which is to be constructed dictates which set of technical standards the facility will have to comply with. For example, if a "treatment or storage facility" is to be constructed, and this facility of one or more tanks, the design and operating standards found in Subpart J of 40 CFR 264 will have to be complied with. It is expected that EPA will take about 5 months to issue a RCRA permit to a hazardous waste treatment or storage facility.

If the facility will dispose of hazardous wastes on site, it will also have to obtain a permit to do so. This permit will be based on standards set out in Part 267, unless the Part 264 standards have been finalized (see discussion above). As the design and operating standards of these temporary, Part 267 regulations are general, leaving many considerations dependent upon the particular permitting situation, EPA has not developed a standard form for the temporary RCRA permits. It has, however, established permit writing teams in the various EPA Regional Offices to assist permit applicants in determining the information which they must submit. This guidance will likely occur during EPA's participation in

Illinois' Coordinated Permit Review Process, discussed above in Section 1.4.

Although no disposal facility permit has yet been issued under these Part 267 regulations, EPA expects these permits to take at least one year to be issued from the time a complete application is submitted.

5.1.2 Subtitle D - Non-Hazardous Solid Waste Management

If a solid waste is determined not to be a hazardous waste, the second major RCRA program under Subtitle D will determine how the solid waste should be handled. Subtitle D of the Act establishes criteria for disposal of non-hazardous wastes in sanitary landfills. Each state is directed to develop a plan to be approved by the EPA which requires that all solid wastes be utilized for resource recovery, be disposed of in sanitary landfills, or be otherwise disposed of in an environmentally sound manner. Any solid waste not subject to the hazardous waste program would have to comply with these requirements if a plan is developed in the state.

Guidelines for the development and implementation of state solid waste management plans are found at 40 CFR 256. These regulations are promulgated pursuant to RCRA section 4002(b), which requires EPA to issue such guidelines to the states, and pursuant to RCRA section 4003, which stipulates certain minimum requirements for the approval of state solid waste plans. RCRA does not require states to develop solid waste plans and EPA will not develop and implement solid waste plans in states which do not do so. However, EPA-approved plans are necessary in order for states to receive federal funds for solid waste management planning and implementation. If a state develops an EPA-approved solid waste management plan, the Part 256 guidelines and requirements will apply to industrial solid wastes which are determined not be be hazardous. Some of the minimum requirements the state plan must address are as follows:

- Solid waste disposal standards
- Surveillance system
- State permit system

Each of these will now be briefly discussed.

The solid waste disposal standards would be based on the health and environmental impacts of disposal facilities and would specify design and operation standards taking into account climatic, geologic and other relevant characteristics of the state.

The surveillance system would establish monitoring requirements for facilities.

The state permit system would provide the administrative control to prohibit the establishment of new open dumps and to assist in meeting the requirement that all wastes be used or disposed of in an environmentally sound manner. Permitting procedures for new facilities would require applicants to demonstrate that the facility will comply with the criteria. The permit system should specify for the facility operator, the location, design, construction, operational, reporting, completion and maintenance requirements.

Criteria which are to be used in determining which solid waste disposal facilities and practices pose a reasonable probability of adverse effects on health and the environment may be found at 40 CFR 257. The criteria were developed pursuant to RCRA sections 1008(a)(3) and 4004(a), and require EPA to develop criteria for defining "open dump" facilities. The criteria are to be used by states with EPA approved solid waste management plans to upgrade or close existing "open dumps". The establishment of new "open dumps" is prohibited by RCRA. The 1008(a)(3) and 4004(a) criteria, found at part 257, apply to most solid waste disposal facilities and practices. The criteria generally require that:

- The selection of sites in "environmentally sensitive areas" such as wetlands, floodplains, critical habitats and sole source aquifers should be avoided or receive lowest priority as potential locations;

- The facility does not adversely affect surface water or groundwater;

- The facility controls air emissions so as to comply with all applicable federal, state and local air requirements and protects public health and welfare;

- A facility for the beneficial utilization of solid waste by application to land used for the production of food chain crops should comply with certain criteria related to the presence of cadmium, pathogens, pesticides and persistent organics; and

- The facility protects public health by controlling disease vectors and does not pose a safety hazard.

Finally, it should be noted that Subtitle D allows citizens to force "open dumps" to close through court action. A facility which uses an "open dump" to dispose of its non hazardous waste should be aware of this limitation.

5.2 Illinois Solid Waste Control

The state of Illinois has enacted a solid waste management program which became effective one year before the 1976 enactment of the federal Resource Conservation and Recovery Act (RCRA). The program is carried out by the Division of Land Pollution Control of the Illinois Environmental Protection Agency (IEPA), under the authority granted to it by the state Environmental Protection Act. The rules and regulations issued under this authority apply to any hazardous waste generator, transporter, or treatment, storage, or disposal facility.

Under RCRA, the Federal EPA must issue permits for hazardous waste activities in states whose hazardous waste management programs do not meet the minimum requirements set forth in section 3006 or RCRA. A state wishing to have its program approved under RCRA, so that it can then issue RCRA permits on its own, must submit its program to EPA for approval. As Illinois has not received this interim authorization for its hazardous waste management program from the U.S.E.P.A., hazardous waste handling in the state must comply with all federal RCRA regulatory requirements in addition to those requirements imposed by the state. Illinois does have a cooperative agreement with the U.S.E.P.A., however, indicating that it has filed for interim authorization and will be granted authorization as soon as the Illinois program meets the requirement that it be substantially equivalent to the federal program. Illinois is expected to obtain interim authorization by September 1981. Illinois is considering amending its Environmental Protection Act to incorporate the hazardous waste management provisions of RCRA. This amendment should expedite the development of the states hazardous waste regulatory program.

Section 22 of the Illinois Environmental Protection Act authorizes the Illinois Pollution Control Board (IPCB) to promulgate regulations for the control of solid waste. These regulations may include the following:

1. location, design, construction, operation, maintenance and closure standards for refuse collection, storage, treatment, disposal, and recovery operations;

2. standards for the handling, storing, processing, transporting and disposal of hazardous waste;

3. record-keeping and reporting requirements for generators, processors, storers, transporters, handlers, treaters and disposers of special or hazardous wastes;

4. requirements for monitoring contaminant discharges, for collecting samples, and for reporting data;

5. emergency standards for situations presenting an acute danger to health or the environment;

6. closure and post-closure requirements for hazardous waste disposal sites;

7. requirements prohibiting the disposal of certain hazardous wastes in sanitary landfills.

Most of these requirements were enacted by the state legislature in 1979, and to date, IEPA has taken the following steps toward controlling solid waste (both hazardous and non-hazardous) in the state:

1) Development of a permit program to promote construction of environmental acceptable management and disposal sites;

2) implementation of a manifest system to track certain categories of waste from "cradle to grave", and;

3) creation of a statewide enforcement program.

These will be elaborated upon in the following paragraphs. But first, it is important to note that under section 3 of the state's Environmental Protection Act, solid wastes in the state are regulated according to whether they are "non-hazardous" or "special wastes". Special wastes consist of both hazardous and non-hazardous industrial wastes and wastes which result from removing contaminants from the air, water, or land, and which may be harmful or otherwise difficult to dispose of. "Hazardous wastes" are considered as a subset of "special wastes" and are defined as wastes which, among other things, are listed pursuant to section 3001 of RCRA under state rules (see discussion of RCRA in Section 5.1 above). In addition, as with RCRA, hazardous wastes may also possess such characteristics as infectiousness, flammability, toxicity, reactivity, or corrosivity. Beyond the considerations of RCRA, the state also views persistence as a characteristic of hazardous waste.

The Permit Program

Under the authority of Part II of Chapter 7 of its rules, IEPA requires that permits be obtained before wastes can be disposed of at an existing disposal site, as well as prior to the construction of a new management or disposal facility. Thus, for either on-site or off-site waste disposal, as well as for on-site management, this project would have to obtain at least one permit.

Under Rule 210, an existing, licensed waste disposal site cannot accept hazardous or non-hazardous industrial waste (refered to as "special waste" in the state's rules) unless the disposal site has first obtained a supplemental permit called a Special Waste Disposal Permit (EXHIBIT 5-2). This permit allows the disposal facility to accept wastes from a particular industrial process. Although the permit applies to the disposal facility, it is usually the responsibility of the generator who wishes to dispose of the waste to apply for the permit. The permit requires the applicant to provide IEPA with such types of information as quantitative and qualitative analyses, leaching tests, etc. Using their own in-house standards, IEPA will be looking to see whether the waste is compatible with the site, as well as with other wastes present in the facility. IEPA has a maximum of 90 days to act upon a complete application, although 60 days is the average length of time which IEPA has been taking for this review.

If a new facility is to be constructed to manage wastes generated by the project, Rule 201 requires that a development permit be obtained. This permit is required in order to develop any "solid waste management facility" to be located in the state. Such a facility is defined in Rule 104 as being a facility which stores, processes or disposes of solid wastes. The permit is not required for facilities which exclusively generate such wastes, nor is it required for hauling or transporting such wastes.

This development permit must be obtained to develop both hazardous and non hazardous waste management facilities. Since this permit must be obtained prior to the start of construction of such facilities, it is important to note that the agency may take up to 180 days to process an application under its Coordinated Permit Review program, discussed in Section 1.4, above.

A copy of this application form is included as EXHIBIT 5-3. The form, in addition to providing quantitive and qualitative information about the wastes to be handled, the site, and the design and operation of the facility (Rule 203), requires that the applicant also demonstrate that the facility will not cause a violation of state law, and that the facility will achieve "consistently satisfactory results" or will conform to any design criteria which are promulgated by the state (Rule 207).

At this time, the state has only promulgated design and operating standards and criteria for sanitary landfills. Thus, in order to construct or operate a sanitary landfill, the applicant would have to abide by Chapter 7, Part III. For other types of management and disposal facilities the state may have some in-house criteria by which they will measure the information contained in the application. It is, therefore, up to the applicant to demonstrate that the facility is designed, and will be operated, to protect the state's environment, as well as to conform to state and federal law.

After having obtained a permit to allow the development of a new solid waste disposal site, the state requires that an operating permit be obtained, under Rule 202, before the facility begins operation. This permit is to insure that the facility abides by the conditions enumerated in the development permit. This permit usually takes IEPA 45 days to act upon.

In addition to submitting a development and operating permit, the state also requires the applicant to fulfill two additional types of requirements under section 39(c) of the state's Environmental Protection Act. Under this section, IEPA requires that the applicant notify the following individuals of their intention to develop or operate a waste disposal facility:

a) State Attorney;

b) Chairman of the County Board of the county in which the facility is located;

c) each member of the General Assembly from the legislative district in which the facility is located;

d) the clerk of each municipality within three miles of the facility;

e) local zoning boards;

f) planning agencies; and

g) adjacent landowners.

The state supplies a form to use for this purpose. A copy is included as EXHIBIT 5-4.

In addition, because of a 1975 state Supreme Court Decision (Carlson v. Village of Worth), IEPA is also required to insure that any applicant which is requesting a development or operation permit for a landfill demonstrate that the landfill meets local land use and zoning requirements. In order to make this demonstration, IEPA requires that a wide range of information be submitted which, among other things, shows that the facility:

a) will be sited to avoid any hazards to public health and safety;

b) minimizes any "offenses to the senses" to anyone within a one-mile radius of the site boundry; and

c) is located to minimize any incompatibility with the surrounding area.

The complete listing of these requirements is included as EXHIBIT 5-5.

In addition, Rule 203 allows for experimentation with new solid waste management processes or techniques. This permit allows for facility operation even if the standards of Rule 207 are not met (these are discussed above). This permit will be issued if the applicant can provide proof that the technique or process has a reasonable chance for successfully improving solid waste technology as long as the environmental hazardous are minimal. These permits are issued for periods not to exceed 2 years, and take the agency 90 days to review upon receipt of a complete application form.

Finally, Chapter 9, Part II of the IPCB rules requires that transporters of special wastes obtain a permit from IEPA in order to haul such wastes. Under rule 205, the IEPA can impose conditions sufficient to insure the safe transportation of these wastes. However, Rule 210 provides for an exemption from this permit requirement for any person who generates 100 kilograms (220 pounds) or less of special wastes in any month. In addition, Rule 211(H) exempts transporters of coal combustion fly ash from having to obtain this permit.

The state also requires that permits be obtained for the construction, operation, and modification of waste disposal injection facilities. As described above, the state's Environmental Protection Act requires these permits under Title V.

IEPA requires that separate application form be submitted for the following activities:

- Construction of test hole and/or injection well (Rule 201)
- Operation of injection well and installation of surface equipment (Rule 202)
- Facility modification, or changes in waste disposed (Rule 210)

As discussed previously, these permits require general information about the applicant, the site, the waste, and waste disposal method. In addition, the state is particulary concerned with hydrogeologic conditions, data on the drilling and testing program, as well as a monitoring program outline and waste movement studies.

6. NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

The National Environmental Policy Act of 1969 (NEPA) requires the preparation of an Environmental Impact Statement (EIS) for "major federal actions significantly affect the quality of the human environment" (section 102 (2)(c)). The detailed statement must include:

1. The environmental impact of the proposed action;

2. Any adverse environmental effects which cannot be avoided should the proposal be implemented;

3. Alternatives to the proposed action;

4. The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and

5. Any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Actions including the issuance of licenses or permits to private parties for the construction of projects which would affect the environment would trigger the EIS process. However, various environmental permit programs have been specifically exempted from the requirements of NEPA.

Many of EPA programs are environmentally oriented and are not subject to NEPA's additional safeguards. EPA has determined that an EIS would not be required for the issuance of a permit pursuant to the Resource Conservation and Recovery Act (RCRA)*. Additionally, none of the federal actions under the Clean Air Act (CAA) trigger on EIS. When the Energy Supply and Coordination Act was enacted in 1974, section 7(c) amended the CAA to exclude EPA's actions under the CAA from NEPA.

Illinois has been delegated authority to administer the NPDES permit and state issuance of the permit does not activate the federal EIS process. Possible funding of the project by the Synthetic Fuels Corporation pursuant to the Energy Security Act would not trigger the NEPA-EIS process (Section 105(i) of the Energy Security Act). However, the requirement for a EIS is triggered by the necessity for an applicant to obtain one or both of the following Corp's permits:

- Permit for discharge of dredge or fill material into a navigable waterway of the U.S. pursuant to section 404 of the CWA.

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* EPA Memorandum, From James A Rogers, Associated General Counsel, Water and Solid Waste Division, to Steffen Plehn, Deputy Assistant Administrator for Solid Waste on the "Applicability of the National Environmental Policy Act's Environmental Impact Statement Requirements to EPA's Actions under the Resource Conservation and Recovery Act," dated 3/79.

- Permit for construction in a navigable waterway of the U.S. under section 10 of the RHA.

An important consideration in the EIS process is the early designation of the federal agency which will act as the "lead agency" responsible for preparation of the EIS. This determination arises when more than one federal agency is involved in the project and a clear distinction does not exist respecting which agency should be the lead agency. However, for this project the only possible lead agency should be the Corps.

The Council on Environmental Quality (CEQ) promulgated NEPA regulations which are binding on virtually all federal agencies. The heart of the EIS is the presentation comparison of alternatives to the proposed action. The Corps' regulations implementing NEPA, pursuant to CEQ NEPA regulations, are found at 33 CFR 230. The Corps, on September 19, 1980 at 45 FR 62732, proposed amendments to its NEPA rules which are expected to be finalized in the summer of 1981. These amendments would provide a "nationwide permit" for several kinds of dredged and fill material discharges, including such discharges for outfall and associated intake structures where the effluent is permitted under NPDES and where the adverse effects of the structures are minimal. An EIS would not be required for a project subject only to a "nationwide" Corps permit, however it is unlikely that the coal-gasification facility will qualify for a nationwide permit.

The Corps will be the lead agency responsible for the preparation of an EIS for the facility. The requirement for the EIS will be triggered by the necessity for the facility to obtain either the Section 404 or section 10 permit under the RHA.

7. TOXIC SUBSTANCES RELATED REGULATORY ACTIVITIES

7.1 Regulatory Overview

Manufactured chemical substances which enter commerce, including synfuels, are subject to the Toxic Substances Control Act (TSCA) notification program implemented by the EPA. The EPA is requesting producers of synfuels to submit a "letter of inquiry" (inquiry) to the EPA in advance of submitting a premanufacture notification (PMN) to obtaining an official determination from the EPA on whether or not the chemical substance is on the inventory. If the EPA notifies the manufacturer that the chemical substance is on the chemical substance (inventory) (e.g. if a manufacturer of the same type of synfuel has already submitted a PMN to the EPA which chemical substance has been inventoried) the manufacturer would then be saved the cost of preparing a PMN.

The following discussion sets forth what should be submitted in the inquiry to EPA and secondly, presents what is required by synfuel manufacturers in the PMN.

7.1.2 EPA's Synfuel Review Process Under TSCA

The EPA has estabished a Synfuels Working Group (Group) to support the synthetic fuels review process of TSCA. The Group, formed in January 1981, has held informal discussions with several manufacturers beginning work on synfuels research. The EPA is treating synfuels as new chemicals that must be reviewed under the PMN program before production can begin. The group is providing an informal review of chemical data which is submitted by a synfuel manufacturer to the EPA, far in advance of the PMN as an "inquiry" to expedite the review of synfuels. Based on this inquiry, the EPA will formally notify the synfuel manufacturer whether or not its proposed chemical substance is on the inventory (i.e. if a manufacturer of the same type of chemical substance has already submitted a PMN to the EPA and it has been inventoried); if so, the manufacturer would then be saved the cost of preparing a PMN.

The inquiry should describe all substances which will be manufactured for "distribution in commerce" i.e. the substance is being sold or introduced into commerce or it will be held after it is introduced into commerce (40 CFR 710.2(J)). Additionally, substances which are being distributed in commerce for test marketing purposes or used as an "intermediate," are to be described on the inquiry (40 CFR 710.2(U)). A substance is an "intermediate" if it is intentionally removed from the "equipment in which it is manufactured," and secondly, is consumed in whole or in part in a chemical reaction(s) used for the intentional manufacturer of other chemical substance(s) or mixture(s), or is intentionally present for the purpose of altering the rate of such chemical reactions. The "equipment in which it was manufactured" includes the reaction vessel in which the chemical substance was manufactured and equipment which is strictly ancillary to the reaction vessel, and any other equipment through which the chemical substance may flow during a continuous flow process, but does not include tasks or other vessels in which the chemical substance is stored after its manufactured (40 CFR 710.2(n)). Products which have no commercial purpose would be excluded from the inquiry because they are not manufactured or processed for distribution in commerce as chemical substances.

The inquiry sent to the EPA should be a narrative, having a detailed description of the process being used and the composition of the synfuel. Additionally, an illustrated composite breakdown of what is known of the chemical should be included. A description of the process and the composition of the gas, should be addressed to:

Dr. Carl Mazza
Office of Toxic Substances
Synfuel Toxic Work Group
TS-794
Environmental Protection Agency
401 M St., S.W. Washington D.C.
20460

Thereafter, the EPA will send back to the manufacturer a notice of whether or not the product is on the EPA's inventory. If it is not on the inventory, a PMN must be submitted at least 90 days before manufacture or processing of the chemical begins. The EPA can delay the initiation of the manufacturing of a product for up to 90 additonal days if good cause exists for such delay.

If the EPA concludes, based on the submitted PMN that the manufacture, processing, distribution in commerce, use, or disposal of a chemical substance presents or will present an unreasonable risk of injury to health or the environment, the EPA can take one or more of the following protective actions:

1) Prohibit or limit to a certain amount the manufacturing, processing, or distribution in commerce of such substance;

2) Prohibit or limit to a certain amount the manufacturing, processing, or distribution in commerce of such substance if it is above a certain concentration set by EPA;

3) Require that the substance be clearly marked with adequate warnings regarding its use, distribution in commerce, or disposal;

4) Prohibit or regulate any manner or method of commercial use of a substance;

5) Prohibit or regulate the disposal of a substance or its container; and,

6) Require manufacturers and processors of chemicals to give notice or unreasonable risk to distributors and to the public, and also to replace or repurchase such substance if necessary.

The EPA must impose these requirements through promulgation of formal rules, using traditional agency rule-making procedures, including an oppotunity for informal hearings for interested persons.

EPA may prohibit or limit activities involving the manufacture or use of the substance until and unless necessary information is contained in the PMN including:

1) The common or trade name, the chemical identity, and the molecular structure of the substance;

2) The categories or proposed categories of use of the substance;

3) The amount of the substance manufactured or processed and reasonable estimates of that to be manufactured or processed in the future, as well as the amount manufactured or processed for each specific use, and reasonable estimates of the amounts to be manufactured or processed for specific uses in the future;

4) A description of the by-products resulting from the manufacture, processing, use of disposal of the substance; and,

5) The number of individuals exposed, and reasonable estimates of those who will be exposed to the substance at their place of employment, and duration of exposure; and

6) The manner and method of disposal of such substance.

The PMN requirements and review procedure will be finalized at 40 CFR 720, and have been proposed at 44 FR 2242 (January 10, 1979) and reproposed at 44 FR 59764 (October 16, 1979).

In summary, the PMN requirements apply not to the coal-gasification facilities but rather the chemical substances produced therefrom. The EPA will be considering the products produced from coal-gasification plants as new chemicals that must be reviewed under the premanufacture notification program before production can begin. However, EPA is requesting synfuel manufacturers to submit to the agency in advance of the PMN, a description of the chemicals which the plant will be producing.

8. MISCELLANEOUS REGULATIONS

8.1 Introduction

This section discusses several additional laws which could affect the licensing, construction, or operation of Clark coal-gasification project.

8.2 Federal Aviation Act

Pursuant to section 1101 of the Federal Aviation Act of 1958, the Federal Aviation Administration (FAA) requires that notice be given to the FAA before any construction permit application is filed for any proposed construction or alteration which would be over 200 feet above the ground level at the site or would be in specified proximity to an airport. A proposed structure in excess of 200 feet is presumed to be hazardous, and the burden weighs heavily on the applicant to prove that it would not be. The applicable FAA regulations are in 14 CFR 77, "Objects Affecting Navigable Airspace." This notice to FAA might have to be filed for the project's flare stack.

After receiving a notice of a proposed project, FAA studies the proposal and makes a determination of whether it would be a hazardous obstruction to navigable airspace. The determination, which is distributed to all interested persons, has no regulatory authority. However, the determination could be discussed during the National Environmental Policy Act-Environmental Impact Statement process, and the determination would probably control in any judicial proceeding to enjoin the construction of the project.

The determination is effective for 18 months, although this period can be extended by petitioning the FAA.

8.3 National Historic Preservation Act

The National Historic Preservation Act of 1966 requires federal agencies which license or fund projects that would affect structures, sites, etc. listed or eligible for listing in the National Register of Historic Places (Register) to take into account the effects of the proposed project on such structures, sites, etc. The Register, which is maintained by the National Park Service, is an official list of archeological, historic, and architectural properties which have local, state, or national significance. Both the states and the federal government nominate properties for inclusion in the Register. Nominations are approved by the National Park Service. In addition, various agencies of the federal government can add properties to the Register.

Federal agency consideration of the effects of a proposed project on structures, etc. listed or eligible for listing in the Register must include consultation with the State Historic Preservation Officer. (States with federally-approved historic preservation plans have such an officer to administer the Register in the state and to review proposed federal undertakings in the state which would affect the Register.) Federal agencies must also provide the Advisory Council on Historic

8.5 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act requires any federal agency which is to license, permit, or otherwise authorize a proposed project, to consult with the U S Fish and Wildlife Service as well as any other agency administering wildlife resources in the project area, when a proposed project would control or modify a water body. The purpose of the consultation is to prevent loss of or damage to, as well, as, where possible, to develop and improve, the wildlife resources in the project area. The Act defines wildlife resources broadly, to include birds, fish, mammals, and other wild animals, as well as the vegetation upon which the wildlife depend. Water impoundments of less than ten acres are exempted from the requirements of the Act.

8.6 Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act has created a National Wild and Scenic River System which consists of river sections which possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or similar values. The purpose of the Act is to preserve these river sections in a free-flowing condition, and to protect their immediate environs for the "benefit and enjoyment of present and future generations". River sections are included in the system through either an Act of Congress, or their designation by a state, which designation is approved by the Department of the Interior. Thus far, 23 river sections are included in the system.

Once a river section becomes part of the system, it, and a specifically designated area surrounding the river, come under the management authority of the federal agency through whose land the river flows. These federal agencies manage the river sections in accordance with the requirements of the Act.

Pursuant to the Act, any proposed water resources project (ie, a project that would affect the free-flowing characteristics of a river) on a river section included in the system must be disapproved if it would have a direct adverse effect on the values for which the river section is so included. Thus, although a proposal for a facility to be sited on a river section included in the system might be approved, such approval would be highly controversial.

Part of the Kaskaskia River, upstream of where the project is proposed to be located, is being considered as a high potential candidate for the National Wild and Scenic Rivers System. The segment of the Kaskaskia under consideration is from US 460 crossing at Fayetteville in St Clair county to Route 161 south of Carlyle in Clinton county, a total of 48.8 miles. Since the project will be located down stream from the segment, the project would not be impacted by this potential designation.

EXHIBITS

EXHIBIT 2-1

EXHIBIT 2-1

LICENSING SCHEDULE

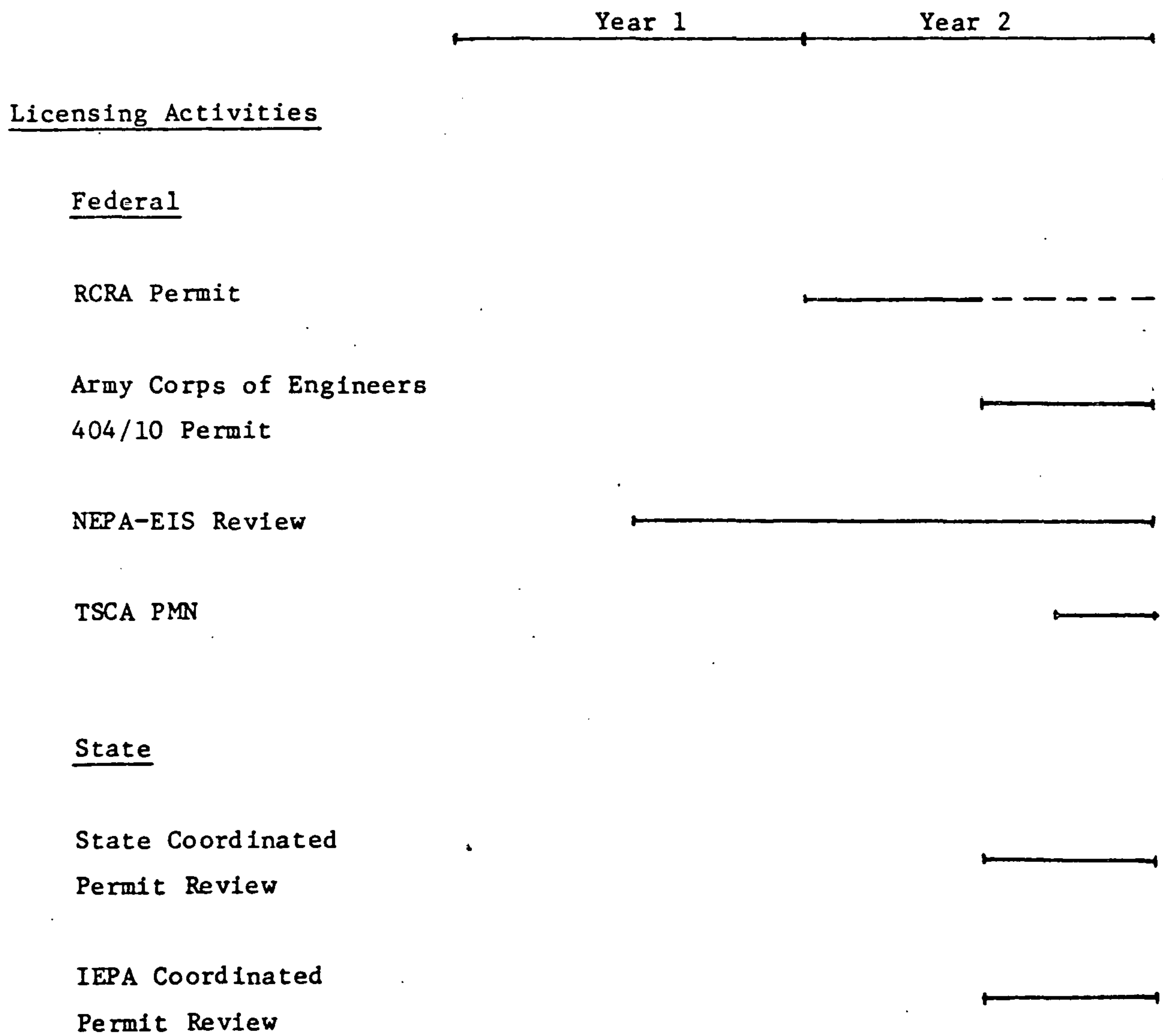

EXHIBIT 3-1

EXHIBIT 3-1

POTENTIAL IMPACT ON THE CLARK PROJECT OF CERTAIN 1981-82 CLEAN AIR ACT AMENDMENTS WHICH ARE URGED BY INDUSTRY

Issue	Some Representative Industry Positions	Potential Impact on Clark Project
1. National Ambient Air Quality Standards (NAAQS's)	• Let the states set the NAAQS attainment deadlines. • Let the states set the secondary NAAQS's.	Illinois could extend (or shorten the current 1982 and 1987 attainment deadlines and could set secondary standards less (or more) stringent than the current secondary NAAQS's. These CAA changes would probably have minimum impact on the project.
	• Allow more permissible exceedances of the NAAQS's than the currently allowed one exceedance of each of the short-term NAAQS's yearly.	Would reduce stringency of NAAQS requirements (which may or may not be critical to the Project.
	• Change from setting the NAAQS's on the basis of threshold of effects plus a margin of safety, to the basis of unreasonable risk of significant adverse effects.	Could reduce (or increase) stringency of NAAQS requirements (which may or may not be critical to the Project).
	• Review of NAAQS's by an independent body, such as the National Science Foundation.	Could reduce (or increase) stringency of NAAQS requirements (which may or may not be critical to the Project).
2. New Source Performance Standards (NSPS)*	• Eliminate the current percent reduction requirement for current NSPS's (eg, the NSPS's for fossil fuel-fired power plants which were promulgated in 1979) and for new NSPS's.	Could result in more favorable future NSPS's for coal.
	• Make new NSPS's effective on the date they are finalized, not on the date they are proposed.	Could lead to the exemption of the Project from the future coal gasification NSPS's.
	• Make EPA's pollution control guidance documents (eg, the documents planned for coal gasification), which are currently planned to be issued directly by EPA, subject to formal rule-making procedures.	Would delay release of the documents, which could be favorable or unfavorable to the Project in terms of control requirements and permit approval time.
3. National Emission Standards for Hazardous Air Pollutants (NESHAP)	• Listing of NESHAP's should be subject to review by an independent body. • The scientific basis for classifying pollutants as hazardous should be improved. • NESHAP's should reflect cost/benefit considerations.	NESHAP's apply to existing as well as new facilities. If the project emits pollutants for which EPA develops NESHAP's, these provisions may have a favorable impact on NESHAP requirements.

EXHIBIT 3-1 (Cont'd)

POTENTIAL IMPACT ON THE CLARK PROJECT OF CERTAIN 1981-82 CLEAN AIR ACT AMENDMENTS WHICH ARE URGED BY INDUSTRY

Issue	Some Representative Industry Positions	Potential Impact on Clark Project
4. Other Technological Controls for New Major Sources	• Eliminate the current technological requirement that controls which will achieve the lowest achievable emission rate be installed in areas where the NAAQS's are not being attained (ie, in nonattainment areas) for major sources of the relevant NAAQS pollutant. Replace this technological requirement by the requirement that the best available control technology (BACT) be installed. BACT is currently only applicable to major new sources (and modifications) in areas where the NAAQS's are being attained.	Probably not relevant. The Clark Project would be located in a non-attainment area for ozone (volatile also TSP crganic compounds (VOC)). However, the project will probably not emit significant amounts of VOC's and, if this is the case, would not be subject to technological requirements for VOC's.
	• Equate BACT to the NSPS's where NSPS's exist for a source category, unless the source would threaten the NAAQS's. Continue to establish BACT on a case-by-case basis where NSPS's do not exist.*	Would be applicable to the Project at least relative to the components of the Project for which NSPS's already exist, eg, for the gas turbine and for coal preparation activities. Could make BACT less stringent than would otherwise be the case.
	• Allow intermittent controls, such as changes in fuel composition and operation, instead of continuous controls, for BACT.	Probably would not impact the Project significantly.
5. Prevention of Significant Deterioration (PSD) Review for New Major Sources	• Abolish the current restrictions on incremental increases in SO_2 and particulate emissions (the "PSD increments") in Class II and III clean air areas.	Would reduce air licensing requirements for the Project relative to SO_2 and particulate emissions.
	• Reduce monitoring requirements for preconstruction review.	Probably not relevant to the Project if monitoring data is intended for use from the site. However, if this data is insufficient, then this proposal could reduce any additional monitoring requirements and the additional front-end scheduling time necessary for such additional monitoring.
	• Eliminate the current CAA requirement that EPA develop PSD regulations for the "Set II PSD pollutants," ie HC's, CO, ozone, NO_x and lead. (EPA currently plans to develop these rules, which would be in addition to the existing BACT requirements for significant emissions of these pollutants, by 1982.)	Would eliminate these additional PSD requirements.

EXHIBIT 3-1 (Cont'd)

POTENTIAL IMPACT ON THE CLARK PROJECT OF CERTAIN 1981-82 CLEAN AIR ACT AMENDMENTS WHICH ARE URGED BY INDUSTRY

Issue	Some Representative Industry Positions	Potential Impact on Convent Project
6. Nonattainment Area (NA) Review for New Major Sources	• Limit or eliminate the current requirement that emission increases from the proposed source be offset by emission decreases nearby. • Limit the current requirement that all other sources owned by the company which is proposing a new major source be in compliance with the CAA, to all other major sources owned by that company.	Could make NA permitting requirements relative to VOC emissions & TSP emissions less stringent (if NA permitting would be necessary because VOC emissions from the project would be significant).
7. State Implementation Plans (SIP)	• Allow the states to permit and set limits for new sources without the current requirements that the relevant SIP be revised and that the revision be approved by EPA.	Illinois currently has an EPA approved NA SIP. This proposal could decrease NA permit approval time (which is probably not relevant to the Project) and Illinois PSD permit approval time

*The potential impacts outlined in this exhibit would only be relevant to the Project if the possible Clean Air Act amendments outlined are enacted and, where relevant, implemented by EPA, etc, in time to apply to the Project permitting.

EXHIBIT 3-2

EXHIBIT 3-2

NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)[1]

Pollutant	Primary NAAQS's	Secondary NAAQS's
Sulfur Oxides (as SO_2)	. 80 ug/m^3 (.03 ppm), annual arithmetic mean . 365 ug/m^3 (.14 ppm), max 24-hr[2]	. 1,300 ug/m^3 (.05 ppm), max 3-hr[2]
Particulate Matter	. 75 ug/m^3, annual geometric mean . 260 ug/m^3, max 24-hr[2]	. 60 ug/m^3, annual geometric mean[3] . 150 ug/m^3, max 24-hr
Carbon Monoxide	. 10 ug/m^3 (9 ppm), max 8-hr[2] . 40 mg/m^3 (35 ppm), max 1-hr[2]	(Same as primary standards)
Ozone	. 235 ug/m^3 (.12 ppm): expected number of days/calendar yr with max hourly average concentrations above 235 ug/m^3 must not exceed 1	(Same as primary standard)
Hydrocarbons[4] (as Methane)	. 160 ug/m^3 (.24 ppm) max 3-hr (6 to 9 am)[2]	(Same as primary standard)

EXHIBIT 3-2

NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)[1]

Pollutant	Primary NAAQS's	Secondary NAAQS's
Nitrogen Dioxide	. 100 ug/m^3 (.05 ppm), annual arithmetic mean	(Same as primary standard)
Lead (as Elemenmental Lead)	. 1.5 ug/m^3, max arithmetic mean averaged over a calendar quarter	(Same as primary standard)

(1) Source: 40 CFR 50

(2) Not to be exceeded more than once/year

(3) Used as a guide in state implementation plans to achieve the 24-hr standard

(4) Used as a guide in state implementation plans to achieve oxidant standards

EXHIBIT 3-3

NSPS FOR COAL PREPARATION PLANTS

Emissions	NSPS For Facilities Where Construction Commences After 10/24/74 (40CFR60) Subpart Y)
Particulates:	
Thermal Dryers	
Maximum Concentration	.070 g/dscm[a]
Opacity	20%
Monitoring	Continuously operate monitoring device
Pneumatic Coal Cleaning Equipment	
Maximum Concentration	.040 g/dscm
Opacity	10%
Coal Processing and Conveying Equipment, Coal Storage System, Coal Transfer and Loading System	
Opacity	20%

(a) Grams/dry cubic meter at standard conditions.

EXHIBIT 3-4

PREVENTION OF SIGNIFICANT DETERIORATION INCREMENTS(1)

Pollutant concentrations shall be limited to the following increases over the baseline concentration. For any period specified below, other than an annual period, the applicable maximum allowable increase may be exceeded during one such period per year at any receptor site.

	Maximum Allowable Increase (micrograms/cubic meter)
Class I:	
Particulate Matter:	
Annual geometric mean	5
24-hour	10
Sulfur Dioxide:	
Annual arithmetic mean	2
24-hour maximum	5
3-hour maximum	25
Class II:	
Particulate matter:	
Annual geometric mean	19
24-hour maximum	37
Sulfur Dioxide:	
Annual arithmetic mean	20
24-hour maximum	91
3-hour maximum	512
Class III:	
Particulate matter:	
Annual geometric mean	37
24-hour maximum	75
Sulfur Dioxide:	
Annual arithmetic mean	40
24-hour maximum	182
3-hour maximum	700

(1) Source: 40 CFR 51, 52.

Note: The Proposed Clark Oil Coal Conversion Project is in Class II area.

EXHIBIT 3-5

EXHIBIT 3-5

DE MINIMIS EMISSION RATES AND AIR IMPACT VALUES[1]

Pollutant	De Minimis Values: Emission Rate, tons/yr	De Minimis Values: Air Impact, ug/m3 (2)	
*Carbon Monoxide	100	575	8-Hour
*Nitrogen Oxides	40	14[3]	24-Hour
*Particulate Matter	25	10[4]	24-Hour
*Sulfur Dioxide	40	13	24-Hour
*Ozone (volatile organic compounds)	40	(5)	
*Lead	0.6	0.1	24-Hour
Mercury	0.1	0.25	24-Hour
Beryllium	0.0004	0.0005	24-Hour
Asbestos	0.007	(6)	
Fluorides	3	0.25	24-Hour
Sulfuric Acid Mist	7	(6)	
Vinyl Chloride	1.0	15	24-Hour
Total Reduced Sulphur (including H_2S)	10	10	1-Hour
Reduced Sulfur Compounds (including H_2S)	10	10	1-Hour
Hydrogen Sulfide	10	0.04	1-Hour

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(1)Source: 45 FR 52676.

(2)For prevention of significant deterioration review only, to determine possible monitoring exemption.

(3)Nitrogen Dioxide.

(4)Total Suspended Particulates.

(5)No de minimis air quality level is provided for ozone. However, any net increase of 100 tons per year or more of volatile organic compounds subject to PSD would be required to perform an ambient analysis including the gathering of ambient air quality data.

(6)No satisfactory monitoring technique available at this time. 45 FR 52709.

*Pollutants for which National Ambient Air Quality Standards exist.

EXHIBIT 3-6

EXHIBIT 3-6

STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
2200 CHURCHILL ROAD
SPRINGFIELD, ILLINOIS 62706

This Agency is authorized to require this information under Illinois Revised Statutes, 1979, Chapter III 1/2, Section 1039. Disclosure of this information is required under that Section. Failure to do so may prevent this form from being processed and could result in your application being denied. This form has been approved by the Forms Management Center.

APPLICATION FOR A PERMIT (A) ☐ CONSTRUCT ☐ OPERATE NAME OF EQUIPMENT TO BE CONSTRUCTED OR OPERATED ______________ (B)	FOR AGENCY USE ONLY I. D. NO. ______ PERMIT NO. ______ DATE ______

1a. NAME OF OWNER:		2a. NAME OF OPERATOR:	
1b. STREET ADDRESS OF OWNER:		2b. STREET ADDRESS OF OPERATOR:	
1c. CITY OF OWNER:		2c. CITY OF OPERATOR:	
1d. STATE OF OWNER:	1e. ZIP CODE:	2d. STATE OF OPERATOR:	2e. ZIP CODE:

3a. NAME OF CORPORATE DIVISION OR PLANT:		3b. STREET ADDRESS OF EMISSION SOURCE:		
3c. CITY OF EMISSION SOURCE:	3d. LOCATED WITHIN CITY LIMITS: ☐ YES ☐ NO	3e. TOWNSHIP:	3f. COUNTY:	3g. ZIP CODE:

4. ALL CORRESPONDENCE TO: (TITLE AND/OR NAME OF INDIVIDUAL)	5. TELEPHONE NUMBER FOR AGENCY TO CALL:
6. ADDRESS FOR CORRESPONDENCE: (CHECK ONLY ONE) ☐ OWNER: ☐ OPERATOR ☐ EMISSION SOURCE	7. YOUR DESIGNATION FOR THIS APPLICATION: (C) _ _ _ _ _ _ _ _ _ _

8. THE UNDERSIGNED HEREBY MAKES APPLICATION FOR A PERMIT AND CERTIFIES THAT THE STATEMENTS CONTAINED HEREIN ARE TRUE AND CORRECT, AND FURTHER CERTIFIES THAT ALL PREVIOUSLY SUBMITTED INFORMATION REFERENCED IN THIS APPLICATION REMAINS TRUE, CORRECT AND CURRENT. BY AFFIXING HIS SIGNATURE HERETO HE FURTHER CERTIFIES THAT HE IS AUTHORIZED TO EXECUTE THIS APPLICATION.

AUTHORIZED SIGNATURE(S): (D)

BY ______________ SIGNATURE ______ DATE	BY ______________ SIGNATURE ______ DATE
______________ TYPED OR PRINTED NAME OF SIGNER	______________ TYPED OR PRINTED NAME OF SIGNER
______________ TITLE OF SIGNER	______________ TITLE OF SIGNER

(A) THIS FORM IS TO PROVIDE THE AGENCY WITH GENERAL INFORMATION ABOUT THE EQUIPMENT TO BE CONSTRUCTED OR OPERATED. THIS FORM MAY ONLY BE USED TO REQUEST ONE TYPE OF PERMIT - CONSTRUCTION OR OPERATION - AND NOT BOTH.

(B) ENTER THE GENERIC NAME OF THE EQUIPMENT TO BE CONSTRUCTED OR OPERATED. THIS NAME WILL APPEAR ON THE PERMIT WHICH MAY BE ISSUED PURSUANT TO THIS APPLICATION. THIS FORM MUST BE ACCOMPANIED BY OTHER APPLICABLE FORMS AND INFORMATION.

(C) PROVIDE A DESIGNATION IN ITEM 7 ABOVE WHICH YOU WOULD LIKE THE AGENCY TO USE FOR IDENTIFICATION OF YOUR EQUIPMENT. YOUR DESIGNATION WILL BE REFERENCED IN CORRESPONDENCE FROM THIS AGENCY RELATIVE TO THIS APPLICATION. YOUR DESIGNATION MUST NOT EXCEED TEN (10) CHARACTERS.

(D) THIS APPLICATION MUST BE SIGNED IN ACCORDANCE WITH PCB REGS., CHAPTER 2, PART 1, RULE 103(a)(4) OR 103(b)(5) WHICH STATES: "ALL APPLICATIONS AND SUPPLEMENTS THERETO SHALL BE SIGNED BY THE OWNER AND OPERATOR OF THE EMISSION SOURCE OR AIR POLLUTION CONTROL EQUIPMENT, OR THEIR AUTHORIZED AGENT, AND SHALL BE ACCOMPANIED BY EVIDENCE OF AUTHORITY TO SIGN THE APPLICATION."

IF THE OWNER OR OPERATOR IS A CORPORATION, SUCH CORPORATION MUST HAVE ON FILE WITH THE AGENCY A CERTIFIED COPY OF A RESOLUTION OF THE CORPORATION'S BOARD OF DIRECTORS AUTHORIZING THE PERSONS SIGNING THIS APPLICATION TO CAUSE OR ALLOW THE CONSTRUCTION OR OPERATION OF THE EQUIPMENT TO BE COVERED BY THE PERMIT.

9. DOES THIS APPLICATION CONTAIN A PLOT PLAN/MAP:
☐ YES ☐ NO
IF A PLOT PLAN/MAP HAS PREVIOUSLY BEEN SUBMITTED, SPECIFY:
AGENCY I.D. NUMBER __________ APPLICATION NUMBER __________
IS THE APPROXIMATE SIZE OF APPLICANT'S PREMISES LESS THAN 1 ACRE?
☐ YES ☐ NO: SPECIFY__________ACRES

10. DOES THIS APPLICATION CONTAIN A PROCESS FLOW DIAGRAM(S) THAT ACCURATELY AND CLEARLY REPRESENTS CURRENT PRACTICE.
☐ YES ☐ NO

11a. WAS ANY EQUIPMENT, COVERED BY THIS APPLICATION, OWNED OR CONTRACTED FOR, BY THE APPLICANT PRIOR TO APRIL 14, 1972:
☐ YES ☐ NO
IF "YES", ATTACH AN ADDITIONAL SHEET, EXHIBIT A, THAT:
(a) LISTS OR DESCRIBES THE EQUIPMENT
(b) STATES WHETHER THE EQUIPMENT WAS IN COMPLIANCE WITH THE RULES AND REGULATIONS GOVERNING THE CONTROL OF AIR POLLUTION PRIOR TO APRIL 14, 1972.

11b. HAS ANY EQUIPMENT, COVERED BY THIS APPLICATION, NOT PREVIOUSLY RECEIVED AN OPERATING PERMIT:
☐ YES ☐ NO
IF "YES", ATTACH AN ADDITIONAL SHEET, EXHIBIT B, THAT:
(a) LISTS OR DESCRIBES THE EQUIPMENT
(b) STATES WHETHER THE EQUIPMENT
(i) IS ORIGINAL OR ADDITIONAL EQUIPMENT
(ii) REPLACES EXISTING EQUIPMENT, OR
(iii) MODIFIES EXISTING EQUIPMENT
(c) PROVIDES THE ANTICIPATED OR ACTUAL DATES OF THE COMMENCEMENT OF CONSTRUCTION AND THE START-UP OF THE EQUIPMENT

12. IF THIS APPLICATION INCORPORATES BY REFERENCE A PREVIOUSLY GRANTED PERMIT(S), HAS FORM APC-210, "DATA AND INFORMATION--INCORPORATION BY REFERENCE" BEEN COMPLETED.
☐ YES ☐ NO

APPLICATION FOR OPERATING PERMIT ONLY

13. DOES THE STARTUP OF AN EMISSION SOURCE COVERED BY THIS APPLICATION PRODUCE AIR CONTAMINANT EMISSION IN EXCESS OF APPLICABLE STANDARDS:
☐ YES ☐ NO
IF "YES," HAS FORM APC-203, "OPERATION DURING STARTUP" BEEN COMPLETED FOR THIS SOURCE:
☐ YES ☐ NO

14. DOES THIS APPLICATION REQUEST PERMISSION TO OPERATE AN EMISSION SOURCE DURING MALFUNCTIONS OR BREAKDOWNS:
☐ YES ☐ NO
IF "YES," HAS FORM APC-204, "OPERATION DURING MALFUNCTION AND BREAKDOWN" BEEN COMPLETED FOR THIS SOURCE:
☐ YES ☐ NO

15. IS AN EMISSION SOURCE COVERED BY THIS APPLICATION SUBJECT TO A FUTURE COMPLIANCE DATE:
☐ YES ☐ NO
IF "YES," HAS FORM APC-202, "COMPLIANCE PROGRAM & PROJECT COMPLETION SCHEDULE," BEEN COMPLETED FOR THIS SOURCE:
☐ YES ☐ NO

16. DOES THE FACILITY COVERED BY THIS APPLICATION REQUIRE AN EPISODE ACTION PLAN (REFER TO GUIDELINES FOR EPISODE ACTION PLANS):
☐ YES ☐ NO

17. WAS THIS OPERATION THE SUBJECT OF A VARIANCE PETITION FILED WITH THE ILLINOIS POLLUTION CONTROL BOARD ON OR BEFORE JUNE 13, 1972:
☐ YES ☐ NO
IF "YES," CITE: PCB NUMBER(S) __________, DATE OF BOARD ORDER __________

WAS CONSTRUCTION OR MODIFICATION OF EQUIPMENT, SUFFICIENT TO ACHIEVE COMPLIANCE WITH THE "RULES AND REGULATIONS GOVERNING THE CONTROL OF AIR POLLUTION" EFFECTIVE PRIOR TO APRIL 14, 1972, COMMENCED PRIOR TO APRIL 14, 1972:
☐ YES ☐ NO
IF "YES," EXPLAIN IN DETAIL, AND IDENTIFY EXPLANATION AS EXHIBIT D.

18. LIST AND IDENTIFY ALL FORMS, EXHIBITS, AND OTHER INFORMATION SUBMITTED AS PART OF THIS APPLICATION. INCLUDE THE PAGE NUMBERS ON EACH ITEM (ATTACH ADDITIONAL SHEETS IF NECESSARY):

TOTAL NUMBER OF PAGES __________

STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
2200 CHURCHILL ROAD
SPRINGFIELD, ILLINOIS 62706

GENERAL INSTRUCTIONS FOR PERMIT APPLICATIONS

Before you attempt to complete a permit application please read the following instructions thoroughly. It is the experience of the Agency that much time can be saved if the applicant has a basic understanding of the requirements for permit applications. If a permit is required, a process flow diagram, a plot plan/map, and the forms provided by the Agency will usually suffice to present the necessary application information in a clear and concise manner. Each of the forms is designed to allow you to present a particular type of information and is constructed to avoid a proliferation of "special forms". The forms adapt to virtually every type of operation and equipment, although in some instances, additional information will be requested.

Review paragraph (i) of Rule 103, Exemptions From Permit Requirements, attached at the end of these instructions. Proceed only if a permit is required for your equipment, process, or operation.

EXCERPTS FROM THE REGULATIONS

RULE 101: DEFINITIONS

Air Pollution Control Equipment: Any equipment or facility of a type intended to eliminate, prevent, reduce or control the emission of specified air contaminants to the atmosphere.

Emission Source: Any equipment or facility of a type capable of emitting specified air contaminants to the atmosphere.

RULE 103(a) CONSTRUCTION PERMITS

(1) Prohibition. No person shall cause or allow the construction of any new emission source or any new air pollution control equipment, or cause or allow the modification of any existing emission source or air pollution control equipment, without first obtaining a construction permit from the Agency, except as provided in paragraph (i) of this Rule 103.

RULE 103(b) OPERATING PERMITS

(1) New Emission Sources and New Air Pollution Control Equipment

Prohibition. No person shall cause or allow the operation of any new emission source or new air pollution control equipment of a type for which a construction permit is required...without first obtaining an operating permit from the Agency....

(2) Existing Emission Sources

Prohibition. No person shall cause or allow the operation of any existing emission source or any existing air pollution control equipment without first obtaining an operating permit from the Agency....

GENERAL INFORMATION

(1) Each permit application must provide sufficient information to allow the Agency to conduct an independent engineering analysis to determine if the equipment covered by the permit application complies with Pollution Control Board Regulations, Chapter 2: Air Pollution, and the Environmental Protection Act.

(2) All data and information should be typed or legibly printed in ink.

Except for original signature pages, all forms and attached material may be photocopied to make the required number of copies.

An operating permit application must be submitted in duplicate.

A construction permit application for construction in Cook County must be submitted in triplicate.

A construction permit application for all other locations must be submitted in duplicate.

All pages in the application should be numbered sequentially and the total number of pages identified. (Example: Page 1 of 10, 2 of 10, ... Page 10 of 10).

It is recommended that the applicant retain a record copy of all applications and correspondence sent to the Agency.

PROCESS FLOW DIAGRAM

(3) A process flow diagram must accompany every permit application and must depict all emission sources and all air pollution control equipment covered by the application. Each item of equipment shall be labeled by name and a unique identifier. The range of flow rates and range of compositions shall be set forth for:

(1) all process equipment
(2) all air pollution control equipment
(3) all emission sources
(4) all stacks and vents

All stream flows shall be identified by lines and arrows denoting the direction and destination of the flow.

A sketch drawing, not to scale, or a block diagram, prepared in a reasonably neat manner, is usually sufficient for the diagram. Show each emission source and each item of air pollution control equipment and any other items of equipment which can affect the emission of air contaminants. Draw arrows showing the direction of product and gas flow, and give the rates and composition for average and maximum flows. Identify each item of equipment and each stack or vent by name or by using symbols, including a key to their meaning. If you have more than one source of emissions, it may be easier to show each source and any related air pollution control equipment on a separate diagram. In this case please identify each of your diagrams, and, if they are interconnected, show where and how they relate to each other.

PLOT PLAN/MAP

(4) An applicant must submit a plot plan/map to reasonably describe the location of the emission source or air pollution control equipment and the location of all stacks or vents. The plot plan/map must also show the distances from the operation to the nearest boundary of the property on which the operation is located, and to the nearest residences, lodgings, nursing homes, hospitals, schools, and commercial and manufacturing establishments.

You can use a format similar to that of the process flow diagram for the plot plan/map. Alternatively you can insert the required information on existing maps or plans of a reasonable scale.

FORMS

(5) A general application form must accompany every application, e.g. APC-200 -- "APPLICATION FOR A PERMIT TO CONSTRUCT/OPERATE" or APC-205 -- "APPLICATION FOR RENEWAL OF AN OPERATING PERMIT".

(6) Information, as requested by the forms, is required for each emission source and each item of air pollution control equipment, and for each item of process equipment that discharges to air pollution control equipment, or is capable of effecting emissions.

Select the forms you need for your particular equipment from the list of available forms on APC-209 -- "REQUEST FOR PERMIT FORMS". There may be insufficient space on a form for you to fully complete certain items. You should then attach a sheet to the form with the required information, indicating the item to which it refers.

(7) Where the applicant can not meet data requirements for describing performance specification of existing equipment, alternate information, such as stack tests, or engineering analysis of the equipment or similar equipment, sufficient to determine the actual levels of emissions may be submitted in lieu of the full detailed portion of the application forms. Acceptance of the alternate information, rather than the information requested by the application form, rests solely with the Agency.

(8) PCB Regs., Chapter 2, Part 1, Rule 103(b)(6)(C) allows the Agency to waive stack test requirements. A waiver may be granted if the applicant submits one of the following: (1) material balances, (2) performance data on similar equipment, or (3) calculations based upon emission factors or upon other methods generally accepted by persons in the field of air pollution control. Waiver under the above rule rests solely with the Agency. If a permit application is accepted as complete, this constitutes a waiver of Rule 103(b)(6)(C).

(9) Only one form is required for "identical" emission sources or "identical" items of air pollution control equipment. The acceptance of an application identifying emission sources or air pollution control equipment of different physical sizes, shapes, or performance specification as "identical" rests solely with the Agency. In any case, all source equipment and air pollution control devices must be shown and identified on the flow diagram(s).

Complete the form for identical equipment as if for one item of equipment. Where appropriate indicate all equipment to which the form applies. It is assumed that each identical item of equipment operates as described in the single form, unless otherwise explained, e.g. 2 regular units and standby unit, standby unit operated only when a regular unit is overhauled.

(10) If an applicant has previously received a permit, there may be certain items in his current application that he wants to include by reference. Data and information with the Division of Air Pollution Control may be incorporated by reference into a permit application and need not be resubmitted. When an applicant incorporates information by reference, he must state whether such information remains true, correct, current and complete. A proper method of referencing is form APC-210 -- "INCORPORATION BY REFERENCE".

Addenda forms should be included, in addition to other appropriate information forms, if they are applicable to your equipment, control equipment or operation, in particular:

(11) In an application to construct or operate storage tanks for organic material, petrochemical products, or other liquid material, the applicant must complete APC-232 -- "PROCESS EMISSION SOURCE ADDENDUM: TANK", for each tank.

(12) In an application to construct or operate a petrochemical or other chemical process, the applicant must complete APC-231 -- "PROCESS EMISSION SOURCE ADDENDUM: REACTOR, DRUM TOWER, HEAT EXCHANGER", for each process unit.

(13) In an application for a permit to construct or operate an incinerator, or to construct or operate control equipment generating solid waste, the applicant must complete APC-103 entitled "DISPOSITION OF WASTE MATERIALS".

(14) In an application for a permit to construct or operate control equipment generating liquid waste, the applicant must complete APC-104 entitled "ADDENDUM W--WASTEWATER TREATMENT FORM WET COLLECTORS".

ADDITIONAL REQUIREMENTS FOR CERTAIN APPLICATIONS

(15) For all chemical processes, petroleum and petrochemical manufacturing operations and other operations for which the Agency deems it necessary, the process flow diagram must be accompanied by a process and instrumentation diagram, or equivalent diagram, depicting those valves venting to the atmosphere, to flares and/or to air pollution control equipment. This process and instrumentation diagram shall include labels to correlate it with the flow diagram. This requirement may be waived by the Agency only if the Agency deems that the applicant has submitted other information equivalent to that provided by a process and instrumentation diagram.

(16) The State of Illinois has specific noise emission limits which apply to all equipment, including air pollution control devices, which generates noise. The applicant should contact the Manager of the Field Operations Section, Division of Noise Pollution Control, 2200 Churchill Road, Springfield, Illinois, 62706, if he has any questions concerning these regulations or noise pollution complaints lodged against his facility.

These instructions, and the instructions on each form will allow you to complete the majority or permit applications. Contact an office of the Environmental Protection Agency, Division of Air Pollution Control if you have any questions.

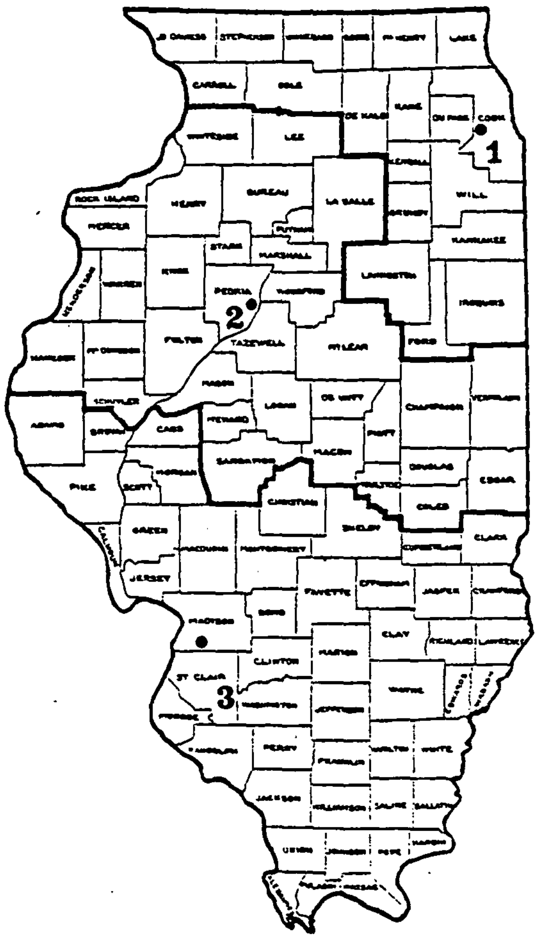
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
PERMIT SECTION
2200 CHURCHILL ROAD
SPRINGFIELD, ILLINOIS 62706
(217) 782-2113

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
FIELD OPERATION SECTION

REGION 1
INTERCONTINENTAL CENTER
SUITE 1205 - 1701 1ST AVENUE
MAYWOOD, ILLINOIS 60153
(312) 345-9780

REGION 2
5415 NORTH UNIVERSITY
PEORIA, ILLINOIS 61614
(309) 691-2200

REGION 3
115A WEST MAIN
COLLINSVILLE, ILLINOIS 62234
(618) 345-0700



STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
2200 CHURCHILL ROAD
SPRINGFIELD, ILLINOIS 62706

RULE 103(i) Exemptions. No permit is required for the following classes of equipment:

(1) air contaminant detectors or recorders, combustion controllers, or combustion shutoffs;

(2) air conditioning or ventilating equipment not designed to remove air contaminants generated by or released from associated equipment;

(3) fuel burning emission sources for indirect heating systems and for heating and reheating furnace systems used exclusively for residential or commercial establishments using gas and/or fuel oil exclusively with a total capacity of less than 50 million BTU per hour input;

(4) fuel burning emission sources other than those listed in (3) above for indirect heating systems with a total capacity of less than one million BTU per hour input;

(5) mobile internal combustion and jet engines, marine installations, and locomotives;

(6) laboratory equipment used exclusively for chemical or physical analysis;

(7) painting operations using not in excess of 5,000 gallons of paint (including thinner) per year;

(8) any emission source acquired exclusively for domestic use, except that a permit shall be required for any incinerator and for any fuel burning emission source using solid fuel with a total capacity of 50 million BTU per hour input or more;

(9) stationary internal combustion engines of less than 1500 horsepower;

(10) stacks or vents used to prevent the escape of sewer gases through plumbing traps;

(11) safety devices designed to protect life and limb, provided that safety devices associated with an emission source shall be included within the permit for such emission source;

(12) storage tanks for liquids used for retail dispensing;

(13) all printing operations using less than 750 gallons of organic solvents per year;

(14) storage tanks of organic liquids with a capacity of less than 5,000 gallons;

(15) flanged and threaded pipe connections, vessel manways and process valves capable of discharging specified air contaminants to the atmosphere;

(16) sampling connections used exclusively to withdraw materials for laboratory testing and analyses;

(17) all storage tanks of Illinois crude oil with capacity of less than 40,000 gallons located on oil field sites;

(18) all organic material - water single or multiple compartment effluent water separator facilities for Illinois crude oil of vapor pressure of less than 5 pounds per square inch absolute (psia).

(19) Grain-handling operations, exclusive of grain-drying operations, with an annual grain through-put not exceeding 300,000 bushels.

(20) Grain-drying operations with a total grain-drying capacity not exceeding 750 bushels per hour for 5% moisture extraction at manufacturer's rated capacity, using the American Society of Agricultural Engineers Standard 248.2, Section 9, Basis for Stating Drying Capacity of Batch and Continuous-Flow Grain Dryers.

(21) Portable grain-handling equipment and one-turn storage space.

PART II: PROJECT AFFECTING NONATTAINMENT AREAS

Complete this part for only those contaminants which the project emits and for which the source is located in a nonattainment area.

Section A: Applicability

		TSP	SO_2	NO_x	HC	CO
1. What are the estimated allowable emissions for this project (T/Yr)		___	___	___	___	___

Provide details of emissions calculations in an attachment entitled "Summary of Project Emissions." (If modification of existing equipment provides calculations showing increase in emissions.)

		TSP	SO_2	NO_x	HC	CO
2. Is the project a new source for which the emissions are major?	Yes:	___	___	___	___	___
	No:	___	___	___	___	___

If "yes," proceed to complete Section B.

		TSP	SO_2	NO_x	HC	CO
3a. Must previous projects be considered together with the current project (aggregation)? •Attach listing of projects with emissions and date of construction.	Yes:	___	___	___	___	___
	No:	___	___	___	___	___
3b. Are credits claimed for contemporaneous emission reductions (net increase)? •Attach listing of reductions, substantiate emissions, and show creditability.	Yes:	___	___	___	___	___
	No:	___	___	___	___	___
3c. Has any equipment undergone reconstruction? •Attach discussion of reconstruction.	Yes:	___	___	___	___	___
	No:	___	___	___	___	___
3d. Does any other provision(s) affect applicability, e.g., exemptions from modification, source definition, fugitive emission exemption, installation definition, etc.? •Attach discussion of provision(s).	Yes:	___	___	___	___	___
	No:	___	___	___	___	___

If "yes" to any of above, submit required items and any other relevant facts in an attachment entitled "Applicability of Nonattainment Area Requirements."

	TSP	SO_2	NO_x	HC	CO
4. What are the accountable actual emissions for this project (T/Yr) based upon discussions in Item 3?	___	___	___	___	___

		TSP	SO_2	NO_x	HC	CO
5. Is the project along with other activities a significant increase in emissions for contaminants for which the existing source is a major (or is the project itself major)?	Yes:	___	___	___	___	___
	No:	___	___	___	___	___

If "yes," complete Section B, otherwise proceed to Part III.

Section B: Requirements

1. Have requirements of Lowest Achievable Emission Rate (LAER) been met? ____Yes ____No

   Include supporting material in an attachment entitled "LAER Demonstration."

2. Has reasonable further progress been satisfied:

   (i) Equal or greater emission offset and net air quality improvement ____Yes ____No
   (ii) Absolute air quality improvement ____Yes ____No
   (iii) Emission offsets at 1.25 to 1 ratio ____Yes ____No

   Provide an attachment, which describes emission offsets (name, location, emission rates, basis for emissions, stack data, permit numbers, etc.) and demonstrates any required air quality improvement, entitled "Fulfillment of Reasonable Further Progress."

3. Are all major sources which are owned and operated in the State of Illinois in compliance with all applicable Illinois Air Pollution Control Regulations? ____Yes ____No

   Attach an "Existing Source Compliance Statement," which includes a list of the subject sources in Illinois.

4. Has an analysis of alternatives to the project been conducted; (HC and CO only)? ____Yes ____No

   Include an "Analysis of Alternatives."

PART III: PROJECT AFFECTING ATTAINMENT AREAS

Complete this part for all other contaminants.

Section A: Applicability

	TSP	SO_2	NO_x	HC	CO	Other
1. What are the estimated allowable emissions for this project (T/Yr)?	___	___	___	___	___	___

Provide details of calculations in an attachment entitled "Summary of Project Emissions." (If modification of existing equipment, provide calculations showing increase in emissions.)

2. Is the project a new source which is major for TSP, SO_2, NO_x, HC or CO? ____Yes ____No

If "yes," proceed to complete Section B for that contaminant and any significant contaminant emissions.

		TSP	SO_2	NO_x	HC	CO	Other
3a. Must previous projects be considered together with the current project (aggregation)? •Attach listing of projects, with emissions and date of construction.	Yes:	___	___	___	___	___	___
	No:	___	___	___	___	___	___
3b. Are credits claimed for contemporaneous emissions reductions (net increase)? •Attach listing of reductions, substantiate emissions, and show creditability.	Yes:	___	___	___	___	___	___
	No:	___	___	___	___	___	___
3c. Does any other provision(s) affect applicability, e.g., exemptions from modification, source definition, fugitive emission exemptions, etc.? •Attach discussion of provision(s).	Yes:	___	___	___	___	___	___
	No:	___	___	___	___	___	___

If "yes" to any of the above, submit required items and any other relevant facts in an attachment titled "Applicability of Attainment Area Requirement."

	TSP	SO_2	NO_x	HC	CO	Other
4. What are the actual accountable emissions (T/Yr) based upon the discussion in Item 3?	___	___	___	___	___	___

	TSP	SO_2	NO_x	HC	CO	Other
5. Is the project along with other activities a significant increase in emissions at an existing major source, or is the project itself major? Yes:	___	___	___	___	___	___
No:	___	___	___	___	___	___

If "yes," complete Section B for that contaminant, otherwise proceed to PART IV.

Section B: Requirements

1. Does the emissions control technology represent BACT (Best Available Control Technology)? ____Yes ____No

   Include supporting material in an attachment entitled "BACT Demonstration."

2. Does the application include an air quality analysis showing compliance with:
   a. Air quality standards? ____Yes ____No
   b. Air quality increments (TSP and SO_2 only)? ____Yes ____No

   Enter title of air quality analysis: "____."

3. Does the air quality analysis show significant air quality impacts? ____Yes ____No

   If "yes," does the air quality analysis rely on on-site ambient air monitoring? ____Yes ____No

   OR

   Have you obtained representative ambient air monitoring data? ____Yes ____No

   Enter title of ambient air data study: "____."

4. Does the application include an analysis of the impact of this project on:
   a. Visibility? ____Yes ____No
   b. Soils? ____Yes ____No
   c. Secondary impacts on vegetation impairment? ____Yes ____No
   d. Other? ____Yes ____No

   Enter title of analyses: "____."

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL

CONSTRUCTION OR MODIFICATION OF A MAJOR SOURCE

Introduction: This form is an addendum to Form APC-200 (Application For A Permit). This form is to be submitted along with other pertinent application forms if a project may be subject to Rules On Construction And Modification Of Major Sources. This form does not go through a rigorous series of questions leading to a determination as to the applicability of these rules. It only lists elements of applicability and general requirements of the rules so as to assure that they are clearly addressed in a permit application. For detailed information on the provisions of the rules, refer to the rules themselves. For further information, please contact the Agency.

PART I: GENERAL INFORMATION

	TSP	SO_2	NO_x	HC*	CO
1. Emissions affected by this project (check):	___	___	___	___	___
2. Air quality of proposed location (check):					
a. Nonattainment:	___	___	___	___	___
b. Attainment or unclassified:	___	___	___	___	___

3. Other contaminants emitted by project: ______________________

4. Project category or description of project: ______________________

____

5. Is this application for construction of a new major source? ____ Yes ____ No

   If "yes" go to Part II and Part III.

6. Is this application for changes to an existing major source? ____ Yes ____ No

   If "yes" reference permits of any emission units being altered:
   Permit No. ____________ ____________ ____________

7. Existing source potential emissions before changes (check category or enter emissions estimate**):

	TSP	SO_2	NO_x	HC	CO	Other
Less than 100 T/Yr	___	___	___	___	___	___
Between 100 & 250 T/Yr	___	___	___	___	___	___
250 T/Yr or greater	___	___	___	___	___	___

8. Source category or description of existing source: ______________________

____

* HC is an abbreviation for organic material.

** If emissions estimate is not reflected by current permits on file with the Agency, include supporting material for this estimate in the application.

APC 352 2/81

PART IV: PUBLIC PARTICIPATION

Complete this Part, if project is subject to requirements of Part II or Part III.

1. Does the application for this project contain confidential data? ____Yes ____No

   If "yes," have 3 edited copies of the application been submitted for public review? ____Yes ____No

2. Have sufficient copies of the application been submitted for Agency use (6 non-confidential or 3 confidential)? ____Yes ____No

3. Does the application include a project summary? ____Yes ____No

PART V: COORDINATED PERMIT REVIEW

1. Is a permit(s) required for this project with respect to:

Water Pollution Control	____Yes	____No	____Don't Know
Public Water Supply	____Yes	____No	____Don't Know
Waste Handling and Disposal	____Yes	____No	____Don't Know

2. If "yes" to the above, is the project subject to "Procedures For Coordinated Permit Review?" ____Yes ____No

   If "yes," include an attachment addressing compliance with these rules, entitled "Compliance With Coordinated Permit Review Procedure."

HMN:sh/sp/1544B/1-6

EXHIBIT 3-7

STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
2200 CHURCHILL ROAD
SPRINGFIELD, ILLINOIS 62706

REQUEST FOR PERMIT FORMS	SEND FORMS TO:
RETURN REQUEST FOR PERMIT FORMS TO THE ABOVE ADDRESS	YOUR MAILING ADDRESS (ATTACH MAILING LABEL OR TYPE EXACT ADDRESS)

GENERAL APPLICATION FORMS		NO. OF COPIES REQUIRED
APPLICATION FOR A PERMIT CONSTRUCT OPERATE	APC-200	______
APPLICATION FOR RENEWAL OF AN OPERATING PERMIT	APC-205	______
INFORMATION RELATIVE TO THE DEMOLITION OF A STRUCTURE CONTAINING ASBESTOS MATERIAL	APC-211	______
APPLICATION FOR ASBESTOS PERMIT	APC-212	______

INSTRUCTIONS AND INQUIRY		NO. OF COPIES REQUIRED
GENERAL INSTRUCTIONS FOR PERMIT APPLICATIONS	APC-201	______
PRELIMINARY INQUIRY FOR A PERMIT	APC-206	______
REQUEST FOR PERMIT FORMS	APC-209	______

EPISODE ACTION FORMS		NO. OF COPIES REQUESTED
GUIDELINES FOR THE COMPLETION OF AIR POLLUTION EPISODE ACTION PLANS	APC-162	______
GUIDELINES FOR THE COMPLETION OF AIR POLLUTION EPISODE ACTION PLANS FOR GRAIN HANDLING OPERATIONS	APC-239	______
AIR POLLUTION EPISODE ACTION PLAN	APC-100	______

REPORTING FORMS		NO. OF COPIES REQUIRED
ANNUAL EMISSION REPORT	APC-208	______
PROJECT COMPLETION REPORT	APC-271	______

INFORMATION FORMS		NO. OF COPIES REQUESTED
DATA AND INFORMATION INCORPORATION BY REFERENCE	APC-210	______
DATA AND INFORMATION PROCESS EMISSION SOURCE	APC-220	______
DATA AND INFORMATION FUEL COMBUSTION EMISSION SOURCE	APC-240	______
DATA AND INFORMATION INCINERATOR	APC-250	______
DATA AND INFORMATION AIR POLLUTION CONTROL EQUIPMENT	APC-260	______
GENERAL INFORMATION. GRAIN-HANDLING AND GRAIN-DRYING OPERATIONS	APC-229	______
DATA AND INFORMATION GRAIN-HANDLING AND GRAIN-DRYING OPERATIONS	APC-230	______
DATA AND INFORMATION CONCRETE, ASPHALT, OR AGGREGATE CRUSHING PLANT	APC-234	______
ADDENDUM L DISPOSITION OF WASTE MATERIALS	APC-103	______
ADDENDUM W WASTEWATER TREATMENT FROM WET COLLECTORS	APC-104	______
PROCESS EMISSION SOURCE ADDENDUM REACTOR, DRUM TOWER, HEAT EXCHANGER	APC-231	______
PROCESS EMISSION SOURCE ADDENDUM TANK	APC-232	______
COMPLIANCE PROGRAM AND PROJECT COMPLETION SCHEDULE	APC-202	______
OPERATION DURING STARTUP	APC-203	______
OPERATION DURING MALFUNCTION AND BREAKDOWN	APC-204	______

RULES AND REGULATIONS (AIR)	______
THE ENVIRONMENTAL PROTECTION ACT	______

PRELIMINARY INQUIRY FOR AN AIR POLLUTION PERMIT

STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
2200 CHURCHILL ROAD
SPRINGFIELD, ILLINOIS 62706

The Illinois Environmental Protection Agency is involved in a program to improve our environment. The Division of Air Pollution Control (a Division of the Environmental Protection Agency) administers a fact-finding and action program for cleaner air. This program requires permits for most new and existing sources capable of polluting the air.

This preliminary inquiry form has been prepared to help you establish communications with the Division relative to the permit program. If you provide the Division with the information requested below, then the Division can advise you of the forms and procedures required to obtain an air pollution permit.

The accuracy of the Division's response to this inquiry is dependent upon the clarity and completeness of the information you provide. Since no record of this correspondence will be retained by the Agency, your response must be self contained.

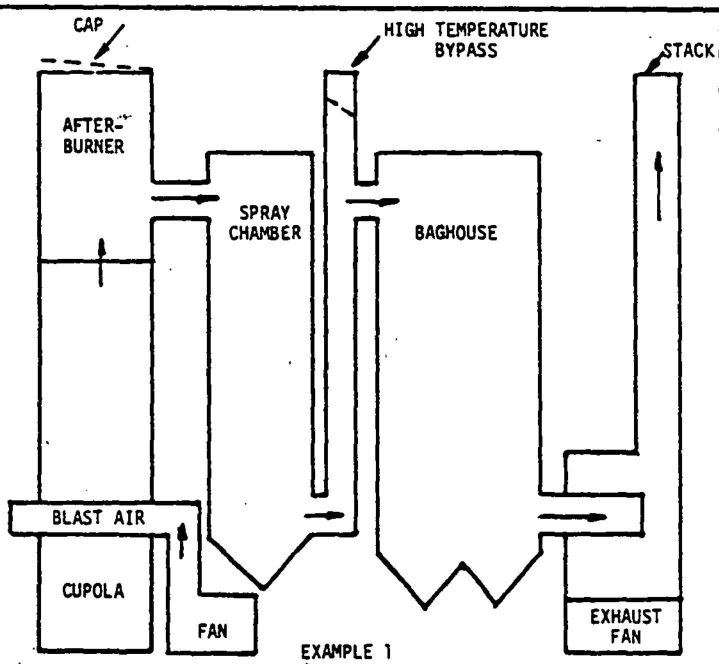
1. Please provide the name and mailing address to whom our response should be mailed.

2. Please provide a labeled diagram of your process or operation. In preparing such a diagram show each emission source and each item of air pollution control equipment and any other item of equipment which can affect the emission of air contaminants. Draw in arrows showing the direction of product and gas flow. Identify each item of equipment and each stack or vent by name or by using symbols with appropriate key to their meaning. You may have more than one source of air pollution. It may be easier to show each source and any related air pollution control system as a separate increment on a separate diagram. In any case, please identify each of your systems or increments. If they are interconnected, show where and how they relate to each other.

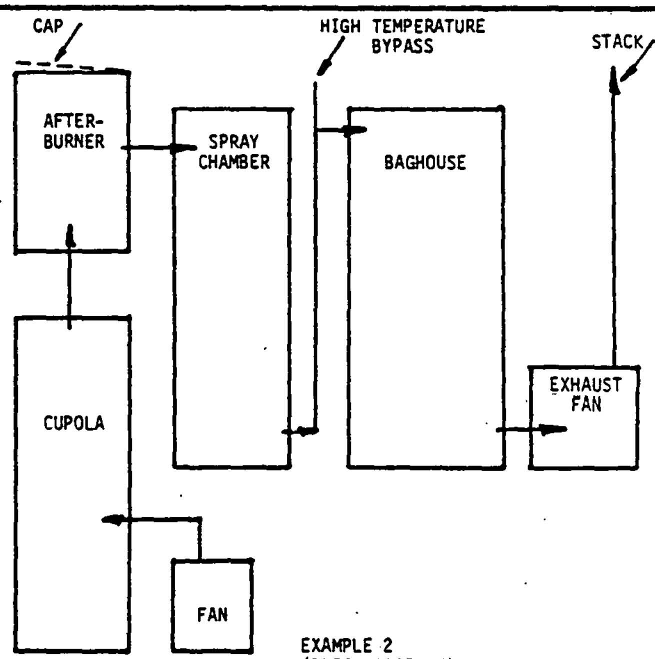
EXAMPLE

To further clarify the type of labeled diagram needed, we have included on this form examples of a labeled diagram of a process. Example #1 below is a pictorial diagram of an iron-melting operation which consists of a cupola and a method for removing most of the resulting air pollutants. In this example the air pollution control system consists of an afterburner, to burn the carbon monoxide, and a spray chamber and bag collector to control the solid particles emitted by the cupola. Example #2 is an alternate method of diagramming this same process.

Your response to this Preliminary Inquiry for an air pollution permit will not be considered an application for a permit. Our response is not intended to be, nor should it be construed as, a waiver or release of any rights of the Agency of any kind whatsoever, or any cause of action which has or may arise.



EXAMPLE 1
(PICTORIAL DIAGRAM)



EXAMPLE 2
(BLOCK DIAGRAM)

Send all correspondence to:

State of Illinois
Environmental Protection Agency
Division of Air Pollution Control
Permit Section
2200 Churchill Road
Springfield, Illinois 62706

EXHIBIT 3-8

EXHIBIT 3-8

Rules For Issuance Of Permits To New Or Modified Air Pollution Sources Affecting Nonattainment Areas

Table Of Contents

Illinois Environmental Protection Agency
Division of Air Pollution Control

Adopted: April 24, 1979
Revised Effective: January 16, 1980

1.0 Statutory Authority

These rules are promulgated pursuant to authority conferred on the Environmental Protection Agency (Agency) by Sections 4 and 39 of the Environmental Protection Act, Ill. Rev. Stat., Ch. 111 1/2, Sections 1004, 1039, and by Rule 103 of the Pollution Control Board Rules and Regulations, Chapter 2: Air Pollution.

2.0 Purpose

These rules establish the requirements for the issuance of permits to major stationary sources desiring to locate in nonattainment areas or at sites where such sources may significantly affect the air quality of nonattainment areas. These rules are designed to allow the construction of new emission sources and modification of existing emission sources while assuring progress towards achievement of ambient air quality standards.

The Agency will examine each proposed new or modified source subject to these rules to determine if such source will meet all applicable statutory requirements, Illinois Pollution Control Board Rules and Regulations, and the applicable provisions of these rules (See Section 5.0, 6.0 and 8.0). If the Agency determines that a proposed new or modified source cannot meet the applicable requirements and emission standards or the provisions of these rules, the permit will be denied.

These rules do not include the requirements for major sources affecting attainment areas, i.e. regulations for Prevention of Significant Deterioration of Air Quality (PSD). Persons planning a new or modified source which may be subject to these regulations should discuss them with the Agency. Public participation for permit applications, i.e. public notice, is not contained in these rules. The requirements and methods for public notice, as discussed in the State Implementation Plan and other Agency procedures apply generally to the construction of major new or modified sources.

3.0 Background

These rules are promulgated to fulfill the requirements of the federal Clean Air Act, as amended, (42 U.S.C. 7401 et seq.) Part D, Plan Requirements For Nonattainment Areas. Failure of the Agency to implement these rules would impose sanctions against industrial expansion in nonattainment areas and threaten sanctions against federal transportation and environmental funding. To avoid these sanctions these rules must be included in Illinois' State Implementation Plan (SIP).

These rules are based in part on regulations of the United States Environmental Protection Agency (USEPA), including the Emission Offset Interpretative Ruling (40 CFR Part 51 Appendix S.) The Agency reserves the right to modify these rules, following the Illinois Administrative Procedure Act, as the requirements of the Clean Air Act are interpreted through either the federal judicial process or rulemaking by the USEPA. These rules are included in the SIP as a commitment by the Agency to maintain rules fulfilling the nonattainment area requirements of the Clean Air Act.

4.0 Definitions

The following definitions are applicable only for the purposes of these rules. Differences between these definitions and definitions used by the USEPA or those contained in the Pollution Control Board Rules and Regulations are discussed in Appendix 1.

All other terms used in these rules shall have the same definitions as those found in Pollution Control Board Rules and Regulations, Chapter 2: Air Pollution.

4.1 Nonattainment Area

A nonattainment area is, for a particular air contaminant, an area which is shown by monitored data or air quality modeling methods to exceed an applicable National Ambient Air Quality Standard. The extent of a nonattainment area is specifically described as a county, township, or other subcounty area. All such areas shall be designated by the Administrator of the United States Environmental Protection Agency (USEPA), in accordance with Section 107 of the Clean Air Act, as amended. These county and subcounty areas, as originally designated by the Administrator on March 3, 1978, subsequently revised on October 5, 1978, and as may be revised in the future are available from the Agency upon request (see Appendix 3).

4.2 Source

A source is any structure, building, facility, or installation (or combination thereof) which is located on one or more contiguous or adjacent properties and which is owned or operated by the same persons (or persons under common control). A source may be composed of one or more air contaminant emitting operations or items of equipment.

4.3 New Source

A new source is a source the construction of which is commenced on or after the effective date of these rules.

4.4 Modified Source

The modified source is that part of the equipment or operations at a source which has undergone modification since the effectiveness of this definition or the date the last construction permit was issued pursuant to section 5.1(a) or 6.1 of these rules, whichever is later.

4.5 Modification

A modification is 1) any addition or reconstruction of equipment or operations at a source, or

2) any physical change to, or any change in the running or functioning of a particular item of equipment or operation at a source which increases the actual or uncontrolled emission rate of any air contaminant (regardless of any emission reductions achieved elsewhere at the source).

The following activities are specifically not considered to be modifications, provided that they do not interfere with reasonable further progress toward attainment of air quality standards:

1) Routine maintenance, routine repair and routine replacement of components and of equipment;

2) Any change incorporated within the operating design of an item of equipment and described in its permit application, unless specifically limited by a condition to a permit;

3) Increase in hours of operation, unless specifically limited by a condition to a permit;

4) Use of an alternative fuel, if on December 21, 1976, the source was capable of accommodating such fuel;

5) Use of an alternative fuel or raw material by reason of an order in effect under Sections 2(a) and (b) of the Energy Supply and Environmental Coordination Act of 1974 (or by any superceding legislation), or by reason of a natural gas curtailment plan in effect pursuant to the Federal Power Act;

6) Use of alternative fuel by reason of an order or rule under Section 125 of the Clean Air Act, as amended;

7) Use of refuse derived fuel generated from municipal solid waste; and,

8) Any change, including the addition or replacement of equipment, which is primarily due to the application of a more stringent environmental regulation to an item of equipment or operation which was in compliance with previously applicable environmental regulation provided that there shall be no increase in overall process capacity.

Normal cyclical variations in emission rates, minor variations in emissions due to changes in fuel or raw material characteristics and change in ownership of a source shall not be considered modifications.

4.6 State Implementation Plan (SIP)

The State Implementation Plan (SIP) is the plan by which the State of Illinois provides for the implementation, maintenance, and enforcement of National Ambient Air Quality Standards.

4.7 Reconstruction

An item of equipment or operation undergoes reconstruction when the repair and replacement of components is not routine. In determining whether such activities are not routine, the following factors shall be considered:

1. fixed capital cost of the replacements in comparison to the fixed capital cost which would be required to construct a comparable entirely new item of equipment or operation;

2. estimated life of the equipment or operation after replacement compared to the life of an entirely new item of equipment or operation; and

3. the extent to which the components being replaced cause or contribute to the emissions from the equipment or operation.

It will be assumed that physical changes are not routine when the fixed capital cost of new components will exceed 50 percent of the fixed capital cost of a comparable entirely new item of equipment. This determination will be made on each item of equipment or on any group of equipment which may be reasonably controlled as a unit or represents a single interrelated production process. Fixed capital cost means the capital needed to provide all depreciable components.

If an item of equipment or an operation undergoes reconstruction, it will be considered new for the purposes of these rules, and treated as the addition of equipment or an operation to a source.

4.8 Reasonable Further Progress

Reasonable further progress means annual incremental reductions in the emissions of an applicable air contaminant sufficient to provide for attainment of the National Ambient Air Quality Standards as expeditiously as practicable. In the case of the National Primary Ambient Air Quality Standards attainment shall not be later than either December 31, 1982 or December 31, 1987, as required by Section 172(a)(1) and (2) of the Clean Air Act, as amended.

4.9 Major Source

A major source is a source which has or will have uncontrolled emissions of particulate matter, sulfur dioxide, nitrogen oxides, organic material, or carbon monoxide equal to or greater than 100 tons per year and allowable emissions of the air contaminant equal to or greater than 50 tons per year or 1000 pounds per day or 100 pounds per hour.

The 1000 pounds per day and 100 pounds per hour criteria apply only if a National Ambient Air Quality Standard exists for the air contaminant for 24 hours, and less than 24 hours respectively.

4.10 Uncontrolled Emissions

Uncontrolled emissions are the greatest pollutant emissions from a source, operating with normal procedures without air pollution control equipment. Annual uncontrolled emissions are determined from the maximum hourly capacity of the equipment or operations at a source and continuous functioning through a year's time, unless the equipment or the operations, or the hours of functioning are limited by enforceable permit conditions.

Enforceable permit conditions which limit hourly capacity, type or amount of material processed, fuel, manner of working, etc., or hours of functioning shall be used in determining the uncontrolled emissions from a source when an applicant requests that such conditions be placed upon a permit to reduce the uncontrolled emissions from a source.

Notwithstanding the above, where it is improper to characterize equipment or operations with an hourly emission rate, annual uncontrolled emissions shall be determined from the maximum annual rated capacity of the equipment or operations, unless limited by enforceable permit conditions.

Uncontrolled emissions are determined from stack test data on similar equipment or using standard air pollution control practices or reference materials, e.g. Compilation of Air Pollutant Emission Factors, United States Environmental Protection Agency, Research Triangle Park, A.P. 42. Use of nonstandard techniques to determine uncontrolled emissions must be approved by the Agency. Use of nonstandard techniques to determine uncontrolled emissions shall be acceptable upon a demonstration by the applicant of their scientific and engineering validity.

Air pollution control equipment is considered to be equipment which, aside from air pollution control laws and regulations, is not vital to the production of the normal product of the source or its normal operation.

4.11 Allowable Emissions

Allowable emissions are the pollutant emissions for which a source is issued a permit(s). Allowable emissions are determined from the most stringent of the following at the maximum hourly capacity of the equipment or operation:

1) the applicable New Source Performance Standard or National Emission Standard for Hazardous Air Pollutants,

2) the applicable Illinois Pollution Control Board emission standard, or

3) the emission rate specified by a permit condition,

and from the functioning of the equipment or operations, through the applicable time period, i.e. a year (8760 hours), a day (24 hours), or one hour. Allowable emissions shall also include a reasonable estimate of emissions in excess of applicable standards during startup, malfunction, or breakdown as appropriate.

Enforceable permit conditions which limit the hours of functioning shall be used in determining the allowable emissions from a source, when an applicant requests that permit conditions limiting the emission rate or the hours of operation be placed upon a permit to reduce the allowable emissions from a source.

Notwithstanding the above, where it is improper to characterize equipment or operations with an hourly emission rate, allowable emissions shall be calculated using the maximum rated capacity for the time period, and the most stringent of the above three items.

4.12 Significant Contributor

A significant contributor is a new source or modified source whose contribution to ambient air quality in a nonattainment area exceeds a concentration specified in Appendix 2 to these rules, as shown through dispersion modeling acceptable to the Agency.

(The contribution from a modified source is determined from the emissions from new (or reconstructed) equipment or operations and from the increase in emissions resulting from the individual modifications of existing equipment or operations.)

4.13 Acceptable dispersion modeling

Acceptable dispersion modeling is dispersion modeling which is demonstrated to be in accordance with generally accepted scientific principles; compatible with the size and nature of the project; and consistent with any available air quality or meteorological data for the area, previous modeling studies in the area and USEPA guidance, as published in Guidelines On Air Quality Models or other similar documents.

4.14 Lowest Achievable Emission Rate (LAER)

The lowest achievable emission rate (LAER) is the lowest rate of contaminant emissions achievable through the application of constant emission control technology, as determined by the applicant and approved by the Agency. LAER will reflect the more stringent of either:

1) The most stringent emission limitation which is contained in the implementation plan of any state for such class or category of source, unless the owner or operator demonstrates that such emission limitations are not achievable, or

2) The most stringent emission limitation which is achieved in practice or is achievable by such a class or category of source.

In no event will the application of LAER to an operation or item of equipment allow emissions to exceed the emission limitations of any applicable New Source Performance Standard established under Section 111 of the Clean Air Act.

5.0 Conditions for Issuance of Permits to New or Modified Sources of Particulate Matter (TSP), Sulfur Dioxide (SO_2), Nitrogen Oxides* (NO_x) or Carbon Monoxide (CO) Emissions.

*For simplicity in measurement and air quality modeling, all emissions of nitrogen oxides are expressed as equivalent nitrogen dioxide.

5.1 For new or modified sources which will be a major source of a particular air contaminant

(a) If the source will be located in a nonattainment area for the contaminant or may be a significant contributor located in an attainment or unclassified area, the applicant shall for the contaminant:

(1) Install constant emission control technology on the new or modified source so that the lowest achieveable emission rate (LAER) results;

(2) Provide either (i) equal or greater emission reductions (emission offset) for the allowable emissions from the new or modified source and demonstrate a net air quality improvement in the nonattainment area as a result of the operation of the new or modified source, or,

(ii) an absolute air quality improvement (i.e. constant or improved air quality at all modeled receptors) as a result of the operation of the new or modified source, or,

(iii) actual emission reductions (emissions offset) for the allowable emissions from the new or modified source, at a ratio of 1:1.25, (i.e. for every ton of new allowable emissions, there shall be at least 1.25 tons of actual emission offsets), in the immediate vicinity of the new or modified source, provided that substantial worsening of air quality does not occur; and

(3) Certify that all major sources of any air contaminant owned or operated by the applicant (or by any person controlling, controlled by, or under common control with the applicant) which are located in the State of Illinois are in compliance with all applicable Illinois Pollution Control Board Rules and Regulations, Chapter 2, except as provided by Section 11.0.

(b) If the source will be located in an attainment or unclassified area for the contaminant and will not be a significant contributor the requirements of "Procedures for Determining the Impact on Air Quality of Proposed New Emission Sources", originally filed with the Secretary of State, Index Division on December 30, 1977, as amended from time to time, shall apply for the contaminant.

5.2 For new or modified sources which will not be a major source of a particular contaminant, the applicant need not comply with these rules for the contaminant.

6.0 Conditions for Issuance of Permits to New or Modified Sources of Organic Material Emissions

6.1 If a new or modified source which will be a major source of organic material will be located in a nonattainment area for photochemical oxidants (ozone), the applicant shall, for organic material:

(a) Install constant emission control technology on the new or modified source so that the lowest achieveable emission rate (LAER) results;

(b) Obtain actual emission reductions (emission offsets) in accordance with Section 10. Such emission reductions must exceed the allowable emissions which will result from operation of the new or modified source; and

(c) Certify that all major sources of any air contaminant owned or operated by the applicant (or by any person controlling, controlled by, or under common control with the applicant) which are located in the State of Illinois are in compliance with all applicable Illinois Pollution Control Board Rules and Regulations, Chapter 2, except as provided by Section 11.0.

6.2 If a new or modified source will not be a major source of organic material or if a new or modified source of organic material will be located in an attainment or unclassified area for photochemical oxidants (ozone), the applicant need not comply with these rules for organic material.

7.0 Geographical Applicability And Effective Dates

The applicability of these rules to a particular new or modified source is dependent upon the proposed geographic location of the source, in either 1) a nonattainment area, 2) an unclassified area, or 3) an attainment area for a particular air contaminant.

These rules shall not be applicable to a new or modified source if the construction permit application for the source, upon which the permit is issued, is received prior to the effective date of these rules.

7.1 For organic material emission sources located in:

(a) Counties designated as nonattainment areas for photochemical oxidants (ozone), the effective date of these rules is April 24, 1979 or the date on which the designation of nonattainment counties for oxidants (ozone) made by USEPA is published in the Federal Register, whichever is later.

(b) Counties designated as attainment areas or unclassified areas for photochemical oxidants (ozone), these rules shall not apply.

(c) Counties designated as unclassified areas for photochemical oxidants (ozone), when an applicant requests that a source be made subject to these rules, these rules shall immediately become effective for that source. (An applicant might make this request if it is felt that ambient air monitoring required by the regulations for the Prevention of Significant Deterioration of Air Quality would lead to a redesignation of an area as nonattainment.)

7.2 For particulate matter (TSP), sulfur dioxide (SO_2), nitrogen oxides (NO_x), and carbon monoxide (CO), emission sources located in or significantly contributing to:

(a) Areas designated as nonattainment areas on March 3, 1978 or October 5, 1978 (see Appendix 3), the effective date of these rules is April 24, 1979.

(b) Areas designated as nonattainment areas after October 5, 1978, the effective date of these rules is the date a given area is identified as a nonattainment area by the Administrator.

(c) Areas designated as attainment areas or unclassified areas, if the source is not subject to Part (a) or (b), these rules shall not apply, subject to the provision of Part (e).

(d) Areas prescribed in Part (a) or (b), the effectiveness of these rules shall be restricted to a limited part of a given nonattainment area when it is demonstrated, by acceptable dispersion modeling conducted by the Agency or an applicant, that the magnitude and extent of violations of air quality standards do not merit the application of these rules throughout a given nonattainment area. The date when the effectiveness of these rules is restricted to a limited part of the nonattainment area is the date that such a study is completed by the Agency or the date such study by an applicant is approved by the Agency.

Applicants may conduct such studies on their own initiative, or the Agency may conduct such studies if performance of such studies is part of the Agency's work plan for further ambient air modeling for the pollutant involved for that area.

(e) Areas designated as unclassified or attainment, when an applicant requests that a source be made subject to these rules, these rules shall become effective for such source on the date the Agency finds that air quality standards in the area might be violated with the construction of such source. (An applicant might make this request if it is felt that ambient air monitoring required by the regulations for Prevention of Significant Deterioration of Air Quality would lead to a redesignation of an area as nonattainment.)

8.0 Special Conditions for Issuance of Permits to New or Modified Sources of Organic Material or Carbon Monoxide Emissions

A source of carbon monoxide emissions subject to the requirement of Section 5.1(a) or a source of organic material emissions subject to the requirements of Section 6.1 must fulfill the requirements for analysis of alternatives pursuant to Section 172(b)(11)(A) of the Clean Air Act as amended (42 U.S.C. 7401 et seq., as amended, August 7, 1977).

Section 172(b)(11)(A) of the Clean Air Act requires that such a permit application include " . . .an analysis of alternative sites, sizes, production processes, and environmental control techniques for such proposed source which demonstrates that benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or modification."

9.0 Procedures for Determination of Lowest Achievable Emissions Rate (LAER)

LAER and the technology associated with LAER, shall be based on information reasonably available at the time the construction permit application for the new or modified source is submitted to the Agency; or for a multi-phase project or a project whose construction is not commenced on schedule, on information reasonably available at the time detailed planning for the operation or equipment must begin. The time by which construction of a project must commence in order to be considered on schedule will be contained, either as a standard or special condition, in the construction permit. If construction is not commenced within this time period, e.g. 12 months in the standard permit condition, the LAER determination must be reevaluated.

A multi-phase project is one in which individual phases of continuous on-site construction are separated by prolonged periods during which construction does not take place. For multi-phase projects, separate construction permits shall be required for phased equipment construction for the purposes of determining LAER if the Agency determines that LAER technology may develop between phases. This Agency determination will be based upon the times projected for the phases, the types of controls and the status of technology development (for example, other projects underway which may demonstrate improved technology).

The Agency strongly encourages persons who are planning sources which may be subject to these rules to contact the Agency early in the preliminary planning to discuss LAER, among other matters, so as to expedite the permit application process. This is particularly important so that an applicant is fully aware of the information that the Agency considers reasonably available.

The Agency may require a demonstration in a permit application showing that the emission rate which will be achieved by the proposed source is LAER, as compared to the emission rate which may be achieved by other possible source technologies or control systems. The demonstration shall include a description of the manner in which the proposed LAER was selected, including a detailed listing of information resources. The Agency shall require such a demonstration unless this information is already available to the Agency for that class or category of source. The Agency suggests that in preparing such a demonstration an applicant review the following items:

1) the LAER Clearinghouse, as operated by the USEPA;
2) general technical works concerning air pollution emission equipment, operations and control technology;
3) the Agency files for plants in Illinois;
4) information from pollution control agencies regulating areas in Illinois or elsewhere where the equipment under consideration is in use;
5) current air pollution control literature;
6) information from persons currently operating the equipment under consideration;
7) information published by control equipment suppliers and other similar manufacturers; and
8) specific observations of the operation of equipment, similar to the equipment under consideration, in Illinois or elsewhere.

The Agency will consider information from the above resources in determining possible emission limitation which may constitute LAER, making determinations as to emission limitations being achievable or having been achieved in practice and reviewing LAER as determined by a permit applicant.

When determining whether a particular emission limitation is achievable or has been achieved in practice, the following issues shall be considered, to the extent allowed by the Clean Air Act and USEPA regulations: cost, energy requirements, health environmental impacts, adequacy of the demonstration of performance in practice, and similarities of the proposed technology to demonstrated technology achieving an emission limitation in terms of gas stream, scale, economics, etc. These considerations do not necessarily prevent a requirement that technology be transferred from one type of equipment or operation to another, or innovative technology be developed to attain a particular emission limitation.

When construction of equipment or an operation has legally begun prior to the applicability of a LAER requirement (and LAER becomes applicable due to a modification or incremental growth), or when equipment may be connected to an existing control system, the stage of construction and the feasibility of further reductions in emissions shall be considered in determining LAER. In such instances incremental improvement in overall efficiency of the existing control system may be equivalent to the achievement of LAER by a particular item of equipment or operation, based upon consideration of the relevant issues.

10.0 Procedure For Determination Of Emission Offsets

10.1 Baseline And Source Of Emission Offsets

Reductions in emissions from any source, including fugitive sources, e.g., stockpiles, unpaved roads, etc., are acceptable as emission offsets provided that they are not significantly less hazardous to human health than the emissions from the new or modified source.

The baseline for determining emission offsets for particulate matter (TSP), sulfur dioxide (SO_2), nitrogen oxides (NO_x) and carbon monoxide (CO) shall be the applicable emission standard or emission level contained in the Pollution Control Board Rules or Regulations, Chapter 2, in effect at the time the application is submitted, unless this is greater than the uncontrolled emission rate. In such cases, the baseline for emission offsets shall be the uncontrolled emission rate. If no emission limitation is contained in the Pollution Control Board Rules and Regulations, Chapter 2, the baseline for emission offsets for TSP, SO_2, NO_x and CO shall be the actual emission rate.

The baseline for emission offsets for organic material, for a particular operation or item of equipment, shall be the actual emissions rate or the allowable emission rate, whichever is lower.

An emission offset must be obtained from a source which is in operation prior to the operation of the new or modified source. If a source which is providing an emission offset is subject to permit requirements, the operating permit application for such source must be submitted to the Agency so that the permit may be withdrawn or a new operating permit may be issued for such "offsetting" source with the reduced emission rate as a condition of the permit. If a source providing an emission offset is not subject to permit requirements, the offset will be made a condition of the permit for the new or modified source. Such a permit must be issued by the Agency and accepted by the applicant and such an emission reduction must be achieved prior to the operation of the new or modified source.

10.2 Location of Emission Offsets

All offsets for emissions of particulate matter, sulfur dioxide, nitrogen oxides, or carbon monoxide must be obtained from sources which are significant contributors to or are located in the nonattainment area affected by the new or modified source.

Offsets for emissions of organic material must be greater than the allowable emissions from the new or modified source. Such offsets must generally be provided by sources located within 100 miles of the new or modified organic material source. If the offsets are to be provided from sources located more than 100 miles from the new or modified source, the applicant must demonstrate, using generally accepted engineering and scientific principles, that the effect of the proposed offsets on air quality is at least as great as if the source of the offsets were located within 100 miles of the new or modified source.

10.3 Banking and Transfer Of Emission Offsets

Reductions in emissions from the baseline which have occurred after December 21, 1976, but prior to the submission of a permit application for a new or modified source, may be saved or "banked" for later use. The use of such banked emission offsets shall be allowed by the Agency, either in full or in part, if use of the banked emission offset does not interfere with reasonable further progress.

Emission offsets which derive from the growth allowance in the SIP, pursuant to Section 13.1, may not be transferred. Other emission offsets, including banked offsets, may be transferred as a property right, e.g., given or sold to another party, by the party who made or is making the emission reduction. The details of such transactions are not subject to approval by the Agency. The use of transferred offsets is subject to approval by the Agency for fulfillment or the continued fulfillment of the requirements of these rules.

Following the promulgation of organic material emission standards for specific types of equipment or operations, actual reductions in organic material emissions below such emission standards may be banked.

10.4 Reduction of Available Emission Offset by a "Replacement Equipment Effectiveness" Rule

The allowable emission standard for sources of particulate matter may be reduced pursuant to a "replacement equipment effectiveness" rule (a rule restricting particulate emissions from sources in certain nonattainment areas to the emission levels resulting from the installation of control equipment with a particular effectiveness). Such a rule would lower the baseline for emission offsets. If such a rule is promulgated by the Illinois Pollution Control Board, the owners or operators of sources subject to the rule will have first claim upon any remaining growth allowance in the SIP as provided by Section 13.1 for use as emission offsets accompanying the operation of new or modified sources. This claim is not transferrable from one person to another, except where ownership of the source limited by such rule is transferred. In such case the new owner shall be entitled to exercise claim to an offset from the growth allowance to the same extent as the former owner.

Following the promulgation of a "replacement equipment effectiveness" rule, actual reductions in emissions (below the allowable emission level or standard) made by installation of additional or improved air pollution control equipment on equipment or operations subject to the rule, may be banked as emission offset.

11.0 Procedure For Certification of Compliance by Other Sources

Certification required by these rules must be made in writing and state that all major sources of particulate matter, sulfur dioxide, nitrogen oxides, organic material or carbon monoxide, owned or operated by the applicant, (or by any person controlling, controlled by, or under common control with the applicant), which are located in the state of Illinois are in compliance with all applicable Pollution Control Board Rules and Regulations Chapter 2. If other information available to the Agency contradicts a certification of compliance provided by the applicant, the Agency shall request appropriate information sufficient to verify such certification. Failure to supply such information will result in denial of the permit application for the new or modified source.

The Agency shall waive this requirement if the applicant is actively following an acceptable Board-ordered or court-ordered program. To be acceptable, a Board-ordered or court-ordered compliance program must provide that an otherwise noncomplying source will be in compliance with the applicable provisions of the Illinois Environmental Protection Act and the Pollution Control Board Rules and Regulations, Chapter 2.

12.0 Procedure For Demonstration Of Improvement In Air Quality

An applicant who is required to demonstrate an improvement in air quality in a nonattainment area where such improvement is due to the operation of a new or modified source shall make such a showing using dispersion modeling techniques acceptable to the Agency or other techniques using generally accepted engineering or scientific principles.

The improvement shall be shown using allowable emission rates from the new or modified source, and actual emissions or actual emissions reductions from existing equipment or operations. The demonstration shall not include "paper offsets", offsets from the allowable emissions where no actual reductions in emission occur. The applicant may use any means acceptable to the Agency and allowable under the Illinois Environmental Protection Act, Pollution Control Board Rules and Regulations, Chapter 2: Air Pollution, and the Clean Air Act (emission offsets, so far as they represent actual reductions in emissions or a portion of the growth allowance contained in the SIP; physical changes in existing sources; improvement of stack design to good engineering practice; etc.) as a basis for air quality improvement.

The air quality improvement demonstration shall be made for each applicable time period for which the air quality standards have been exceeded. A net air quality improvement demonstration need not show that air quality improves at every location in the nonattainment area, but only that, on the balance, air quality is improved and that at no location is air quality substantially worsened. An absolute air quality improvement demonstration shall show constant or improved air quality at every location which the new or modified source affects.

13.0 Alternatives to Emission Offsets

13.1 State Implementation Plan Growth Allowance

The Illinois State Implementation Plan (SIP) includes a limited allowance for growth. This growth allowance is essential to compensate for increases in emissions at sources not subject to the requirements of these rules.

A person planning a source subject to these rules may petition the Agency for use of some portion of this growth allowance as a required emission offset. A person making such a petition must show that possible emission offsets were investigated and no offsets were reasonably available at the time. The Agency shall grant the petition if (1) it does not interfere with reasonable further progress and (2) the permit applicant enters into an enforceable program to provide the required emission offset at some future time.

This enforceable program shall provide for the return of the growth allowance to the SIP, as emission offsets become available to the permittee, through the normal shut down of operations or other actions initiated by the permittee, or when the equipment or operation, for which the growth allowance was given, ceases operation.

13.2 Attainment Area Credit

A person may prepare an air quality study showing that emissions or some portion of the emissions from the new or modified source subject to these rules does not affect the nonattainment area, or, in other words, that a certain fraction of the emissions solely impacts attainment areas. If such an air quality study is submitted, using acceptable dispersion modeling approved by the Agency, the Agency will waive the emission offset requirement for such fraction of emissions, provided that such emissions are subject to permit conditions, which are essentially equivalent in effect to the USEPA regulations for the Prevention of Significant Deterioration of Air Quality (40 CFR 51.24), notwithstanding any applicability criteria contained in those regulations.

13.3 Nonattainment In Rural Areas Attributable to Rural Fugitive Emissions

(Reserved.)

14.0 Temporary Emission Sources

Temporary emission sources, such as pilot plants and construction activity, and temporary operation of portable emission sources, e.g., concrete batch plants and asphalt plants, are not subject to emission offset or air quality improvement provisions of these rules. (Such sources are subject to the other provisions of these rules.) Generally for the operation of a source to be considered temporary, the emissions must occur for less than two years. A source with emissions for a longer period of time will be dealt with on a case-by-case basis by the Agency for determining whether such source may be considered temporary.

The Agency shall determine that a source is temporary based upon limitations of materials, terms of relevant contracts, experimental or noncommercial nature of the project, its dependence upon other activities and any other factors unique to the source or site.

Appendix 1

Discussion of Definitions

Certain terms which are specifically defined in these rules have definitions which combine aspects from both the definitions contained in the USEPA Emission Offset regulations and the definitions contained in the Pollution Control Board Regulations. This has been necessary to fulfill the requirements of the Clean Air Act and USEPA regulations (Appendix S to 40 CFR Part 51) within the Illinois context. To reduce confusion about the meaning of these terms for these rules, the following provides the basis for the definitions and a general discussion of their significant points.

SOURCE is defined according to the definition contained in the USEPA regulations. This definition makes it clear that a source is not a single item of equipment at a plant, but all items of equipment and all operations at a single plant, or adjacent plants under a single control. This differs from the Board definition, "Emission source: Any equipment or facility of a type capable of emitting specified air contaminants to the atmosphere.", where the term facility has been construed as an entire plant.

A NEW SOURCE is defined in relation to the applicability of these rules. A new source is a source which commences construction on or after the effectiveness of these rules.

The MODIFIED SOURCE defines the portion of a source which must be considered in applying these rules to an existing source. An existing source may be made up of existing, modified, and new equipment and operations. On one hand these rules are concerned with increases in emissions from the equipment and operations making up the source. Assume one had an existing operation which produced "x" emissions, and modified it so that it produced "x + y" emissions. The increase in emissions, or increment, which is important in these rules is "y". On the other hand these rules are concerned about the addition of new equipment. If one also has a new item of equipment, including an item of equipment which was reconstructed (discussed later), which produces "z" emissions, the relevant increase in emissions is "z." The modified source has emission of "y + z."

Proceeding with increments, modified source is defined so as to allow the aggregation through time of individual increases in emissions from separate operations or items of equipment for determining the applicability of these rules. This is necessary so that a person cannot avoid the requirements of these rules by dividing increases in emissions into increments whose emissions are individually less than the major applicability criteria. A modified source can consist of an item of equipment constructed in one year and another item of equipment constructed the next year. In effect this definition establishes the modified source as the difference between the source at time A and a later time. Time A is the date this definition became effective or the date a permit was last issued pursuant to these rules. The difference is defined "positively", ignoring any decreases in emissions. The definition is based upon the first part of the definition of "major modification" contained in the USEPA regulations.

The purpose of the definition of MODIFICATION is to designate activities which either alone or in aggregate make up the modified source and should be subject to these rules (if they represent major emissions of an air contaminant). A modification is any change in an item of equipment or an operation at a source which increases emissions without an equivalent reduction in emissions, e.g. the addition of operating capacity to an item of equipment as opposed to regular repair of equipment or the partial replacement of an item of existing equipment. A modification is also any change which increases emissions without previous accounting, e.g., operation in a manner not described in a permit application or a significant change in maintenance practices. A modification can also be the addition of a new operation or equipment. Lastly, a modification can be due to reconstruction, nonroutine repair and replacement of an item of equipment.

A modification can occur with respect to either uncontrolled or actual emissions and is determined independently of any emissions reductions achieved elsewhere at the source. One cannot compensate for an increase in emissions in one operation by a decrease at another operation (and thereby avoid these rules). Thus an understanding of what constitutes an operation is essential for working with these rules. In determining whether operations are separate one must consider whether they are identifiable units, whether the emissions from the operations can be controlled as discrete units or must be approached as an emission unit. Whether operations produce a similar product, using similar processes, etc., is not a relevant issue. The fact that a number of operations vent to a common control or stack is also not relevant. The "uniqueness" of operations is a case by case determination based upon the particular situation. For example, consider the construction of an alternate processing unit for a particular material stream. This is a separate operation from an existing processing unit, even if the total amount of material processed by the two units remains constant, both are ducted to the same control device, and overall emissions decrease. Similarly the installation of a new line next to an identical existing line, where they both produce the same product and vent through the same stack, is installation of a new operation. Reducing the emissions from the existing line to compensate for the emissions from the new line will not avoid the applicability of these rules, even though it may provide any required emission offset. However, increasing the operating rate of the existing line while keeping emissions constant, through the installation of more efficient controls, would not directly be subject to these rules.

The definition of modification is based upon the definition contained in the USEPA regulations. It includes specific exemptions from modification contained in the second part of the USEPA definition of major modification, (with the provision that the exempted activities do not interfere with reasonable further progress). For example, use of an alternative fuel is not a modification if it is inherent in the design of equipment, e.g. fuel handling system, burners, control equipment, etc. Similarly, an increase in the firing rate does not constitute a modification, if it does not exceed the design of the equipment and has been described in a permit application.

The "reasonable further progress" caveat on the above exempt activities is a reminder of the basis of these rules. The exempted activities consume the SIP growth allowance. Accordingly the Agency must retain "general" authority over such activities which if large could interfere with reasonable further progress and thereby restrict overall industrial growth. More practically, the impending interference with reasonable further progress by a project would not necessarily mean that all the requirements of these rules be met. Rather, such specific conditions would need be met so that reasonable further progress would be maintained, as resolved through discussion with the Agency. The conditions could include combination of control technology, emission offsets and the growth allowance.

An activity that does not constitute a modification by these rules, may require permits pursuant to the definitions contained in the Board regulations. For example the replacement of a control device is not a modification in these rules as it would be considered routine maintenance. The replacement control device is "new" pursuant to the Board Rules and Regulations, and construction and operating permits are required for it.

The definition of RECONSTRUCTION contains the criteria which will be used in determining whether the investment in the equipment is of such an extent and nature that these rules should be applied and the control technology upgraded. The definition reinforces the fact that equipment which replaces existing equipment, replacement in kind, is generally subject to these rules.

The size criteria for defining a MAJOR SOURCE are taken from the USEPA regulations.

The definition of REASONABLE FURTHER PROGRESS is taken from the Clean Air Act, as amended. An underlying basis and purpose of these rules, as previously stated, is to ensure that major source growth affecting nonattainment areas is not an obstacle to reasonable further progress and timely achievement of air quality standards.

The definitions of UNCONTROLLED EMISSIONS and ALLOWABLE EMISSIONS are based upon USEPA definitions. Some changes have been made to clarify the difference between maximum capacity, the physical capacity of the equipment, and maximum capacity, the duration of the hours of functioning. The maximum hours of functioning are specifically stated in the definition.

Full provision is made for permit conditions limiting equipment capacity or hours of functioning in determining allowable emissions. Through such conditions a permit applicant may reduce uncontrolled emission and restrict allowable emissions to actual emissions and lessen the effect of these rules or totally avoid their applicability. A permit is considered subject to a permit condition either 1) when a special condition has been included in the permit issuance letter, or 2) the information in the permit application specifically acknowledges a limitation on the equipment or operation.

The air quality increments for SIGNIFICANT CONTRIBUTOR are the air quality significance increments from the USEPA Regulations.

LOWEST ACHIEVABLE EMISSION RATE (LAER) is an emission limitation which represents the maximum degree of emissions reduction, determined on a case-by-case basis, for a particular installation based upon the degree of emissions reductions, achieved or required of similar installations. LAER must be achieved by using constant emission control technology, as distinguished from an intermittent or "supplementary" control system. The technology associated with LAER may be either control equipment, as such, or process design, operating procedures, raw material limitation, etc., or a combination thereof.

The definition contained in the rules is based upon the USEPA definition. The definition has been altered so that LAER is not an absolute emission rate, but the emission rate as approved by the Agency. Because of this alteration, the procedure for determination of LAER, also included in the rules, is very important to a working understanding of LAER. LAER is both an emission rate and a process by which an emission rate is to be determined. The procedures emphasize the role of the permit applicant as it is the Agency's belief that the applicant is best qualified to assess the costs, and benefits associated with alternative control options which may achieve LAER for a particular installation. In the LAER procedures the Agency elaborates upon the definition by outlining both considerations for evaluation of LAER and procedural requirements for a LAER demonstration.

Appendix 2

Significant Air Quality Increments for Nonattainment Areas

A new or modified source of sulfur dioxide (SO_2), particulate matter (TSP), nitrogen oxides (NOX*) or carbon monoxide (CO) located in an attainment area may cause or exacerbate a known existing air quality violation in a nearby nonattainment area. In this case it is necessary to determine if the air quality impact of the source is significant. The incremental increase in concentration at the location of a violation may be considered significant if it is greater than the following concentrations:

Pollutant	Averaging Time				
	Annual	24-Hour	8-Hour	3-Hours	1-Hour
SO_2	1 ug/m^3	5 ug/m^3		25 ug/m^3	
TSP	1 ug/m^3	5 ug/m^3			
NOX	1 ug/m^3				
CO			0.5 mg/m^3		2 mg/m^3

These incremental concentrations of SO_2, TSP and NOX are partially based on allowable SO_2 increments for Class I areas. However, the annual concentration increment is reduced to 1 ug/m^3 since this value may be considered significant for a point source in an area which exceeds the NAAQS. The increments for CO are based on concentrations which are 5 percent of the CO National Ambient Air Quality Standard. All of these increments apply to the highest estimated concentration for all averaging times. The second highest is not used since the incremental increase in concentration is added to a concentration which is already based on the highest, second-highest concentration.

*For simplicity, all emissions of nitrogen oxides are treated as if they are nitrogen dioxide (NO_2), see Section 4.3.5 of the Guidelines on Air Quality Models, USEPA, Office of Air Quality Standards and Planning, Research Triangle Park, OAQPS 1.2-080, April, 1978.

APPENDIX 3

ILLINOIS AIR QUALITY DESIGNATIONS

Under the Clean Air Act, as amended, Section 107(d), the Agency makes recommendations to the USEPA as to those areas in Illinois which it deems are attainment, nonattainment or unclassified with respect to National Ambient Air Quality Standards. The administrator of the USEPA promulgates these recommendations, with such modifications as he deems necessary.

The Agency recommends areas for designation into one of the three above identified categories based primarily upon the Agency's available ambient air quality data for the previous year, although air quality data from earlier years is also considered. Additional information considered by the Agency includes emissions inventory and emission density data, special modelling and monitoring studies and special air quality monitoring site information and meteorology. Included in these latter considerations is the impact upon the monitored information of such non-representative features as construction and localized fugitive dust emissions resulting from meteorological phenomena. Recommendations for designation are made on a pollutant by pollutant basis utilizing an appropriate geographic scale commensurate with the pervasiveness of the particular pollutant. The proposed designations are based upon geo-political boundaries (e.g., county or township) and are constructed so that in all cases they encompass completely any projected or measured areas of non-attainment.

The original recommendations as to Illinois air quality were made on December 5, 1977, and subsequently promulgated on March 3, 1978 by the administrator of the USEPA in the Federal Register, Volume 43, No. 43, pages 8985 through 8992. Subsequently revisions were made to this listing for particulate matter and sulfur dioxide. A revised listing for these contaminants was promulgated on October 5, 1978 in the Federal Register, Volume 43, No. 194, pages 46004 through 46007. Accompanying the 1979 SIP submittal to the USEPA was an evaluation of nonattainment area designations in effect at that time. Further recommendations and revisions will be made to these listings either as necessary or as part of an annual review by the Agency.

A copy of the most current listing of air quality designations, as published in the Federal Register, is available from the Agency upon request.

CPR:jw/sp/0113b,1-22

EXHIBIT 4-1

65 POLLUTANTS/POLLUTANT CLASSES

LISTED IN THE NATURAL RESOURCES DEFENSE COUNCIL V TRAIN

SETTLEMENT AGREEMENT*

1. Acenaphthene
2. Acrolein
3. Acrylonitrile
4. Aldrin/Dieldrin
5. Antimony and compounds
6. Arsenic and compounds
7. Asbestos
8. Benzene
9. Benzidine
10. Beryllium and compounds
11. Cadmium and compounds
12. Carbon tetrachloride
13. Chlordane (technical mixture and metabolites)
14. Chlorinated benzenes (other than dichlorobenzenes)
15. Chlorinated ethanes (including 1,2-dichloroethane, 1,1,1-trichloroethane, and hexachloroethane)
16. Chloroalkyl ethers (chloromethyl, chloroethyl, and mixed ethers)
17. Chlorinated naphthalene
18. Chlorinated phenols (other than those listed elsewhere; includes trichlorophenols and chlorinated cresols)
19. Chloroform
20. 2-Chlorophenol
21. Chromium and compounds
22. Copper and compounds
23. Cyanides
24. DDT and metabolites
25. Dichlorobenzenes (1,2-, 1,3-, and 1,4-dichlorobenzenes)
26. Dichlorobenzidine
27. Dichloroethylenes (1,1- and 1,2-dichloroethylene)
28. 2,4-Dichlorophenol
29. Dichloropropane and dichloropropene
30. 2,4-Dimethylphenol
31. Dinitrotoluene
32. Diphenylhydrazine
33. Endosulfan and metabolites
34. Endrin and metabolites
35. Ethylbenzene
36. Fluoranthene
37. Haloethers (other than those listed elsewhere; includes chlorophenylphenyl esters, bromophenylphenyl ether, bis(dichloroisopropyl) ether, bis(chloroethoxy) methane, and polychlorinated diphenyl ethers)
38. Halomethanes (other than those listed elsewhere; includes methylene chloride, methyl chloride, methyl bromide, bromoform, dichlorobromomethane, trichlorofluoromethane, dichlorodifluoromethane)
39. Heptachlor and metabolites
40. Hexachlorobutadiene
41. Hexachlorocyclohexane (all isomers)
42. Hexachlorocyclopentadiene
43. Isophorone
44. Lead and compounds
45. Mercury and compounds
46. Naphthalene
47. Nickel and compounds
48. Nitrobenzene
49. Nitrophenols (including 2,4-dinitrophenol, dinitrocresol)
50. Nitrosamines
51. Pentachlorophenol
52. Phenol
53. Phthalate esters
54. Polychlorinated biphenyls (PCBs)
55. Polynuclear aromatic hydrocarbons (including benzanthracenes, benzopyrenes, benzofluorathene, chrysenes, dibenzanthracenes, and indenopyrenes)
56. Selenium and compounds
57. Silver and compounds
58. 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
59. Tetrachloroethylene
60. Thallium and compounds
61. Toluene
62. Toxaphene
63. Trichloroethylene
64. Vinyl chloride
65. Zinc and compounds

*Source: 40 CFR 401

EXHIBIT 4-2

EXHIBIT 4-2

PRIORITY POLLUTANTS DETECTED IN SAMPLING PROGRAM OF POWER PLANT WASTE STREAMS*

Benzene
Chlorobenzene
1,2-Dichloroethane
1,1,1-Trichloroethane
1,1,2-Trichloroethane
2-Chloronaphthalene
Chloroform
2-Chlorophenol
1,2-Dichlorophenol
1,4-Dichlorobenzene
1,1-Dichloroethylene
1,2-Trans-Dichloroethylene
2,4-Dichlorophenol
Ethylbenzene
Methylene Chloride
Bromoform
Dichlorobromomethane
Trichlorofluoromethane
Chlorodibromomethane
Nitrobenzene
Pentachlorophenol
Phenol
Bis(2-Ethylhexyl) Phthalate
Butyl Benzyl Phthalate
Di-N-Butyl Phthalate
Di-N-Octyl Phthalate
Diethyl Phthalate
Dimethyl Phthalate
Tetrachloroethylene
Toluene
Trichloroethylene
4,4-DDD
Antimony (Total)
Arsenic (Total)
Asbestos (Total-Fibers/Liter)
Beryllium (Total)
Cadmium (Total)
Chromium (Total)
Copper (Total)
Cyanide (Total)
Lead (Total)
Mercury (Total)
Nickel (Total)
Selenium (Total)
Silver (Total)
Thallium (Total)
Zinc (Total)

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*Source: Table VI-1, pp. 235-238, in EPA's "Development Document for Effluent Limitations Guidelines and Standards for the Steam Electric Point Source Category", EPA 440/1-80/029-b, September 1980. These pollutants were detected in greater concentrations in the effluent of at least one waste stream, than in the influent (except that for coal pile runoff only the effluent was sampled).

EXHIBIT 4-3

EXHIBIT 4-3

CLEAN WATER ACT SECTION 311 HAZARDOUS SUBSTANCES*

Acetaldehyde
Acetic acid
Acetic anhydride
Acetone cyanohydrin
Acetyl bromide
Acetyl chloride
Acrolein
Acrylonitrile
Adipic acid
Aldrin
Allyl alcohol
Allyl chloride
Aluminum sulfate
Ammonia
Ammonium acetate
Ammonium benzoate
Ammonium biacarbonate
Ammonium bichromate
Ammonium bifluoride
Ammonium bisulfite
Ammonium carbamate
Ammonium carbonate
Ammonium chloride
Ammonium chromate
Ammonium citrate
Ammonium fluoborate
Ammonium hydroxide
Ammonium oxalate
Ammonium silicofluoride
Ammonium sulfamate
Ammonium sulfide
Ammonium sulfite
Ammonium tartrate
Ammonium thiocyanate
Ammonium thiosulfate
Amyl acetate
Aniline
Antimony pentachloride
Antimony potassium tartrate
Antimony tribromide
Antimony trichloride
Antimony trifluoride
Antimony trioxide
Arsenic disulfide
Arsenic pentoxide
Arsenic trichloride
Arsenic trioxide
Arsenic trisulfide
Barium cyanide
Cupric tartrate
Cyanogen chloride

Benzene
Benzoic acid
Benzonitrile
Benzoyl chloride
Beryllium chloride
Beryllium fluoride
Beryllium nitrate
Butyl acetate
Butylamine
n/butyl phthalate
Butyric acid
Cadmium acetate
Cadmium arsenate
Cadmium bromide
Calcium carbide
Calcium chloride
Calcium chromate
Calcium cyanide
Calcium dodecylbenzenesulfonate
Calcium hypochlorite
Captan
Carbaryl
Carbofuran
Carbon disulfide
Carbon tetrachloride
Chlordane
Chlorine
Chlorobenzene
Chloroform
Chlorpyrifos
Chlorosulfonic acid
Chromic acetate
Chromic acid
Chromic sulfate
Chromous chloride
Cobaltous bromide
Coabaltous formate
Cobaltous sulfamate
Coumaphos
Cresol
Crotonal dehyde
Cupric acetate
Cupric acetoarsenite
Cupric chloride
Cupric nitrate
Cupric oxalate
Cupric sulfate
Cupric sulfate, ammoniated
Hydrofluoric acid
Hydrogen cyanide

EXHIBIT 4-3 (Cont'd)

Cyclohexane
2,4-D acid
2,4-D esters
DDT
Diazinon
Dicamba
Dichlobenil
Dichlone
Dichlorobenzene
Dichloropropane
Dichloropropene
Dichloropropene-dichloropropane Mixture
2,2-Dichloropropionic acid
Dichlorvos
Dieldrin
Diethylamine
Dimethylamine
Dinitrobenzene (mixed)
Dinitrophenol
Dinitrotoluene
Diquat
Disulfoton
Diuron
Dodecylbenzenesulfonic acid
Endosulfan
Endrin
Epichlorohydrin
Ethion
Ethylbenzene
Ethylenediamine
Ethylenediamine-tetraacetic acid (EDTA)
Ethylene dibromide
Ethylene dichloride
Ferric ammonium citrate
Ferric ammonium oxalate
Ferric chloride
Ferric fluoride
Ferric nitrate
Ferric sulfate
Ferrous ammonium sulfate
Ferrous chloride
Ferrous sulfate
Formaldehyde
Formic acid
Fumaric acid
Furfural
Guthion
Heptachlor
Hexachlorocyclopentadiene
Hydrochloric acid
Phosgene
Hydrogen sulfide
Isoprene
Isopropanolamine dodecylbenzenesulfonate
Kelthane
Kepone
Lead acetate
Lead arsenate
Lead chloride
Lead fluoborate
Lead fluoride
Lead iodide
Lead nitrate
Lead stearate
Lead sulfate
Lead sulfide
Lead thiocyanate
Lindane
Lithium chromate
Maleic acid
Maleic anhydride
Mercaptodimethur
Mercuric cyanide
Mercuric nitrate
Mercuric sulfate
Mercuir thiocyanate
Mercurous nitrate
Methoxychlor
Methyl mercaptan
Methyl methacrylate
Methyl parathion
Mevinphos
Mexacarbate
Monoethylamine
Monomethylamine
Naled
Naphthalene
Naphthenic acid
Nickel ammonium sulfate
Nickel chloride
Nickel hydroxide
Nickel nitrate
Nickel sulfate
Nitric acid
Nitrobenzene
Nitrogen dioxide
Nitrophenol (mixed)
Nitrotoluene
Paraformaldehyde
Parathion
Pentachlorophenol
Phenol
Tetraethyl lead

EXHIBIT 4-3 (Cont'd)

Phosphoric acid
Phosphorus
Phosphorus oxychloride
Phosphorus pentasulfide
Phosphorus trichloride
Polychorinated biphenyls
Potassium arsenate
Potassium arsenite
Potassium bichromate
Potassium chromate
Potassium cyanide
Potassium hydroxide
Potassium permanganate
Propargite
Propionic acid
Propionic anhydride
Propylene oxide
Pyrethrins
Quinoline
Resorcinol
Selenium oxide
Silver nitrate
Sodium
Sodium arsenate
Sodium arsenite
Sodium bichromate
Sodium bifluoride
Sodium bisulfite
Sodium chromate
Sodium cyanide
Sodium dodecylbenzenesulfonate
Sodium fluoride
Sodium hydrosulfide
Sodium hydroxide
Sodium hypochlorite
Sodium methylate
Sodium nitrite
Sodium phosphate, dibasic
Sodium phosphate, tribasic
Sodium selenite
Strontium chromate
Strychnine
Styrene
Sulfuric acid
Sulfur monochloride
2,4,5-T acid
2,4,5-T amines
2,4,5-T esters
2,4,5-T salts
TDE
2,4,5-TP acid
2,4,5-TP acid esters
Tetraethyl pyrophosphate
Thallium sulfate
Toluene
Toxaphene
Trichlorfon
Trichlorethylene
Trichlorophenol
Triethanolamine
dodecylbenzenesulfonate
Triethylamine
Trimethylamine
Uranyl acetate
Uranyl nitrate
Vanadium pentoxide
Vanadyl sulfate
Vinyl acetate
Vinylidene chloride
Xylene (mixed)
Xylenol
Zinc acetate
Zinc ammonium chloride
Zinc borate
Zinc carbonate
Zinc chloride
Zinc cyanide
Zinc fluoride
Zinc formate
Zinc hydrosulfite
Zinc nitrate
Zinc phenolsulfonate
Zinc phosphide
Zinc silicofluoride
Zinc sulfate
Zirconium nitrate
Zirconium potassium fluroride
Zirconium sulfate
Zirconium tetrachloride

*Source: 40 CFR 116, 117

Please print or type in the unshaded areas only
(fill—in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-R0175

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY
GENERAL INFORMATION
Consolidated Permits Program
(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

F | D

LABEL ITEMS

I. EPA I.D. NUMBER

III. FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill—in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill—in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold—faced terms.

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED	SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a discharge to **waters of the U.S.**? (FORM 2A)	16	17	18	B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a discharge to waters of the U.S.? (FORM 2B)	19	20	21
C. Is this a facility which currently results in **discharges** to waters of the U.S. other than those described in A or B above? (FORM 2C)	22	23	24	D. Is this a proposed facility *(other than those described in A or B above)* which will result in a discharge to waters of the U.S.? (FORM 2D)	25	26	27
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)	28	29	30	F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, **underground sources of drinking water**? (FORM 4)	31	32	33
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)	34	35	36	H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)	37	38	39
I. Is this facility a proposed **stationary source** which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area**? (FORM 5)	40	41	42	J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area**? (FORM 5)	43	44	45

III. NAME OF FACILITY

C 1 SKIP
15 16 - 29 30 69

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)* | B. PHONE *(area code & no.)*

C 2
15 16 45 46 - 48 49 - 51 52 - 55

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

C 3
15 16 45

B. CITY OR TOWN | C. STATE | D. ZIP CODE

C 4
15 16 40 41 42 47 51

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

C 5
15 16 45

B. COUNTY NAME

46 70

C. CITY OR TOWN | D. STATE | E. ZIP CODE | F. COUNTY CODE *(if known)*

C 6
15 16 40 41 42 47 51 52 - 54

CONTINUED FROM THE FRONT

VII. SIC CODES *(4-digit, in order of priority)*

A. FIRST	B. SECOND
7 *(specify)*	7 *(specify)*
C. THIRD	**D. FOURTH**
7 *(specify)*	7 *(specify)*

VIII. OPERATOR INFORMATION

A. NAME

8

B. Is the name listed in Item VIII-A also the owner?

☐ YES ☐ NO

C. STATUS OF OPERATOR *(Enter the appropriate letter into the answer box; if "Other", specify.)*

F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC *(other than federal or state)*
O = OTHER *(specify)*

(specify)

D. PHONE *(area code & no.)*

A

E. STREET OR P.O. BOX

F. CITY OR TOWN

B

G. STATE

H. ZIP CODE

IX. INDIAN LAND

Is the facility located on Indian lands?

☐ YES ☐ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES *(Discharges to Surface Water)*	D. PSD *(Air Emissions from Proposed Sources)*
9 N	9 P
B. UIC *(Underground Injection of Fluids)*	E. OTHER *(specify)*
9 U	9 *(specify)*
C. RCRA *(Hazardous Wastes)*	E. OTHER *(specify)*
9 R	9 *(specify)*

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property bounderies. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS *(provide a brief description)*

XIII. CERTIFICATION *(see instructions)*

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE *(type or print)*	B. SIGNATURE	C. DATE SIGNED

COMMENTS FOR OFFICIAL USE ONLY

C

★U.S. GOVERNMENT PRINTING OFFICE: 1980—323-829:6355

FORM APPROVED
OMB No. 158–R0100

FOR AGENCY USE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER

STANDARD FORM C – MANUFACTURING AND COMMERCIAL

SECTION I. APPLICANT AND FACILITY DESCRIPTION

Unless otherwise specified on this form all items are to be completed. If an item is not applicable indicate 'NA.'

ADDITIONAL INSTRUCTIONS FOR SELECTED ITEMS APPEAR IN SEPARATE INSTRUCTION BOOKLET AS INDICATED. REFER TO BOOKLET BEFORE FILLING OUT THESE ITEMS.

Please Print or Type

1. Legal Name of Applicant (see instructions) — 101 ______

2. Mailing Address of Applicant (see instructions)
   - Number & Street — 102a ______
   - City — 102b ______
   - State — 102c ______
   - Zip Code — 102d ______

3. Applicant's Authorized Agent (see instructions)
   - Name and Title — 103a ______
   - Number & Street Address — 103b ______
   - City — 103c ______
   - State — 103d ______
   - Zip Code — 103e ______
   - Telephone — 103f ______ Area Code ______ Number

4. Previous Application
   If a previous application for a National or Federal discharge permit has been made, give the date of application. Use numeric designation for date. — 104 ___ YR ___ MO ___ DAY

I certify that I am familiar with the information contained in this application and that to the best of my knowledge and belief such information is true, complete, and accurate.

______ Printed Name of Person Signing — 102e — ______ Title

______ Signature of Applicant or Authorized Agent — 102f — ___ YR ___ MO ___ DAY Date Application Signed

18 U.S.C. Section 1001 provides that:

Whoever, in any matter within the jurisdiction of any department or agency of the United States knowingly and wilfully falsifies, conceals or covers up by any trick, scheme, or device a material fact, or makes any false, fictitious or fraudulent statement or representation, or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than five years, or both.

FOR AGENCY USE

Received ___ YR ___ MO ___ DAY

OFFICE: ____ EPA Region Number
____ State

5. Facility/Activity (see instructions) Give the name, ownership, and physical location of the plant or other operating facility where discharge(s) does or will occur.

FOR AGENCY USE

Name	105a	____________
Ownership (Public, Private or Both Public and Private)	105b	☐ PUB ☐ PRV ☐ BPP
Check block if Federal Facility and give GSA Inventory Control Number	105c	☐ FED
	105d	____________
Location		
Street & Number	105e	____________
City	105f	____________
County	105g	____________
State	105h	____________

6. Nature of Business State the nature of the business conducted at the plant or operating facility.	106a	____________
	106b	AGENCY USE

7. Facility Intake Water (see instructions) Indicate water intake volume per day by sources. Estimate average volume per day in thousand gallons per day.

Municipal or private water system	107a	______ thousand gallons per day
Surface water	107b	______ thousand gallons per day
Groundwater	107c	______ thousand gallons per day
Other*	107d	______ thousand gallons per day
Total item 7	107e	______ thousand gallons per day
*If there is intake water from 'other,' specify the source.	107f	____________

8. Facility Water Use Estimate average volume per day in thousand gallons per day for the following types of water usage at the facility. (see instructions)

Noncontact cooling water	108a	______ thousand gallons per day
Boiler feed water	108b	______ thousand gallons per day
Process water (including contact cooling water)	108c	______ thousand gallons per day
Sanitary water	108d	______ thousand gallons per day
Other*	108e	______ thousand gallons per day
Total item 8	108f	______ thousand gallons per day
*If there are discharges to 'other,' specify.	108g	____________
If there is 'Sanitary' water use, give the number of people served.	108h	______ people served

EPA Form 7550-23 (7-73)

EXHIBIT 4-4 con't.

FORM APPROVED
OMB No. 158—R0100

FOR AGENCY USE

9. All Facility Discharges and other Losses; Number and Discharge (see instructions) Volume Specify the number of discharge points and the volume of water discharged or lost from the facility according to the categories below. Estimate average volume per day in thousand gallons per day.

		Number of Discharge Points		Total Volume Used or Discharged, Thousand Gal/Day
Surface Water	109a1		109a2	
Sanitary wastewater transport system	109b1		109b2	
Storm water transport system	109c1		109c2	
Combined sanitary and storm water transport system	109d1		109d2	
Surface impoundment with no effluent	109e1		109e2	
Underground percolation	109f1		109f2	
Well injection	109g1		109g2	
Waste acceptance firm	109h1		109h2	
Evaporation	109i1		109i2	
Consumption	109j1		109j2	
Other*	109k1		109k2	
Facility discharges and volume Total Item 9.	109l1		109l2	

*If there are discharges to 'other,' specify. 109m1 ______

10. Permits, Licenses and Applications
List all existing, pending or denied permits, licenses and applications related to discharges from this facility (see instructions).

	Issuing Agency	For Agency Use	Type of Permit or License	ID Number	Date Filed YR/MO/DA	Date Issued YR/MO/DA	Date Denied YR/MO/DA	Expiration Date YR/MO/DA
110	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1.								
2.								
3.								

11. Maps and Drawings
Attach all required maps and drawings to the back of this application.(see instructions)

12. Additional Information

112 Item Number	Information

FORM APPROVED
OMB No. 158–R0100

STANDARD FORM C – MANUFACTURING AND COMMERCIAL

FOR AGENCY USE

SECTION II. BASIC DISCHARGE DESCRIPTION

Complete this section for each discharge indicated in Section I, Item 9, that is to surface waters. This includes discharges to municipal sewerage systems in which the wastewater does not go through a treatment works prior to being discharged to surface waters. Discharges to wells must be described where there are also discharges to surface waters from this facility. SEPARATE DESCRIPTIONS OF EACH DISCHARGE ARE REQUIRED EVEN IF SEVERAL DISCHARGES ORIGINATE IN THE SAME FACILITY. All values for an existing discharge should be representative of the twelve previous months of operation. If this is a proposed discharge, values should reflect best engineering estimates.

ADDITIONAL INSTRUCTIONS FOR SELECTED ITEMS APPEAR IN SEPARATE INSTRUCTION BOOKLET AS INDICATED. REFER TO BOOKLET BEFORE FILLING OUT THESE ITEMS.

1. **Discharge Serial No. and Name**
   a. **Discharge Serial No.** (see instructions) — 201a ____
   b. **Discharge Name** Give name of discharge, if any. (see instructions) — 201b ____
   c. **Previous Discharge Serial No.** If previous permit application was made for this discharge (see Item 4, Section I), provide previous discharge serial number. — 201c ____

2. **Discharge Operating Dates**
   a. **Discharge Began Date** If the discharge described below is in operation, give the date (within best estimate) the discharge began. — 202a ____ YR ____ MO
   b. **Discharge to Begin Date** If the discharge has never occurred but is planned for some future date, give the date (within best estimate) the discharge will begin. — 202b ____ YR ____ MO
   c. **Discharge to End Date** If discharge is scheduled to be discontinued within the next 5 years, give the date (within best estimate) the discharge will end. — 202c ____ YR ____ MO

3. **Engineering Report Available** Check if an engineering report is available to reviewing agency upon request. (see instructions) — 203 ☐

4. **Discharge Location** Name the political boundaries within which the point of discharge is located.

				Agency Use
State	204a	____	204d	____
County	204b	____	204e	____
(if applicable) City or Town	204c	____	204f	____

5. **Discharge Point Description** Discharge is into (check one): (see instructions)
   - Stream (includes ditches, arroyos, and other intermittent watercourses) — 205a ☐ STR
   - Lake ☐ LKE
   - Ocean ☐ OCE
   - Municipal Sanitary Wastewater Transport System ☐ MTS
   - Municipal Combined Sanitary and Storm Transport System ☐ MCS

DISCHARGE SERIAL NUMBER

______

FOR AGENCY USE								

Municipal Storm Water Transport System — ☐ STS

Well (Injection) — ☐ WEL

Other — ☐ OTH

If 'other' is checked, specify — 205b ______

6. Discharge Point — Lat/Long Give the precise location of the point of discharge to the nearest second.

   Latitude — 206a ____DEG ____MIN ____SEC

   Longitude — 206b ____DEG ____MIN ____SEC

7. Discharge Receiving Water Name Name the waterway at the point of discharge.(see instructions) — 207a ______

If the discharge is through an outfall that extends beyond the shoreline or is below the mean low water line, complete Item 8. — 207b

For Agency Use

Major	Minor	Sub

207c

For Agency Use

303e

8. Offshore Discharge

   a. Discharge Distance from Shore — 208a ______feet

   b. Discharge Depth Below Water Surface — 208b ______feet

9. Discharge Type and Occurrence

   a. Type of Discharge Check whether the discharge is continuous or intermittent. (see instructions) — 209a ☐ (con) Continuous ☐ (int) Intermittent

   b. Discharge Occurrence Days per Week Enter the average number of days per week (during periods of discharge) this discharge occurs. — 209b __days per week

   c. Discharge Occurrence —Months If this discharge normally operates (either intermittently, or continuously) on less than a year-around basis (excluding shutdowns for routine maintenance), check the months during the year when the discharge is operating. (see instructions) — 209c

☐ JAN	☐ FEB	☐ MAR	☐ APR
☐ MAY	☐ JUN	☐ JUL	☐ AUG
☐ SEP	☐ OCT	☐ NOV	☐ DEC

Complete Items 10 and 11 if "intermittent" is checked in Item 9.a. Otherwise, proceed to Item 12.

10. Intermittent Discharge Quantity State the average volume per discharge occurrence in thousands of gallons. — 210 ______thousand gallons per discharge occurrence.

11. Intermittent Discharge Duration and Frequency

   a. Intermittent Discharge Duration Per Day State the average number of hours per day the discharge is operating. — 211a ____hours per day

   b. Intermittent Discharge Frequency State the average number of discharge occurrences per day during days when discharging. — 211b ____discharge occurrences per day

12. Maximum Flow Period Give the time period in which the maximum flow of this discharge occurs. — 212 From ____ (month) to ____ (month)

DISCHARGE SERIAL NUMBER

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13. **Activity Description** Give a narrative description of activity producing this discharge.(see instructions)

213a

14. **Activity Causing Discharge** For each SIC Code which describes the activity causing this discharge, supply the type and maximum amount of either the raw material consumed (Item 14a) or the product produced (Item 14b) in the units specified in Table I of the Instruction Booklet. For SIC Codes not listed in Table I, use raw material or production units normally used for measuring production.(see instructions)

a. **Raw Materials**

	SIC Code	Name	Maximum Amount/Day	Unit (See Table I)	Shared Discharges (Serial Number)
214a	(1)	(2)	(3)	(4)	(5)

b. **Products**

	SIC Code	Name	Maximum Amount/Day	Unit (See Table I)	Shared Discharges (Serial Number)
214b	(1)	(2)	(3)	(4)	(5)

DISCHARGE SERIAL NUMBER

______

FOR AGENCY USE

15. **Waste Abatement**

a. **Waste Abatement Practices**
Describe the waste abatement practices used on this discharge with a brief narrative. (see instructions)

215a Narrative: ______

b. **Waste Abatement Codes**
Using the codes listed in Table II of the Instruction Booklet, describe the waste abatement processes for this discharge in the order in which they occur if possible.

215b (1) ______, (2) ______, (3) ______,
(4) ______, (5) ______, (6) ______,
(7) ______, (8) ______, (9) ______,
(10) ______, (11) ______, (12) ______,
(13) ______, (14) ______, (15) ______,
(16) ______, (17) ______, (18) ______,
(19) ______, (20) ______, (21) ______,
(22) ______, (23) ______, (24) ______,
(25) ______.

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16. Wastewater Characteristics

Check the box beside each constituent which is present in the effluent (discharge water). This determination is to be based on actual analysis or best estimate.(see instructions)

Parameter 216	Present	Parameter 216	Present
Color 00080		Copper 01042	
Ammonia 00610		Iron 01045	
Organic nitrogen 00605		Lead 01051	
Nitrate 00620		Magnesium 00927	
Nitrite 00615		Manganese 01055	
Phosphorus 00665		Mercury 71900	
Sulfate 00945		Molybdenum 01062	
Sulfide 00745		Nickel 01067	
Sulfite 00740		Selenium 01147	
Bromide 71870		Silver 01077	
Chloride 00940		Potassium 00937	
Cyanide 00720		Sodium 00929	
Fluoride 00951		Thallium 01059	
Aluminum 01105		Titanium 01152	
Antimony 01097		Tin 01102	
Arsenic 01002		Zinc 01092	
Beryllium 01012		Algicides* 74051	
Barium 01007		Chlorinated organic compounds* 74052	
Boron 01022		Pesticides* 74053	
Cadmium 01027		Oil and grease 00550	
Calcium 00916		Phenols 32730	
Cobalt 01037		Surfactants 38260	
Chromium 01034		Chlorine 50060	
Fecal coliform bacteria 74055		Radioactivity* 74050	

*Specify substances, compounds and/or elements in Item 26.

Pesticides (insecticides, fungicides, and rodenticides) must be reported in terms of the acceptable common names specified in *Acceptable Common Names and Chemical Names for the Ingredient Statement on Pesticide Labels*, 2nd Edition, Environmental Protection Agency, Washington, D.C. 20250, June 1972, as required by Subsection 162.7(b) of the Regulations for the Enforcement of the Federal Insecticide, Fungicide, and Rodenticide Act.

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DISCHARGE SERIAL NUMBER

FOR AGENCY USE

17. **Description of Intake and Discharge**

For each of the parameters listed below, enter in the appropriate box the value or code letter answer called for.(see instructions)

In addition, enter the parameter name and code and all required values for any of the following parameters if they were checked in Item 16; ammonia, cyanide, aluminum, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, phenols, oil and grease, and chlorine (residual).

Parameter and Code 217a	Influent		Effluent					
	Untreated Intake Water (Daily Average) (1)	In-Plant Treated Intake Water (Daily Average) (2)	Daily Average (3)	Minimum Value Observed or Expected During Discharge Activity (4)	Maximum Value Observed or Expected During Discharge Activity (5)	Frequency of Analysis (6)	Number of Analyses (7)	Sample Type (8)
Flow* Gallons per day 00056								
pH Units 00400			X					
Temperature (winter) ° F 74028								
Temperature (summer) ° F 74027								
Biochemical Oxygen Demand (BOD 5-day) mg/l 00310								
Chemical Oxygen Demand (COD) mg/l 00340								
Total Suspended (nonfilterable) Solids mg/l 00530								
Specific Conductance micromhos/cm at 25° C 00095			X					
Settleable Matter (residue) ml/l 00545								

*Other discharges sharing intake flow (serial numbers).(see instructions)

EXHIBIT 4-4 con't.

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FOR AGENCY USE

17. (Cont'd.)

Parameter and Code 217a	Influent		Effluent					
	Untreated Intake Water (Daily Average) (1)	In-Plant Treated Intake Water (Daily Average) (2)	Daily Average (3)	Minimum Value Observed or Expected During Discharge Activity (4)	Maximum Value Observed or Expected During Discharge Activity (5)	Frequency of Analysis (6)	Number of Analyses (7)	Sample Type (8)

18. Plant Controls Check if the following plant controls are available for this discharge. 218

Alternate power source for major pumping facility. ☐ APS

Alarm or emergency procedure for power or equipment failure ☐ ALM

Complete item 19 if discharge is from cooling and/or steam water generation and water treatment additives are used.

19. Water Treatment Additives If the discharge is treated with any conditioner, inhibitor, or algicide, answer the following:

a. Name of Material(s) 219a ______

b. Name and address of manufacturer 219b ______

c. Quantity (pounds added per million gallons of water treated). 219c ______

DISCHARGE SERIAL NUMBER

____

FOR AGENCY USE

d. Chemical composition of these additives (see instructions). 219d ________

Complete items 20-25 if there is a thermal discharge (e.g., associated with a steam and/or power generation plant, steel mill, petroleum refinery, or any other manufacturing process) and the total discharge flow is 10 million gallons per day or more. (see instructions)

20. Thermal Discharge Source Check the appropriate item(s) indicating the source of the discharge. (see instructions) 220

Boiler Blowdown	☐ BLBD
Boiler Chemical Cleaning	☐ BCCL
Ash Pond Overflow	☐ APOF
Boiler Water Treatment — Evaporator Blowdown	☐ EPBD
Oil or Coal Fired Plants — Effluent from Air Pollution Control Devices	☐ OCFP
Condense Cooling Water	☐ COND
Cooling Tower Blowdown	☐ CTBD
Manufacturing Process	☐ MFPR
Other	☐ OTHR

21. Discharge/Receiving Water Temperature Difference

Give the maximum temperature difference between the discharge and receiving waters for summer and winter operating conditions. (see instructions)

Summer 221a ______ °F.

Winter 221b ______ °F.

22. Discharge Temperature, Rate of Change Per Hour 222 ______ °F./hour

Give the maximum possible rate of temperature change per hour of discharge under operating conditions. (see instructions)

23. Water Temperature, Percentile Report (Frequency of Occurrence)

In the table below, enter the temperature which is exceeded 10% of the year, 5% of the year, 1% of the year and not at all (maximum yearly temperature). (see instructions)

Frequency of occurrence		10%	5%	1%	Maximum
a. Intake Water Temperature (Subject to natural changes)	223a	°F	°F	°F	°F
b. Discharge Water Temperature	223b	°F	°F	°F	°F

24. Water Intake Velocity (see instructions) 224 ______ feet/sec.

25. Retention Time Give the length of time, in minutes, from start of water temperature rise to discharge of cooling water. (see instructions) 225 ______ minutes

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26. Additional Information

226

Item	Information

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GPO 908-014

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FOR AGENCY USE

STANDARD FORM C – MANUFACTURING AND COMMERCIAL

SECTION III. WASTE ABATEMENT REQUIREMENTS & IMPLEMENTATION (CONSTRUCTION) SCHEDULE

This section requires information on any uncompleted implementation schedule which may have been imposed for construction of waste abatement facilities. Such requirements and implementation schedules may have been established by local, State, or Federal agencies or by court action. In addition to completing the following items, a copy of an official implementation schedule should be attached to this application.
IF YOU ARE SUBJECT TO SEVERAL DIFFERENT IMPLEMENTATION SCHEDULES, EITHER BECAUSE OF DIFFERENT LEVELS OF AUTHORITY IMPOSING DIFFERENT SCHEDULES (Item 1a.) AND/OR STAGED CONSTRUCTION OF SEPARATE OPERATION UNITS (Item 1c), SUBMIT A SEPARATE SECTION III FOR EACH ONE.

FOR AGENCY USE

SCHED. NO. ____________

1. **Improvements** 300

a. **Discharge Serial Number Affected** List the discharge serial numbers, assigned in Section II, that are covered by this implementation schedule. 301a ______ ______ ______ ______ ______ ______

b. **Authority Imposing Requirements** Check the appropriate item indicating the authority for implementation schedule. If the identical implementation schedule has been ordered by more than one authority, check the appropriate items. (see instructions)

Locally developed plan	301b	☐LOC
Areawide Plan		☐ARE
Basic Plan		☐BAS
State approved implementation schedule		☐SQS
Federal approved water quality standards implementation plan.		☐WQS
Federal enforcement procedure or action		☐ENF
State court order		☐CRT
Federal court order		☐FED

c. **Facility Requirement.** Specify the 3-character code of those listed below that best describes in general terms the requirement of the implementation schedule and the applicable six-character abatement code(s) from Table II of the instruction booklet. If more than one schedule applies to the facility because of a staged construction schedule, state the stage of construction being described here with the appropriate general action code. Submit a separate Section III for each stage of construction planned.

301c 3-character (general) ______

301d 6-character (specific) (see Table II) ______ ______ ______

New Facility	NEW
Modification (no increase in capacity or treatment)	MOD
Increase in Capacity	INC
Increase in Treatment Level	INT
Both Increase in Treatment Level and Capacity	ICT
Process Change	PRO
Elimination of Discharge	ELI

FOR AGENCY USE

2. Implementation Schedule and 3. Actual Completion Dates

Provide dates imposed by schedule and any actual dates of completion for implementation steps listed below. Indicate dates as accurately as possible. (see instructions)

Implementation Steps		2. Schedule (Yr./Mo./Day)		3. Actual Completion (Yr./Mo./Day)
a. Preliminary plan complete	302a	___/___/___	303a	___/___/___
b. Final plan submission	302b	___/___/___	303b	___/___/___
c. Final plan complete	302c	___/___/___	303c	___/___/___
d. Financing complete & contract awarded	302d	___/___/___	303d	___/___/___
e. Site acquired	302e	___/___/___	303e	___/___/___
f. Begin action (e.g., construction)	302f	___/___/___	303f	___/___/___
g. End action (e.g., construction)	302g	___/___/___	303g	___/___/___
h. Discharge Began	302h	___/___/___	303h	___/___/___
i. Operational level attained	302i	___/___/___	303i	___/___/___

EXHIBIT 4-5

EXHIBIT 4-5

INSTRUCTIONS FOR WPC-PS-1

ıis form must be submitted for all Authorizations to Construct or Permit Applications. Two sets of the applications must be submitted. Items which are self-explanatory are omitted in these instructions. Signatures on at least one (1) submittal must be original.

1. Name and location of the project.

2. Give a brief description of the scope of the project such as "A sanitary sewer extension serving Happy Hills Subdivision" or "A sanitary sewer system and activated sludge, sand filter, and disinfection waste treatment facilities serving Happy Hills Subdivision."

3. A detailed explanation of when each of the below indicated schedules must be submitted is indicated on the instruction sheet for the appropriate schedule. Generally, if the project involves any of the items listed, submit the corresponding schedule and check the appropriate space(s).

   Whenever the appropriate instructions for the needed schedule indicates that plans and specifications must be submitted, the exact title as it appears on the plan drawings and specifications should be entered in the appropriate space. Also any other supporting documents for the application should be indicated with the correct titles of those documents.

   Land Trust Disclosure submittal may be a copy of the Trust Agreement from the bank or Schedule K (for MSDGC area) or a statement giving names, addresses and percentage interest of each Trustee or Beneficiary and signed by the Trust Officer (required by Illinois Revised Statutes, 1977, Chapter 148, Paragraph 72).

4. Inidcate the type of application being filed.

   4b. If there is an existing NPDES Permit, indicate Permit Number and Date of Issuance.

5. CERTIFICATE BY DESIGN ENGINEER

   5.1 The Design Engineer should complete this section. This certificate must be provided by all applicants unless a prior written waiver is granted by the Illinois Environmental Protection Agency. The waiver will be granted only for a relatively few instances involving minor discharges or connections.

6. CERTIFICATIONS AND APPROVALS FOR PERMITS

   6.1.1 This certificate applies to the person, firm, or other entity which intends to construct the proposed sewer, wastewater source or treatment works. The applicant to construct is the person, firm, agency or the entity paying for the cost of construction.

   Rule 902(h) states that an application for NPDES shall be signed by a principal executive officer of at least the level of vice president, or his duly authorized representative if such representative is responsible for the overall operation of the facility from which the discharge described in the application form originates. In the case of a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively. In the case of a publicly owned facility, the application shall be signed by either the principal executive officer, ranking elected official or other duly authorized employee. Since an Authorization to Construct is part of an NPDES Permit the above requirements must be complied with when signing.

   6.1.2 This certificate applies to the person, agency, firm, or other entity which owns or is responsible for the operation and maintenance of the proposed project.

   Enter the name of the applicant as it is officially or legally referred to, i.e., the Springfield Sanitary District; Metropolitan Sanitary District of Chicago, the City of Marion or the Super Deluxe Development Corporation. Do not use colloquial names as a substitute for the official name.

   The mailing address of the applicant should be the complete mailing address as its main office. This often will not be the same address as is used to designate the location of the work or activity.

   6.4 These certificates apply to the owners of the intercepting sewers to which the project will be tributary. The "Additional Certificate By Intermediate Sewer Owner" must be completed if intermediate sewers are owned by more than one governing body. If additional certifications are required, please supply the required information on a plain sheet of paper and attach hereto.

   6.5 Rule 958(b) of the Pollution Control Board Regulations Chapter 3 indicates that permit applications for sewer construction or modification shall be accompanied by signed statements from the owners of all intermediate receiving sewers and the receiving treatment works certifying that their facilities have adequate capacity to transport and/or treat the wastewater that will be added through the proposed sewer without violating any provisions of the Act and of Chapter 3. Therefore, it will be necessary to have all such owners provide a certification as required by Chapter 3.

   NOTE: Signatures are also required in other application forms.

JG:jw/sp/1933b,3

INSTRUCTIONS FOR SCHEDULE N - WASTE CHARACTERISTICS

This schedule must be submitted to show raw waste characteristics, effluent quality, and upstream and downstream quality of the receiving waters, sludge characteristics and other wastewater characteristics as required for the various schedules.

1. The name of the project must be the same as that indicated in WPC-PS-1.

2. Flow data

    2.1 Indicate existing, if applicable, and proposed or present design average flow.

    2.2 Indicate existing, if applicable, or proposed or present design maximum flow depending on the schedule originating the request.

    2.3 The information submitted to the Agency for temperature must be sufficient to prove that violations of the temperature portion, 203(i) of the Illinois Pollution Control Board Regulations Chapter 3 will not occur.

    In the case of discharges from power plants, a graphical description of the discharge plume must be provided to the Agency which describes the various isotherm regimes in the plume and defines the boundaries of the discharge plume in relation to the receiving stream.

    The definition of mixing zone is given in Rule 201(a) of the Illinois Pollution Control Board's Regulations. Make sure you are using the latest Illinois Pollution Control Board's interpretation of this definition - mixing zone.

    2.6 The flow rate in the receiving stream at the time of stream sampling must be indicated.

3. Chemical Characteristics: The applicant must prove that the facility if permitted, will not cause violations of the Environmental Protection Act or of Regulations adopted by the Board pursuant to the Act. If the characteristics are not applicable so indicate with the letters NTF (not tested for).

    For existing facilities, the type of sample (grab, composite) and the number of samples taken should be indicated on Schedule N. The Sampling points should be indicated on an appropriately labeled process flow sketch for raw wastewater and treated effluent. The process flow sketch should show all wastewater influent points to the treatment works before ultimate discharge.

    Please review the following comments prior to proceeding.

    3.1 The characteristics must show the average concentration of the particular waste parameter in the design year except when the schedule is being submitted to depict the currect conditions.

    3.2 For existing domestic waste treatment works, as a minimum the influent and effluent analyses should include ammonia nitrogen, fecal coliform, (effluent only), nitrite and nitrate nitrogen, pH, phosphorous as p, suspended solids, total dissolved solids and biochemical oxygen demand (5day).

    3.3 The influent and effluent should be analyzed for chemical parameters appropriate to reflect industrial discharges into the sewer system tributary to the treatment works. Guidelines for such additional analyses are contained in Table 1, which may also be used by industrial discharges as minimum required analysis guidelines.

    3.4 The effluent parameter concentrations shown must reflect the average and maximum concentrations of the treatment works or discharge effluent.

    3.5 An analysis must be performed on the influent and effluent, if it is existing, for each parameter shown on Table 1 for the appropriate industry.

    3.6 If the proper industrial category is not provided on Table 1, the consulting engineer should write the Illinois Environmental Protection Agency requesting a letter with a statement of the required parameters or use the parameters for a similar category on Table 1.

    3.7 If background concentration, Rule 401(b), is considered by the applicant to be a factor in the allowable contaminants being discharged, submit an analysis of the water supply showing the concentration of the applicable parameters.

    3.8 If any constituent level in any discharge or effluent exceeds the water quality standard then analyses must be performed for that parameter upstream and downstream in the receiving stream. The flow rate in the receiving stream at the time of stream sampling must be specified.

    3.9 For proposed facilities approximations should be made and analysis performed in accordance with these items and Table 1.

    3.10 The analysis must be performed in accordance with the Standard Methods for the Examination of Water and Wastewater, 13th edition or with the most current later edition or with other generally accepted procedures approved by the Agency. The methods indicated in Table A of the U.S. Environmental Protection Agency National Pollutant Discharge Elimination System Application Form Standard Form Instructions will be considered acceptable to the agency unless noted otherwise in subsequent changes to these instruction forms.

    3.11 Upstream and downstream analyses will not be required for pretreatment facilities. However, if current data is not available regarding receiving treatment works effluent quality, additional data may be requested.

    3.12 Upstream and downstream analyses will not be required if the minimum, 7-day, 10-year low flow of the stream is zero (0) c.f.s. The effluent quality must meet water quality standards.

FOR IEPA USE:
LOG #
DATE RECEIVED:

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF WATER POLLUTION CONTROL
PERMIT SECTION
Springfield, Illinois 62706

APPLICATION FOR PERMIT OR CONSTRUCTION APPROVAL

WPC-PS-1

1. NAME AND LOCATION:

Name of project: ______

Municipality or Township ______ County ______

2. BRIEF DESCRIPTION OF PROJECT: ______

3. DOCUMENTS BEING SUBMITTED: If the project involves any of the items listed below, submit the corresponding schedule, and check the appropriate spaces.

PROJECT

Private Sewer Connection . . . . A	____	Spray Irrigation . . . . H	____
Public Sewer Extension . . . . B	____	Septic Tanks I	____
Sewer Extension Construct Only C	____	Industrial Treatment or Pretreatment . . . . J	____
Sewage Treatment Works . . . . D	____		
Excess Flow Treatment. . . . . E	____	Cyanide Acceptance. L	____
Lift Station/Force Main. . . . . F	____	Updating Cyanide Acceptance Form. . . . . M	____
Sludge Disposal. . . . . G	____	Waste Characteristics . . . . N	____

LAND TRUST: Is the project identified in item number 1 herein, for which a permit is requested, to be constructed on land which is the subject of a trust? ____ Yes ____ No
If yes, item number 6.1.1 herein must be signed by a beneficiary, trustee or trust officer, and a trust disclosure must be submitted (see instructions, item 3).

Plans: Title ______

______ Number of Pages ______

Specifications: Title ______ Number of Books/Pages ______

Other Documents (Please Specify) ______

4. THIS IS AN APPLICATION FOR (CHECK):

____ A. Joint Construction And Operating Permit
____ B. Authorization To Construct (See Instructions) NPDES Permit No. IL00______ Issue Date ______
____ C. Construct Only Permit (Does Not Include Operations)
____ D. Operate Only Permit (Does Not Include Construction)

5. CERTIFICATIONS AND APPROVAL:

5.1 Certificate by Design Engineer
I hereby certify that I am familiar with the information contained in this application, including the attached schedules indicated above, and that to the best of my knowledge and belief such information is true, complete and accurate. The plans and specifications (specifications other than Standard Specifications or local specifications on file with this Agency) as described above were prepared by me or under my direction.

ENGINEER ______ NAME ______ REGISTRATION NUMBER ______ SEAL

FIRM ______

ADDRESS ______

______ PHONE NUMBER ______

SIGNATURE ______

6. CERTIFICATIONS AND APPROVALS FOR PERMITS:

6.1 Certificate by Applicant(s)
I/We hereby certify that I/we have read and thoroughly understand the conditions and requirements of this Application, and am/are authorized to sign this application in accordance with the Rules and Regulations of the Illinois Pollution Control Board.
I/We hereby agree to conform with the Standard Conditions and with any other Special Conditions made part of this Permit.
6.1.1 NAME OF APPLICANT FOR PERMIT OR AUTHORIZATION TO CONSTRUCT ______

______ STREET ______ CITY ______ STATE ______ ZIP CODE

SIGNATURE ______

TITLE ______ ORGANIZATION ______

6.1.2 NAME OF APPLICANT FOR PERMIT TO OWN AND OPERATE ______________________________

STREET CITY STATE ZIP CODE

SIGNATURE ______________________________

TITLE ______________________________

6.2 Attested (Units of Government)

DATE ____________ SIGNATURE ____________ TITLE ____________
(CITY CLERK, VILLAGE CLERK, SANITARY DISTRICT CLERK, ETC.)

6.3 Applications from non-governmental applicants which are not signed by the owner, must be signed by a principal executive officer of at least the level of vice president, or his duly authorized representative.

6.4 CERTIFICATE BY INTERMEDIATE SEWER OWNER

I hereby certify that (Please check one):

____1. The sewers to which this project will be tributary have adequate reserve capacity to transport the wastewater that will be added by this project without causing a violation of the Environmental Protection Act or Chapter 3, Illinois Pollution Control Board Rules and Regulations, or

____2. The Illinois Pollution Control Board, in PCB ________ dated ____________, granted a variance from Chapter 3 to allow construction and operation of the facilities that are the subject of this application.

Name and location of sewer system to which this project will be tributary:

____

SEWER SYSTEM OWNER ______________________________

STREET CITY STATE ZIP CODE

SIGNATURE ____________ DATE ____________ TITLE ____________

6.4.1 ADDITIONAL CERTIFICATE BY INT. SEWER OWNER

I hereby certify that (Please check one):

____1. The sewers to which this project will be tributary have adequate reserve capacity to transport the wastewater that will be added by this project without causing a violation of the Environmental Protection Act or Chapter 3, Illinois Pollution Control Board Rules and Regulations, or

____2. The Illinois Pollution Control Board, in PCB ________ dated ____________, granted a variance from Chapter 3 to allow construction and operation of the facilities that are the subject of this application.

Name and location of sewer system to which this project will be tributary:

____

SEWER SYSTEM OWNER ______________________________

STREET CITY STATE ZIP CODE

SIGNATURE ____________ DATE ____________ TITLE ____________

6.5 CERTIFICATE BY WASTE TREATMENT WORKS OWNER

I hereby certify that (Please check one):

____1. The waste treatment plant to which this project will be tributary has adequate reserve capacity to treat the wastewater that will be added by this project without causing a violation of the Environmental Protection Act or Chapter 3, Illinois Pollution Control Board Rules and Regulations, or

____2. The Illinois Pollution Control Board, in PCB ________ dated ____________, granted a variance from Chapter 3 to allow construction and operation of the facilities that are the subject of this application.

I also certify that the industrial waste discharges described in the application is capable of being treated by the treatment works, and such waste discharges will be in compliance with all currently applicable local, state or federal pretreatment requirements.

Name and location of waste treatment works to which this project will be tributary:

____

TREATMENT WORKS OWNER ______________________________

STREET CITY STATE ZIP CODE

SIGNATURE ____________ DATE ____________ TITLE ____________

JG:bs/sp/1933b/1-2

INSTRUCTIONS FOR SCHEDULE J - INDUSTRIAL TREATMENT WORKS OR PRETREATMENT WORKS

This application form is intended for applications for Permits or Authorizations to Construct or Permits to operate industrial treatment works or pertreatment works. Schedule J must be submitted with a WPC-PS-1 Form.

All blanks must be filled. When the question is not applicable to your project write "not applicable" or "N.A."

1.1 The name of the project must be the same as that indicated in WPC-PS-1.

1.2.1 Give the location of the discharge point to the nearest quarter section including section, township, range and principal meridian.

1.2.2 Give the location of the discharge point and degrees, minutes, and seconds by interpolation from a quadrangle map.

1.2.3 Name of U. S. Geological Survey Quadrangle Map used in making above determinations.

2. Such a description and schematic waste flow diagram should show the flow of the water from the source to the treatment works. The diagram should specifically include both routine and potential sources of contamination. It may be that information included for this subject could be included on the schematic diagram required in Part 3 below. If this is the case, so indicate and do not duplicate other information provided.

3.1 A schematic wastewater flow diagram must be submitted. It should generally conform to the following description:

A line drawing of wastewater flow through the facility producing the proposed discharges. Average flow rates should be shown for various wastewaters. Specific treatment processes are to be indicated.

A location map is also required. The map should generally conform to the following:

A map showing the location of each discharge structure including any and all outfall devices, dispersive devices, and non-structural points of discharge. The usual meridian arrow showing north as well as the map scale must be shown. On all maps of rivers, the directions of the current is to be indicated by an arrow. Preferably this location map should be done on a copy of U. S. Geological Survey Quadrangle Map for the area involved.

Plans and specifications: For instruction on completion or plans and specifications please refer to the instructions for Schedule D Treatment Works Item 3.

4. Receiving Stream: Please refer to the instructions on receiving stream for Schedule D - Item 4. If the industrial waste treatment or pretreatment is tributary to a municipal sanitary, storm, or combined sewer, signatures of the appropriate municipal or sanitary district official should be provided on Form WPC-PS-1 in Items 5.5 and 5.6 and a current copy of the industrial waste ordinance must be provided.

5. The Agency's design criteria mandates that waste treatment facilities shall be located at an elevation which is not subject to flooding or otherwise be adequately protected against flood damage. Therefore, it will not be acceptable to include in a design the possibility of the waste treatment facilities being subject to flooding at any time regardless of the extent of the flooding.

6. The approximate time schedule is requested to allow the scheduling of Agency field engineering personnel to begin visits to the waste treatment facility site. The date of completion and the date of operation are expected to be essentially the same. The 100 percent design load to be reached by the year indicated is essentially the design year at which time additional facilities must be provided to treat additional waste load to the treatment plant if necessary.

7.5 Contact the Illinois Water Survey in Urbana.

7.6 See the definition of dilution ratio in Chapter 3 Illinois Pollution Control Board Regulations.

8.1.2 Use maximum daily flow for last twelve months.

11. Rule 601(a) of the Illinois Pollution Control Board Chapter 3 Regulations indicates that all treatment works and associated facilities shall be so constructed and operated as to minimize violations of the applicable standards during such contingencies as flooding, adverse weather, power failure, equipment failure, or maintenance through such measures as multiple units, holding tanks, duplicate power sources or other measures.

12. A Schedule G is necessary if sludge must be disposed of from this facility.

13. Submit Schedule N. Use the instructions for Schedule N for completing the information required.

14. The requirements for Operator Certification are given in Part 12 of Chapter 3 Illinois Pollution Control Board Regulations.

FOR IEPA USE:
LOG #
DATE RECEIVED:

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF WATER POLLUTION CONTROL
PERMIT SECTION
Springfield, Illinois 62706

SCHEDULE J INDUSTRIAL TREATMENT WORKS CONSTRUCTION OR PRETREATMENT WORKS

1. NAME AND LOCATION:

1.1 Name of project ____

1.2 Plant Location

1.2.1 ____ Quarter Section ____ Section ____ Township ____ Range ____ P.M.

1.2.2 Latitude ____ ____ ° ____ ____ ' ____ ____ "North

Longitude ____ ____ ° ____ ____ ' ____ ____ "West

1.2.3 Name of USGS Quadrangle Map (7.5 or 15 Minutes) ____

2. NARRATIVE DESCRIPTION AND SCHEMATIC WASTE FLOW DIAGRAM: (see instructions)

____

2.1 PRINCIPAL PRODUCTS: ____

2.2 PRINCIPAL RAW MATERIALS: ____

3. DESCRIPTION OF TREATMENT FACILITIES:

3.1 Submit a flow diagram through all treatment units showing size, volumes, detention times, organic loadings, surface settling rate, weir overflow rate, and other pertinent design data. Include hydraulic profiles and description of monitoring systems.

3.2 Waste Treatment Works is: Batch____, Continuous____; No. of Batches/day____, No. of Shifts/day____

3.3 Submit plans and specifications for proposed construction.

3.4 Discharge is: Existing____; Will begin on____.

4. DIRECT DISCHARGE IS TO: Receiving Stream____ Municipal Sanitary Sewer____, Municipal storm or municipal combined sewer____. If receiving stream or storm sewer indicated complete the following:

Name of receiving stream____; tributary to____;

tributary to____; tributary to____.

5. Is the treatment works subject to flooding? If so, what is the maximum flood elevation of record (in reference to the treatment works datum) and what provisions have been made to eliminate the flooding hazard?____

6. APPROXIMATE TIME SCHEDULE: Estimated construction schedule:

Start of Construction____; Date of Completion____

Operation Schedule____; Date Operation Begins____

100% design load to be reached by year____.

EXHIBIT 4-5 con't.

FOR IEPA USE:
LOG #
DATE RECEIVED:

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF WATER POLLUTION CONTROL
PERMIT SECTION
Springfield, Illinois 62706

SCHEDULE N WASTE CHARACTERISTICS

1. Name of Project ______________________________

2. FLOW DATA — EXISTING — PROPOSED-DESIGN

2.1 Average Flow (gpd) __________ __________

2.2 Maximum Daily Flow (gpd) __________ __________

2.3 TEMPERATURE

Time of year	Ave. Intake Temp. F	Avg. Effluent Temp. F	Max. Intake Temp. F	Max. Effluent Temp. F	Max. Temp. Outside Mixing Zone F
SUMMER					
WINTER					

2.4 Minimum 7-day, 10-year flow: __________cfs __________MGD.

2.5 Dilution Ratio: __________;__________

2.6 Stream flow rate at time of sampling __________cfs __________MGD.

3. CHEMICAL CONSTITUENT Existing Permitted Conditions___; Existing conditions___; Proposed Permitted Conditions__________.

Type of sample:____grab (time of collection___); ___composite (Number of samples per day_____)

(see instructions for analyses required)

Constituent	RAW WASTE (mg/1)	TREATED EFFLUENT Avg. (mg/1) Max.	UPSTREAM DOWNSTREAM SAMPLES (mg/1) (mg/1)
Ammonia Nitrogen (asN)			
Arsenic (total)			
Barium			
Boron			
BOD_5			
Cadmium			
Carbon Chloroform Extract			
Chloride			
Chromium (total hexavalent)			
Chromium (total tribalent)			
Copper			
Cyanide (total)			
Cyanide (readily released @150°F & pH 4.5)			
Dissolved Oxygen			
Fecal Coliform			

7. DESIGN LOADINGS.

7.1 Design population equivalent (one population equivalent is 100 gallons of wastewater per day, containing 0.17 pounds of BOD_5 and 0.20 pounds of suspended solids;

BOD______________________; Suspended Solids____________________; Flow______________________.

7.2 Design Average Flow Rate____MGD.

7.3 Design Maximum Flow Rate____MGD.

7.4 Design Minimum Flow Rate____MGD.

7.5 Minimum 7-day, 10-year low flow__________________cfs______________MGD.

Minimum 7-day, 10-year flow obtained from______________________________________.

7.6 Dilution Ratio_______;_________.

8. <u>FLOW TO TREATMENT WORKS (if existing)</u>:

8.1 Flow (last 12 months)

8.1.1 Average Flow____________MGD

8.1.2 Maximum Flow____________MGD

8.2 Equipment used in determing above flows______________________________________.

9. Has a preliminary engineering report for this project been submitted to this Agency for Approval?

YES___ NO___. If so, when was it submitted and approved. Date Submitted______________________

Certification#______________________

Dated______________________

10. List Permits previously issued for the facility:______________________________________

____

11. Describe provisions for operation during contingencies such as power failures, flooding, peak loads, equipment failure, maintenances shut-downs and other emergencies.

12. Complete and submit Schedule G if sludge disposal will be required by this facility.

13. <u>WASTE CHARACTERISTICS</u>: Schedule N must be submitted.

14. <u>TREATMENT WORKS OPERATOR CERTIFICATION</u>: List names and certification numbers of certified operators:

____

____

FOR IEPA USE:
LOG #
DATE RECEIVED:

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF WATER POLLUTION CONTROL
PERMIT SECTION
Springfield, Illinois 62706

SCHEDULE N WASTE CHARACTERISTICS

1. Name of Project ______________________________

2. FLOW DATA — EXISTING — PROPOSED-DESIGN

2.1 Average Flow (gpd) ______________ ______________

2.2 Maximum Daily Flow (gpd) ______________ ______________

2.3 TEMPERATURE

Time of year	Ave. Intake Temp. F	Avg. Effluent Temp. F	Max. Intake Temp. F	Max. Effluent Temp. F	Max. Temp. Outside Mixing Zone F
SUMMER					
WINTER					

2.4 Minimum 7-day, 10-year flow: ____________cfs ____________MGD.

2.5 Dilution Ratio: ____________;____________

2.6 Stream flow rate at time of sampling ____________cfs ____________MGD.

3. CHEMICAL CONSTITUENT Existing Permitted Conditions___; Existing conditions____; Proposed Permitted Conditions____________.

Type of sample:____grab (time of collection___); ___composite (Number of samples per day______)

(see instructions for analyses required)

Constituent	RAW WASTE (mg/1)	TREATED EFFLUENT Avg. (mg/1) Max.	UPSTREAM DOWNSTREAM SAMPLES (mg/1) (mg/1)
Ammonia Nitrogen (asN)			
Arsenic (total)			
Barium			
Boron			
BOD_5			
Cadmium			
Carbon Chloroform Extract			
Chloride			
Chromium (total hexavalent)			
Chromium (total tribalent)			
Copper			
Cyanide (total)			
Cyanide (readily released @150°F & pH 4.5)			
Dissolved Oxygen			
Fecal Coliform			

	RAW WASTE (mg/l)	TREATED EFFLUENT Avg. (mg/l) Max.	UPSTREAM (mg/l)	DOWNSTREAM SAMPLES (mg/l)
Fluoride				
Hardness (as $CaCO_3$)				
Iron (total)				
Lead				
Manganese				
MBAS				
Mercury				
Nickel				
Nitrates (asN)				
Oil & Grease (hexane solubles or equivalents)				
Organic Nitrogen (as N)				
pH				
Phenols				
Phosphorous (as P)				
Radioactivity				
Selenium				
Silver				
Sulfate				
Suspended Solids				
Total Dissolved Solids				
Zinc				
Others				

EXHIBIT 5-1

EXHIBIT 5-1

Please print or type in the unshaded areas only
(fill—in areas are spaced for elite type, i.e., 12 character/inch).

Form Approved OMB No. 158 S80004

FORM 3 RCRA — EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY
HAZARDOUS WASTE PERMIT APPLICATION
Consolidated Permits Program
(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER
F

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

☐ 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

☐ 2. NEW FACILITY *(Complete item below.)*

8 | YR. | MO. | DAY | FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

| YR. | MO. | DAY | FOR NEW FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR IS EXPECTED TO BEGIN

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

☐ 1. FACILITY HAS INTERIM STATUS

☐ 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. PROCESS CODE — Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY — For each code entered in column A enter the capacity of the process.
1. AMOUNT — Enter the amount.
2. UNIT OF MEASURE — For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY	PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:			**Treatment:**		
CONTAINER (barrel, drum, etc.)	S01	GALLONS OR LITERS	TANK	T01	GALLONS PER DAY OR LITERS PER DAY
TANK	S02	GALLONS OR LITERS	SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS	INCINERATOR	T03	TONS PER HOUR, METRIC TONS PER HOUR, GALLONS PER HOUR OR LITERS PER HOUR
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS	OTHER (Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)	T04	GALLONS PER DAY OR LITERS PER DAY
Disposal:					
INJECTION WELL	D79	GALLONS OR LITERS			
LANDFILL	D80	ACRE-FEET (the volume that would cover one acre to a depth of one foot) OR HECTARE-METER			
LAND APPLICATION	D81	ACRES OR HECTARES			
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY			
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS			

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C | DUP | 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1					7				
					8				
3					9				
4					10				

SAMPLE

EXHIBIT 5-1 Cont'd

Continued from the front.

III. PROCESSES (continued)

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES (code "T04"). FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY

SAMPLE

IV. DESCRIPTION OF HAZARDOUS WASTES

A. EPA HAZARDOUS WASTE NUMBER – Enter the four–digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four–digit number(s) from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY – For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non–listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE – For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed hazardous waste: For each listed hazardous waste entered in column A select the code(s) from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non–listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code(s) from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non–listed hazardous wastes that possess that characteristic or toxic contaminant.

Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code(s).

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER – Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B, C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* – A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non–listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)				D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3	D 8 0			
X-2	0 0 0 2	400	P	T 0 3	D 8 0			
X-3	0 0 0 1	100	P	T 0 3	D 8 0			
X-4	0 0 0 2							included with above

Continued from page 2.

NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)	T/A C	FOR OFFICIAL USE ONLY	T/A C
W	1	W DUP	2

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

SAMPLE

EPA Form 3510-3 (5-80)

PAGE 3 ____ OF 5

(enter "A", "B", "C", etc. behind the "3" to identify photocopied pages)

CONTINUE ON REVERSE

Continued from the front

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM B(1) ON PAGE 3.

SAMPLE

EPA I.D. NO. (enter from page 1)

F | | | | | | | | | | | | T/A C 6

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility (see instructions for more detail).

VI. PHOTOGRAPHS

All existing facilities must include photographs (aerial or ground–level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE (degrees, minutes, & seconds)	LONGITUDE (degrees, minutes, & seconds)

VIII. FACILITY OWNER

☐ A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER			2. PHONE NO. (area code & no.)
D			
3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
E	F		

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED

EXHIBIT 5-1 con't.

Continued from page 4.

Form Approved OMB No. 158-S80004

V. FACILITY DRAWING *(see page 4)*

SAMPLE

FR Doc. 80-14313 Filed 5-16-80; 8:45 am

BILLING CODE 6560-01-C

EXHIBIT 5-2

New Application ___
Renewal ___
Additional Site ___

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL
SPECIAL WASTE DISPOSAL APPLICATION

FOR AGENCY USE Log #________

THIS APPLICATION FOR WASTE:
Treatment ___
Disposal ___
Storage ___

RD TYPE DATE ________ L P S W C (1–5) AUTHORIZATION NUMBER 8 _ _ _ _ _ 13 TRANS CODE 14 DATE ENTERED (Agency Use) 15 16 / 17 18 / 19 20

WASTE HAULER

1 6 (6 7) HAULER REGISTRATION NUMBER 21 _ _ 24 NAME ________________

ADDRESS ________________ COMMUNITY ________________

COUNTY ________ STATE ________ ZIP ________ AREA CODE ____ TELEPHONE ________

WASTE GENERATOR

GENERATOR CODE 25 _ _ _ _ _ _ _ _ _ G 35 NAME ________________

ADDRESS ________________ COMMUNITY ________________

COUNTY ________ STATE ________ ZIP ________ AREA CODE ____ TELEPHONE ________

GENERATOR CONTACT NAME 36 _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ 65

DUNS NUMBER ________ SIC CODE ________ USEPA GEN. CODE ________

2 0 (6 7) PROCESS NAME 21 _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ 50

WASTE CHARACTERISTICS

GENERIC WASTE NAME 51 _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ 80

4 0 (6 7) IUPAC WASTE NAME 21 _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ 50

TOTAL ANNUAL WASTE VOLUME 51 _ _ _ _ _ _ _ _ _ 60 VOLUME UNITS 61 WASTE PHASE 62

TRANSPORT FREQUENCY 63 WASTE CLASS (Agency Use) 64 65

VOLUME UNITS:
1 = CUBIC YARDS
2 = GALLONS

WASTE PHASE:
1 = SOLID
2 = SEMI-SOLID
3 = LIQUID
4 = GAS

TRANSPORT FREQUENCY:

1 = ONE TIME	5 = MONTHLY
2 = DAILY	6 = BI-MONTHLY
3 = WEEKLY	7 = QUARTERLY
4 = BI-WEEKLY	8 = SEMI-ANNUALLY

(Code either "1" for Low, "2" for Medium, or "3" for High as appropriate for columns 21 through 26):

5 0 (6 7) INHALATION TOXICITY 21 DERMAL TOXICITY 22 INGESTIVE TOXICITY 23 INFECTIOUS 24 REACTIVITY 25 EXPLOSIVE 26

FLASH POINT 27 _ _ 30 °F ALPHA RADIATION 31 _ _ _ _ 36 (pCi/L) COMPOSITION 37

COMPOSITION:
1 = ORGANIC
2 = INORGANIC

PERCENT ACIDITY 38 _ . 40 PERCENT ALKALINITY 41 _ . 43 pH 44 _ . 46 PERCENT TOTAL SOLIDS 47 _ _ . _ 51

6 0 (6 7) KEY COMPONENT NAME — PERCENT — KEY COMPONENT NAME — PERCENT

1 (21) 22 _ _ _ _ _ _ _ _ _ _ 43 44 . 47 — 2 (48) 49 _ _ _ _ _ _ _ _ _ _ 70 71 . 74
3 (21) 22 _ _ _ _ _ _ _ _ _ _ 43 44 . 47 — 4 (48) 49 _ _ _ _ _ _ _ _ _ _ 70 71 . 74
5 (21) 22 _ _ _ _ _ _ _ _ _ _ 43 44 . 47 — 6 (48) 49 _ _ _ _ _ _ _ _ _ _ 70 71 . 74

USEPA HAZARDOUS WASTE NO. ____, ____, ____, ____
(If Hazardous)

IL 532-0474
ADM 1067 (Rev. 1/81)

CARD TYPE DATE ________ L P S W C (1–5) AUTHORIZATION NUMBER ______ (8–13) TRANS CODE __ (14) DATE ENTERED (Agency Use) __ __ / __ __ / __ __ (15 16 / 17 18 / 19 20)

WASTE CHARACTERISTICS

/ 0 (6 7)

METAL	KEY	TOTAL (PPM)	EP TOXICITY (PPM)	METAL	KEY	TOTAL (PPM)	EP TOXICITY (PPM)
CN	__ __ (21)	______.__ (23–30)	______.__ (31–38)	Cu	__ __ (39)	______.__ (41–48)	______.__ (49–56)
Ag	__ __	______.__	______.__	Hg	__ __	______.__	______.__
As	__ __	______.__	______.__	Ni	__ __	______.__	______.__
Ba	__ __	______.__	______.__	Pb	__ __	______.__	______.__
Cd	__ __	______.__	______.__	Se	__ __	______.__	______.__
Cr	__ __	______.__	______.__	Zn	__ __	______.__	______.__
PHENOL	__ __	______.__		S	__ __	______.__	
ENDRIN			______.__	2 - 4 D			______.__
LINDANE			______.__	2,4,5 - TP			______.__
METHOXYCHLOR			______.__	TOXAPHENE			______.__

8 0 (6 7) LABORATORY NAME ____________________ (21–40)

CERTIFICATION NUMBER __________ (41–50) REVIEWED BY: __ __ __ / __ __ __ (51 53 / 54 56)

9 0 (6 7)

1 (21) SITE CODE ________ (22–29) SITE NAME ____________

DISPOSAL METHOD __ __ (30 31) NEUTRALIZATION METHOD __ __ (32 33)

SIGNATURE ____________ (SITE OWNER) SIGNATURE ____________ (SITE OPERATOR)

STATUS __ (34) START DATE __ __ / __ __ / __ __ (35 36 / 37 38 / 39 40) EXPIRATION DATE __ __ / __ __ / __ __ (41 42 / 43 44 / 45 46)

2 (21) SITE CODE ________ (22–29) SITE NAME ____________

DISPOSAL METHOD __ __ (30 31) NEUTRALIZATION METHOD __ __ (32 33)

SIGNATURE ____________ (SITE OWNER) SIGNATURE ____________ (SITE OPERATOR)

STATUS __ (34) START DATE __ __ / __ __ / __ __ (35 36 / 37 38 / 39 40) EXPIRATION DATE __ __ / __ __ / __ __ (41 42 / 43 44 / 45 46)

3 (21) SITE CODE ________ (22–29) SITE NAME ____________

DISPOSAL METHOD __ __ (30 31) NEUTRALIZATION METHOD __ __ (32 33)

SIGNATURE ____________ (SITE OWNER) SIGNATURE ____________ (SITE OPERATOR)

STATUS __ (34) START DATE __ __ / __ __ / __ __ (35 36 / 37 38 / 39 40) EXPIRATION DATE __ __ / __ __ / __ __ (41 42 / 43 44 / 45 46)

4 (21) SITE CODE ________ (22–29) SITE NAME ____________

DISPOSAL METHOD __ __ (30 31) NEUTRALIZATION METHOD __ __ (32 33)

SIGNATURE ____________ (SITE OWNER) SIGNATURE ____________ (SITE OPERATOR)

STATUS __ (34) START DATE __ __ / __ __ / __ __ (35 36 / 37 38 / 39 40) EXPIRATION DATE __ __ / __ __ / __ __ (41 42 / 43 44 / 45 46)

EXHIBIT 5-3

EXHIBIT 5-3

ILLINOIS EPA

Environmental Protection Agency

2200 Churchill Road, Springfield, Illinois 62706

217/782-6760

This is in response to your recent request for application forms, Rules and Regulations, and information relative to obtaining a permit for a waste management (non-disposal) facility.

Enclosed are the following:

- 1 copy Environmental Protection Act
- 1 copy Chapter 7: Solid Waste Rules and Regulations
- 1 copy Chapter 9: Special Waste Hauling Regulations
- 2 copies Application for Permit to Develop a Solid Waste Management Site
- 2 copies Application form for Operating and/or Supplemental Permit

If no on-site disposal is requested, all of the information requested in the application shall be provided, with these exceptions:

1. Item 17 and all of Part III may be omitted if there are no disposal areas, treatment/holding lagoons, or underground tanks for waste storage.

2. Topography of the site may be omitted on plan sheets described in Items 23 and 24.

3. Items 25, 26, 28b and d, 30g and h do not apply to non-disposal facilities, and may be omitted.

4. Item 27 may be omitted if the facility is an existing facility.

The following is provided to aid the applicant and his engineer in preparation of the application:

1. The Agency's greatest concern for non-disposal facilities is the attention to "housekeeping" and safety. A safe, well-run operation poses a minimal pollution potential and minimal threat to the employees and neighbors of the facility. Please address the following in this light:

   a. Include a paragraph describing the general purpose of the facility (or portion of the facility concerned with waste storage, recycling, etc.).

   b. Contingency plans and responses in the event of any type of spill, leaks, tank rupture, fire, or release of special waste to the environment shall be provided.

   c. Procedures for and frequency of inspection for leaky containers shall be provided.

   d. Provide the name of the IEPA-licensed Special Waste Hauler for special wastes received at or removed from the facility, and the name and permit number of receiver of waste generated at this facility.

   e. Specific type(s) of waste received and removed shall be stated. Provide on a monthly and yearly basis:

      1. Volumes of incoming waste
      2. Storage capacity for waste (maximum)
      3. Process capacity (maximum)
      4. Volume of outgoing waste

   f. A flow diagram (for all facilities for other than on-site storage only) shall show how waste is stored, handled, processed, and removed from the site.

2. If the applicant and/or owner is a corporation, name the president and corporation. The shift manager is not the person responsible for the operation - the company owner is.

3. For Items 23 and 24, generally one plan sheet may be submitted showing all requested features (those that show the operation to be permitted). Topographic contours may be omitted, but include essential dimensions of all other features. Procedures and areas for waste loading and unloading shall be shown on plan sheets. Catchment basins, curbing, berms, or the like for spill control shall be shown on plans. Describe procedures in narrative. If only a small portion of the facility is to be permitted, such as a barrelled waste storage area in a factory, outline the entire factory, and provide details of waste storage area only. The plan sheet shall be attested by a professional engineer.

4. For Item 31, list all storage or process tanks, trucks, fork lifts for moving barrels, etc. Pumps, valves, hoses may be omitted.

5. The Agency requires soil borings and possibly monitoring wells to be made in the vicinity of underground tanks to insure their integrity. These borings, at least three equally spaced around a tank, are to be situated ten to thirty feet from the tank, one up-gradient, two down-gradient, and finished to a depth of thirty feet below the bottom of the tank. For more than one tank, additional borings may be needed to adequately address the pollution potential. Monitoring wells may be required at these locations dependent on soil conditions. Soil borings shall be submitted to the Agency for evaluation. A monitoring program shall be established by the Ground Water Management Section.

6. Item 32a-h requests names <u>and addresses</u> of those persons and groups listed. Give the appropriate title for the <u>various office</u> holders. This information is required for proposed and existing facilities. The term "adjacent property owners" refers to those who share property lines with the facility. Vacant property is owned by someone.

7. Item 33 may be answered either in several short paragraphs, one for each section, or in one or a few longer paragraphs, responding to all statements collectively.

8. On page 10, the application <u>must</u> be signed by the applicant (operator), an Illinois registered professional engineer, and the land owner. If the applicant or owner is a corporation, the president or authorized agent shall sign. Give the title of the person signing the application. The lower portion of the last page is (optional) space for other persons to sign who supplied information or otherwise aided in preparation of the application. Type or print the name below each signature.

If you have any further questions concerning the application, please call this office at the number above, or make an appointment to meet with us here at the Agency.

Very truly yours,

Sallie Anne Smith

Sallie Anne Smith
Solid Waste Unit
Residual Management Section
Division of Land/Noise Pollution Control

SAS:sh

APPLICATION FOR PERMIT

In order to clarify submittals made to the Land Permit Section, this document shall be utilized as page one of applications for Operating Permit and Supplemental Permit for site modification. This form is not to be used with applications for Development Permit and for Supplemental Permit to accept special waste (green forms).

____
date

Illinois Environmental Protection Agency
Land Permit Section
Division of Land/Noise Pollution Control
2200 Churchill Road
Springfield, Illinois 62706

Gentlemen:

This is an application for

- ☐ Operating Permit
- ☐ Supplemental Permit to modify development
- ☐ Supplemental Permit to modify operation

for

Site Name: ____________________

Site Address: ____________________

____

____

County: ____________________

Signatures:

Site Operator: ______________________________

Operator Address: ______________________________

____

____

Site Owner: ______________________________

Owner Address: ______________________________

____

____

Engineer: ______________________________

P.E. Reg. No.: ______________________________

Address: ______________________________

____

____

Phone No.: ______________________________

I hereby authorize ____________________________________
________________ to execute all permit application documents to the Land Permit Section, Division of Land/Noise Pollution Control on my behalf as site owner.

Signature ____________________, Date __________

I hereby authorize ____________________________________
________________ to execute all permit application documents to the Land Permit Section, Division of Land/Noise Pollution Control on my behalf as site operator.

Signature ____________________, Date __________

ILLINOIS EPA

Environmental Protection Agency

2200 Churchill Road, Springfield, Illinois 62706

Waste
Check if
Applicable

___Storage
___Transfer
___Processing
___Recovery
___Incineration
___Other

APPLICATION FOR PERMIT TO DEVELOP A SOLID WASTE MANAGEMENT SITE

In Accordance With The Environmental Protection Act

All information submitted as part of the Application is available to the public except when specifically designated by the Applicant to be treated confidentially as regarding a trade secret or secret process in accordance with Section 7(a) of the Environmental Protection Act.

APPLICATION MUST BE SUBMITTED IN DUPLICATE

PART I - APPLICANT INFORMATION

A. Site Identification

1. Name of Applicant________________________________
(Person responsible for operation)

2. Address of Applicant________________________________
(Street, P.O, Box, or R. R. #)

____
City State Zip Code

Telephone:________________
(Area Code) (Number)

3. Name of Land Owner________________________________
(If same as above, so indicate)

4. Address of Land Owner________________________________
(Street, P.O. Box, or R. R. #)

____
City State Zip Code

STPR 5/15/79
LPC-7 Rev. 5/79

5. Name of Site ______________________________

6. Address of Site ______________________________
(Street, P.O. Box, or R. R. #)

____
City State Zip Code

______________ County ____________ Township

7. Land ownership (Check Applicable Boxes)

( ) Presently Owned by Applicant ( ) To be Leased by Applicant For ___ Years
( ) To Be Purchased by Applicant ( ) ___ Years of Lease Remaining:
Termination date of lease ____________

Operated by: Ill. Corporation ( ) Partnership ( ) Government ( )
Individual ( ) Other ( )

B. SITE BACKGROUND (Check Applicable Box or Boxes)

8. ( ) This is an existing operation begun _______ (mo.) _______ (yr.)
( ) this is a proposed operation.
( ) This is a proposed extension of an existing adjacent operation:
Illinois E.P.A. Permit No. ________________:
( ) No Illinois E.P.A. Permit.

PART II - LOCATION INFORMATION

A. ZONING AND LOCAL REQUIREMENTS

9. Present zoning classification of site ______________________

10. Does present zoning of site allow the proposed usage?
( ) Yes ( ) No.

11. Restrictions (if any) ______________________________

____

12. Check applicable boxes which describe the use of adjacent properties surrounding site.

	Residential	Commercial	Industrial	Agricultural	Others*
a. North	( )	( )	( )	( )	( )
b. East	( )	( )	( )	( )	( )
c. South	( )	( )	( )	( )	( )
d. West	( )	( )	( )	( )	( )

*SPECIFY USE CLASSIFICATION________________________

13. a. Are there any permits, operational requirements, licenses, or other requirements or restrictions by any municipality, planning commission, county, county health department, state agency, or other governing body?
( ) Yes ( ) No If yes, List below.____________________

____

____

b. Have these requirements, licenses or restrictions been approved by the agency or governing body having jurisdiction?
( ) Yes ( ) No

c. If the answer to (b) is yes, include photocopies of supporting documents.

B. LOCATION

14. Attach a copy of the United States Geologic Survey (U.S.G.S.) topographic quadrangle map of the area which contains the site. (7.5 minute quadrangle, if published).

Quadrangle Map Provided:____________________ ____________________
Name Date

15. a. Outline on the U.S.G.S. topographic quadrangle map the location and extent of the site.

b. Provide a legal description of the site. (Typewritten on attached sheet.)

______Acres in _____Quarter, ______Quarter, ______Quarter, of Section___________, Township ___________,
Range ___________, _____________P.M.

16. General characteristic: (Flood Plain, Hillside, Field, Strip Mine, Quarry, Gully, Gravel Pit, Swamp, etc.)
Briefly describe:____

____

____

17. Plot the following information on the U.S.G.S. quadrangle topographic map, if within the site or adjacent to the outer perimeter of facility:

a. Wells (domestic, industrial, etc.)
b. Public water sources (wells, stream, etc.)
c. Residences or residential areas, commercial facilities, sewage treatment facilities, industries, institutions, etc.
d. Other treatment facilities not shown on topographic map such as diverted steams, strip mines, ponds, etc.

If scale of quadrangle map is not sufficient, show the above items on a separate topographic map (See Part IV - A - 23).

PART III - SITE CHARACTERISTICS

To Be Completed If Land Disposal Of Waste On Site Is Requested

A. GEOLOGY - HYDROLOGY

NOTE: The instructions for this Part of the Application should be read carefully prior to initiating the data-gathering program for the site.

Provide subsurface information in comprehensive detail, sufficient to allow thorough evaluation of the hydrologic and geologic conditions beneath and surrounding the site. This data must fully describe the hydrogeologic interrelationships of the landfill facility, local ground waters, and surface waters. All information requested in sections 18 through 22 should be integrated and presented as a detailed hydrogeologic report.

B. GEOLOGY

GENERAL GEOLOGIC SETTING

18. Provide a brief description of the general geography of the region in which the site is located, and a summary of the hydrogeologic conditions typical of that portion of Illinois.

TYPE AND EXTENT OF SUBSURFACE MATERIALS

19. Provide a complete log (description) of each boring made during the exploratory program, and include all other pertinent data so obtained.

20. Include the following information regarding the bedrock, if encountered during the boring program:

    a. Depth(s) to bedrock.
    b. Lithology (physical character) and hydrologic characteristics of the bedrock formation.
    c. Name and age of the formations encountered during the boring operation and (or) which crop out on or adjacent to the site.

C. MATERIALS CLASSIFICATION AND ANALYSIS

21. Provide the following information for samples taken during the boring operation:

    a. textural classification (U.S.D.A. system)
    b. particle size distribution curves for representative samples
    c. coefficient of permeability - based on field and (or) laboratory determinations
    d. ion-exchange capacity and ability to absorb and "fix" heavy metal ions

D. HYDROLOGY

22. Provide the following information regarding the hydrologic flow system in the area of the site:

    a. Depth to water in boreholes at time of boring completion and periodic measurements until the water level has stabilized.
    b. Rate(s) and direction(s) of ground-water movement.
    c. A narrative description (with diagrams) of the design and installation procedures for all piezometers installed at the site. This shall include both water-level measuring piezometers and those installed for permanent use as water-quality monitoring points.
    d. An analysis of the background ground-water quality, as per those constituents listed in the Instructions. Attach a copy of the laboratory report.
    e. An outline of the procedures, devices, and personnel to be employed for the collection of periodic ground-water samples from the monitoring point(s) installed at the site.

PART IV - CONSTRUCTION PLANS AND SPECIFICATIONS

A. SITE DEVELOPMENT PLAN

23. Provide a detailed topographic map of the existing site (Scale 1" = 200' or larger) showing 5-foot contour intervals on sites (or portions thereof) where the relief exceeds 20 feet, and 2-foot contour intervals on sites (or portions thereof) having less than 20 feet of relief. This map should show all buildings, ponds, streams, wooded areas, bedrock outcrops, underground and overhead utilities, roads, fences, culverts, drainage ditches, drain tiles, easements, streets, any other item of significance, including legal boundaries.

    Show the location and elevation of borings as described in Part III - 19, 20.

24. Provide a separate map, at the same scale as that above, of the developed site showing the following:

    a. All changes in topography dictated by design and operational factors.
    b. All surface features (as specified in IV - A - 23) both unaltered and modified, and installed as part of the facility. This shall include all new construction with location plans for berms, dikes, dams, earth barriers, surface drainage ditches, drainage devices, (culverts, tiles), fencing, access roads, entrance(s), utilities, buildings, sanitary facilities, monitoring well(s), streams, ponds, mines, and any other special construction as may be required to comply with the provisions of the Rules and Regulations.
    c. Earth barriers, berms, dikes and other barriers, including essential dimensions of each.

25. Provide a topographic map of the closed and covered site showing final contours, with an interval of 5 feet if relief is greater than 20 feet, and intervals of 2 feet if relief is less than 20 feet.

26. Provide plan views (Scale 1" = 200') and cross sections of the leachate collection and treatment system, if utilized, including the following information:

    a. Type, location and construction of subsurface collection system, and all attendant devices.
    b. Location, dimensions, volume, and surface elevation of treatment lagoon(s), if used.
    c. Detailed written narrative of the method and processes of the treatment system, and program for monitoring the performance and effectiveness of the treatment system.
    d. Discharge point(s) of effleunt.

B. SCHEDULE OF CONSTRUCTION

27. Attach a typewritten narrative supplemented by indications on the plans of the sequence of areas to be developed. Estimate the date of beginning and ending of each phase of construction and operation.

C. CONSTRUCTION REQUIREMENTS

28. Attach a typewritten narrative supplemented by indications on the plans of provisions to be made for:

   a. Prevention of surface-water pollution.

   b. Control of gas migration.

   c. Elimination of flood hazard, if any.

   d. Employee facilities.

   f. Measuring quantity of waste delivered to the site.

PART V - OPERATING PLAN

A. SOURCE AND VOLUME

29. Indicate the estimated quantity of each of the following source and types of waste the facility will handle during each day of operations; each week of opertion; each year of operation. Specify any additional information regarding refuse source and quantity.

SOURCE	TYPE	DAILY QUAN.	WEEKLY QUAN.	ANNUAL QUAN.
a. Residential				
b. Commercial				
c. Industrial				
d. Agricultural				
e. Other (Describe)				

B. OPERATING REQUIREMENTS

30. Attach a typewritten description of provisions for:

   a. Personnel for supervision and operation
   b. Traffic control

c. Designation of unloading area
d. Dust control
e. Odor control
f. Management of surface water
g. Erosion control
h. Monitoring program for gas
i. Reuse and recycling operations

31. Provide a list of equipment to be used for the operation:

ITEMS	MODEL NUMBER	NO. OF UNITS IN OPERATION	DESCRIPTION

PART VI - NOTICE/LAND USE

32. In order that notice of intent be sent to those affected by this application, you shall provide these names and addresses to the Agency:

a) State's Attorney of the county in which the site is located.
b) Chairman of the County Board of the county in which the site is located.
c) Each member of the General Assembly from the Legislative district in which the site is located. (Three Representatives, One Senator)

d) The clerk of each municipality, any portion of which is within three miles of the site.
e) Adjacent landowners to the proposed site.
f) Local zoning and planning agencies.

33. Provide the following documentary evidence sufficient to show:

a) That the facility is located so as to minimize scenic blight, and to avoid damage to archaeological and/or historic sites and areas of significant natural beauty;

b) That the facility is located so as to avoid any hazards to public health and safety and to minimize any offenses to the senses of persons residing, working, traveling, and/or in any way spending periods of time in the immediate vicinity. Immediate vicinity is here defined to mean a one-mile radius zone adjacent to the boundary of the site;

c) Taking into consideration the character of the area involved, including the character of surrounding land uses and the trend of development, as well as local comprehensive plans and zoning ordinances, that the facility is located so as to minimize incompatibility with the character of the surrounding area.

d) That the facility is located so as to avoid causing substantial depreciation of nearby property (taking into consideration, where possible, any mitigation caused by the short proposed life of the site and end use);

e) That any detriments caused by removal of the site from its former use are out-weighed by the need in the area for such a facility at this location;

f) That the facility is located so as to avoid a continued adverse effect on existing air and water quality; and

g) Taking into consideration geological and hydrological factors, the location of the site in relating to sources of solid waste and accessibility to transportation modes, and the technical feasibility and economic reasonableness of disposing of solid waste at the proposed location, that the facility is suited for its intended use.

h) That access roads and bridges are not limited to preclude necessary vehicular traffic (i.e. proposed size and weight limits).

I hereby affirm that all information contained in this Application is true and accurate to the best of my knowledge and belief.

Signature of Applicant: ______________________ ______________
Date

Attest: ______________________ ______________
Date

Signature of Engineer: ______________________ ______________

Illinois Reg. No: ______________________

Attest: ______________________ ______________
Date

Signature of Landowner(s): ______________________ ______________
Date

Attest: ______________________ ______________
Date

Engineer (Seal)

Signature of other person, technical and non-technical, who has supplied data contained in the submittal.

______________________ ______________
Signature Date

____
Reg. No., Position, Title, Etc.

Engineer (Seal)

______________________ ______________
Signature Date

____
Reg. No., Position, Title, Etc.

(Seal)

SAS:bls/7055A/sp

EXHIBIT 5-4

EXHIBIT 5-4

ILLINOIS EPA

Environmental Protection Agency

2200 Churchill Road, Springfield, Illinois 62706

____
(addressee)

Pursuant to the provisions of Section 1039 of the Illinois Environmental Protection Act (Illinois Revised Statutes, Chapter 111½, § 1039) you are hereby notified that:

______________________________ Applicant (Person or Company)

______________________________ Address

______________________________ City & State

has applied to the Agency for a:

☐ 1. Development Permit
☐ 2. Operation Permit
☐ 3. Supplemental Permit
☐ 4. Other

To:

☐ A. Develop a Site
☐ B. Operate the Site
☐ C. Modify Site Development
☐ D. Modify Site Operation
☐ E. To Receive Special Waste (generically described as:)

____

____

Site

☐ 1. Landfill
☐ 2. Waste Storage Only
☐ 3. Transfer Station
☐ 4. Recycling, Processing facility
☐ 5. Incinerator
☐ 6. Other (describe) ____________

____

____

At: ______________________________ Site Name

______________________________ Street or Road

______________________________ Near (Municipality)

______________________________ City, County, State, Zip Code

If you have any comments, please submit them in writing within thirty-five (35) days for Development and Operation Permits, or twenty-one (21) days for Supplemental Permits to:

Illinois Environmental Protection Agency
Residual Management Section, Division of Land/Noise Pollution Control
2200 Churchill Road
Springfield, Illinois 62706

Thomas E. Cavanagh, Jr., Manager
Residual Management Section
Division of Land/Noise Pollution Control

IL 532-0334
LPC-40 Rev. 2/81

EXHIBIT 5-5

EXHIBIT 5-5

In order to show that the applicant meets local land-use and zoning requirements, IEPA requires that "documentary evidence" be submitted sufficient to show the following":

1. That the landfill is located so as to minimize scenic blight, and to avoid damage to archaeological and/or historic sites and areas of significant natural beauty;

2. That the landfill is located so as to avoid any hazards to public health and safety and to minimize any offenses to the senses of persons residing, working, traveling, and/or in any way spending periods of time in the immediate vicinity. Immediate vicinity is defined to mean a one-mile radius zone adjacent to the boundary of the site;

3. Taking into consideration the character of the area involved, including the character of surrounding land uses and the trend of development, as well as local comprehensive plans and zoning ordinances, that the landfill is located so as to minimize incompatibility with the character of the surrounding area.

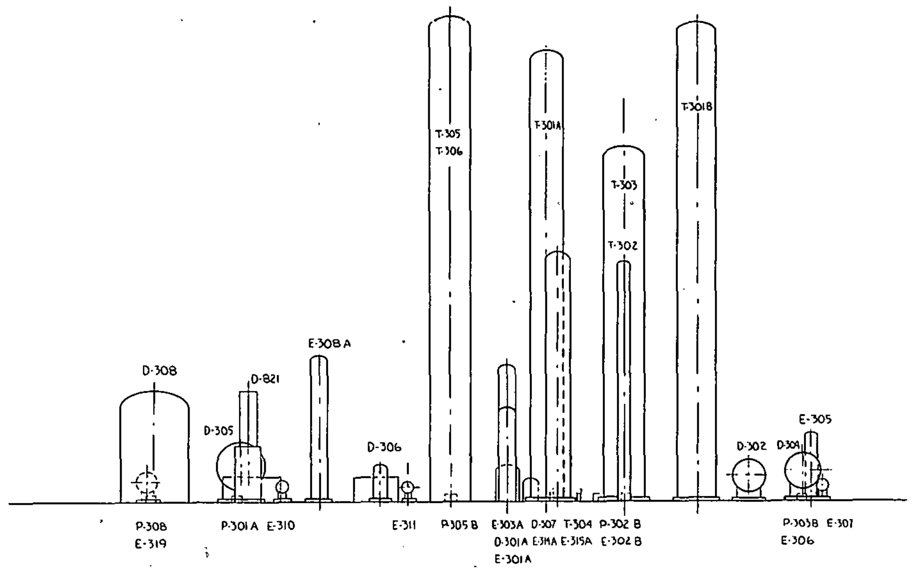
4. That the landfill is located so as to avoid causing substantial depreciation of nearby property (taking into consideration, where possible, any mitigation caused by the short proposed life of the site and end use);

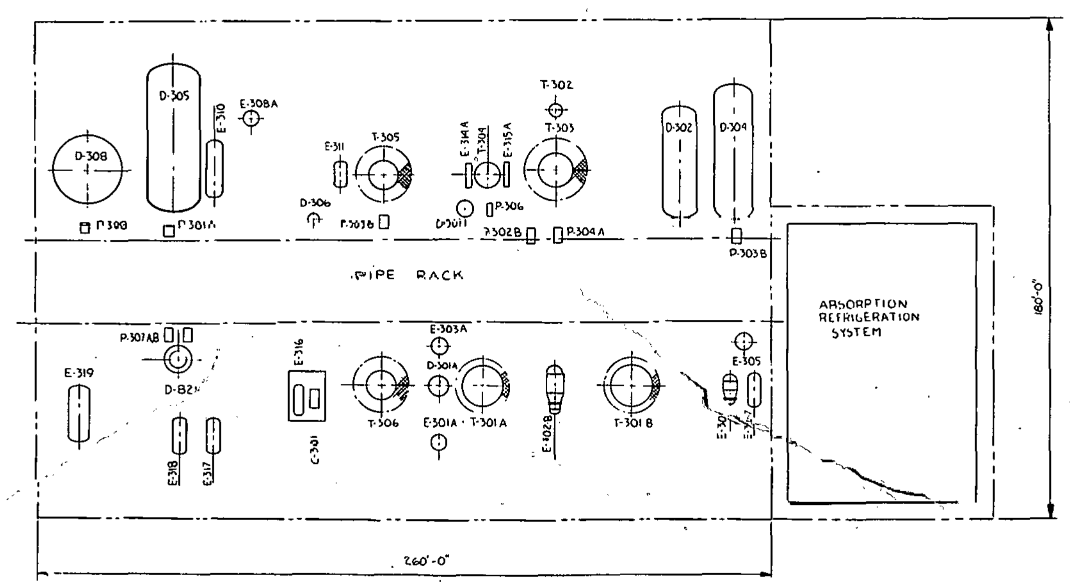
5. That any detriments caused by removal of the site from its former use are out-weighed by the need in the area for a landfill at this location;

6. That the landfill is located so as to avoid a continued adverse effect on existing air and water quality; and

7. Taking into consideration geological and hydrological factors, the location of the site in relating to sources of solid waste and accessibility to transportation modes, and the technical feasibility and economic reasonableness of disposing of solid waste at the proposed location, that the landfill is suited for its intended use.

8. That municipal officials (and/or county officials, where applicable) as well as local zoning boards and planning agencies and state legislators from the district in which the landfill is located, and adjacent landowners have been notified of the intent to develop and operate a landfill at this location. In addition, that access roads and bridges are not limited to preclude necessary vehicular traffic (ie, proposed size and weight limits).





SE-5034 | 1-LO-1671

CLARK OIL & REFINING CORPORATION
MILWAUKEE, WISCONSIN

FEASIBILITY STUDY OF PRODUCING
GASOLINE FROM COAL IN ILLINOIS
DEPARTMENT OF ENERGY GRANT NO. DE-FG01-80RA50328

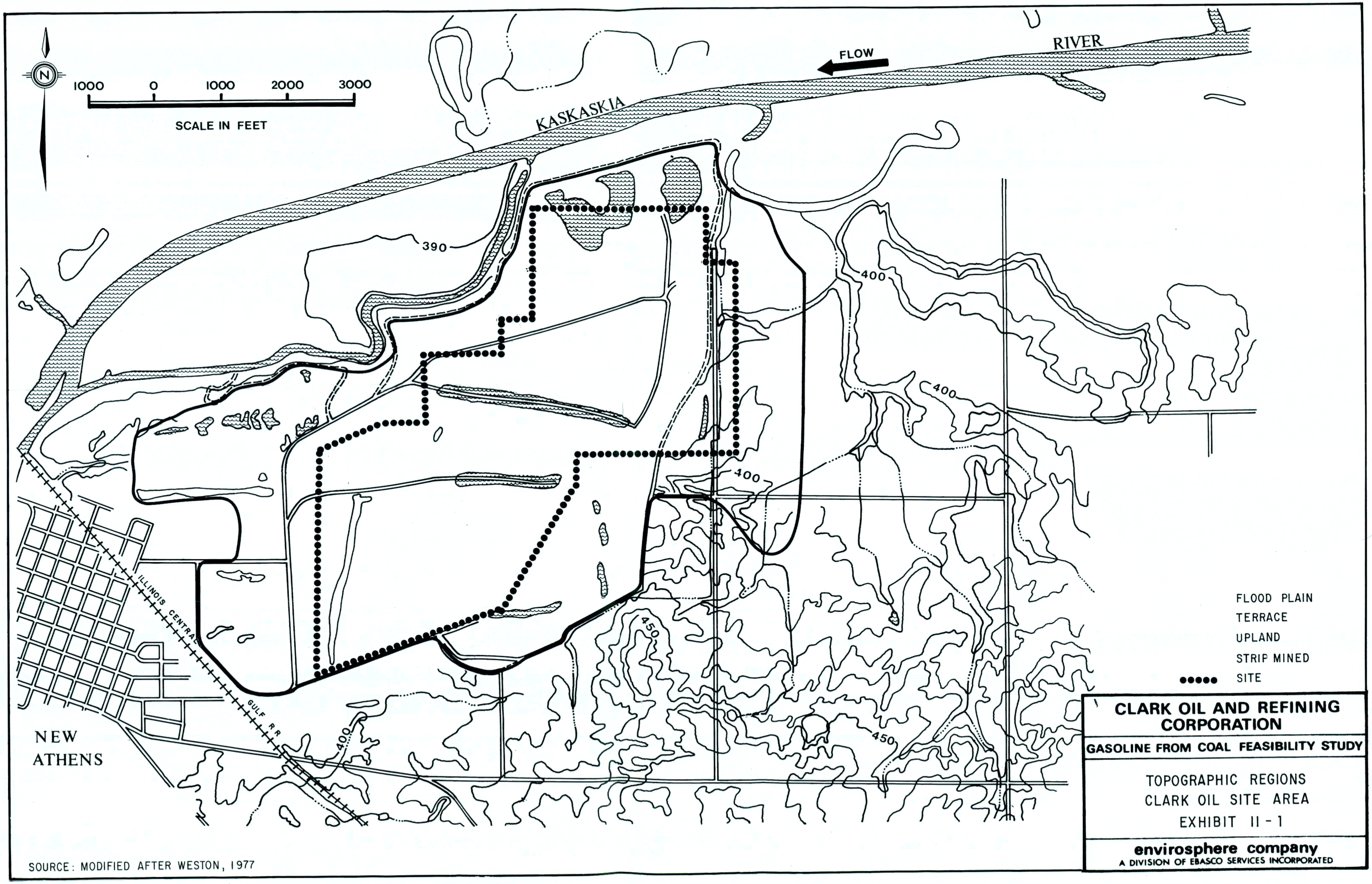
ACID GAS REMOVAL — SECTION 300

SECTION PLOT PLAN & ELEVATION

EBASCO SERVICES INCORPORATED

DR SAN TOS		PROCESS INDUSTRIAL DIVISION	AUTHORIZATION NO. COIL-4816
CH			
DES MGR		APPROVED	DRAWING NO. M-30-1
ENGR			ISSUE 0
PROJ ENGR			
APPROVED BY	DATE	SCALE: 1" = 20'-0	

NP

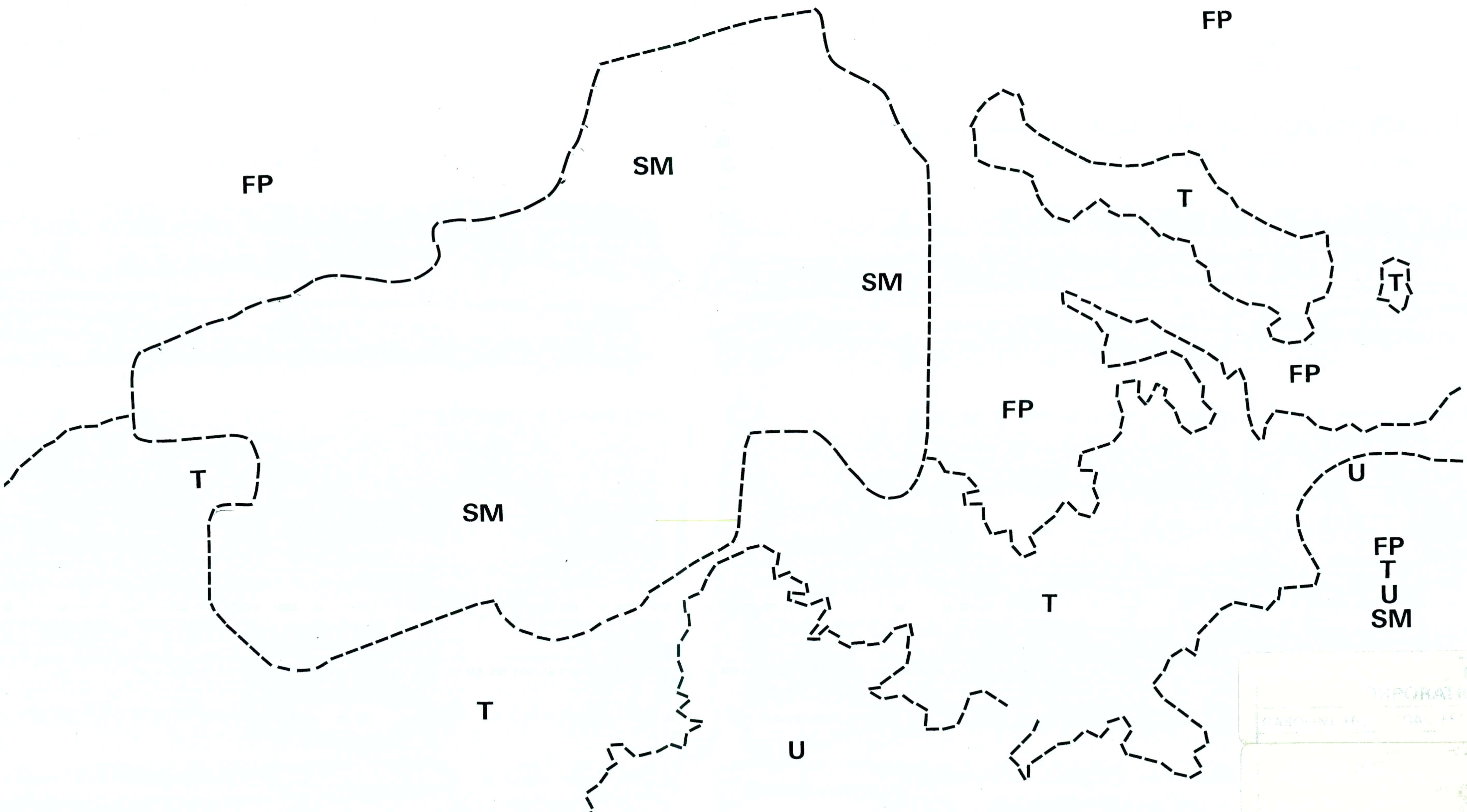


CLARK OIL AND REFINING CORPORATION

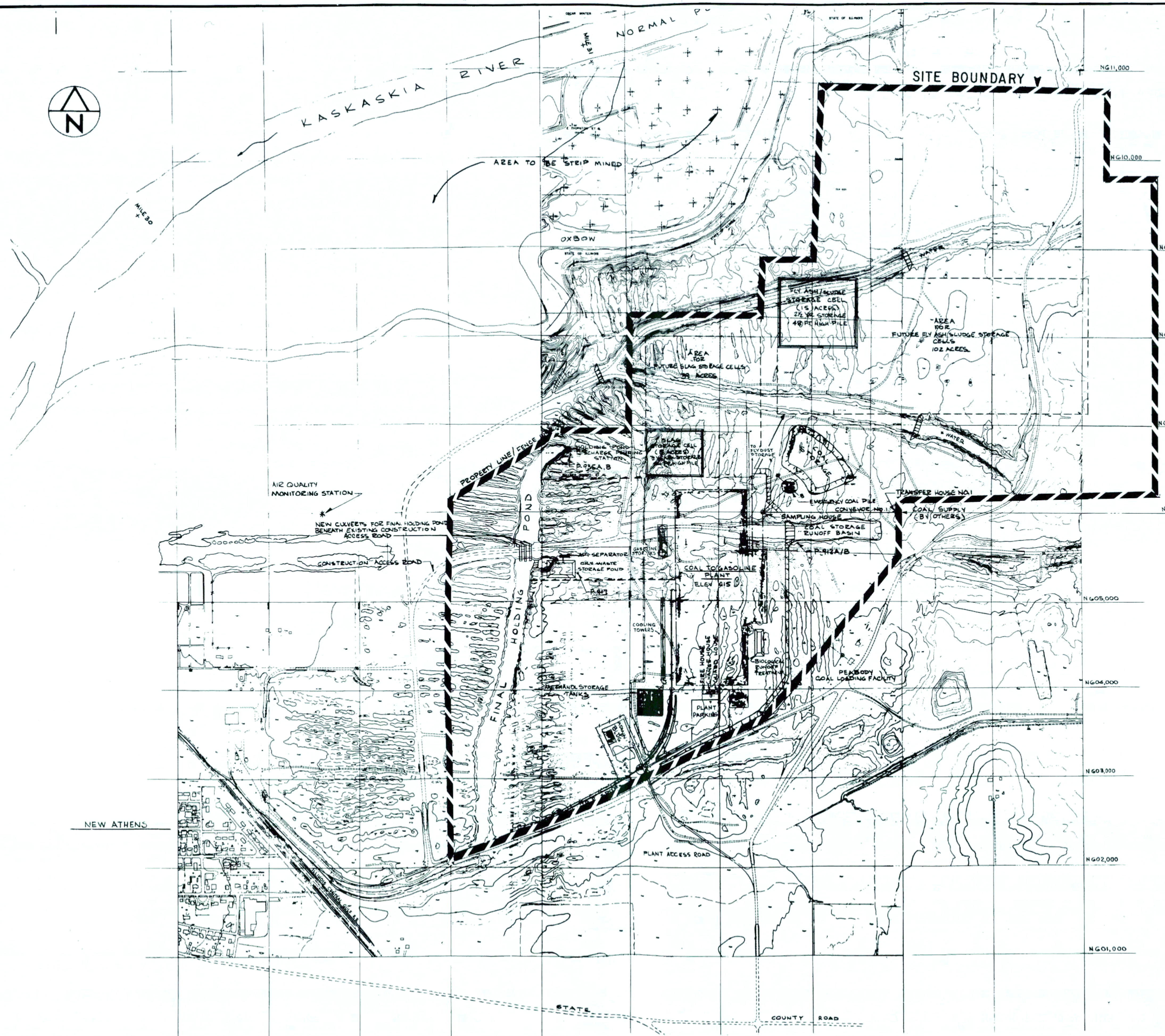
GASOLINE FROM COAL FEASIBILITY STUDY

TOPOGRAPHIC REGIONS
CLARK OIL SITE AREA
EXHIBIT II - 1

envirosphere company
A DIVISION OF EBASCO SERVICES INCORPORATED



11-1



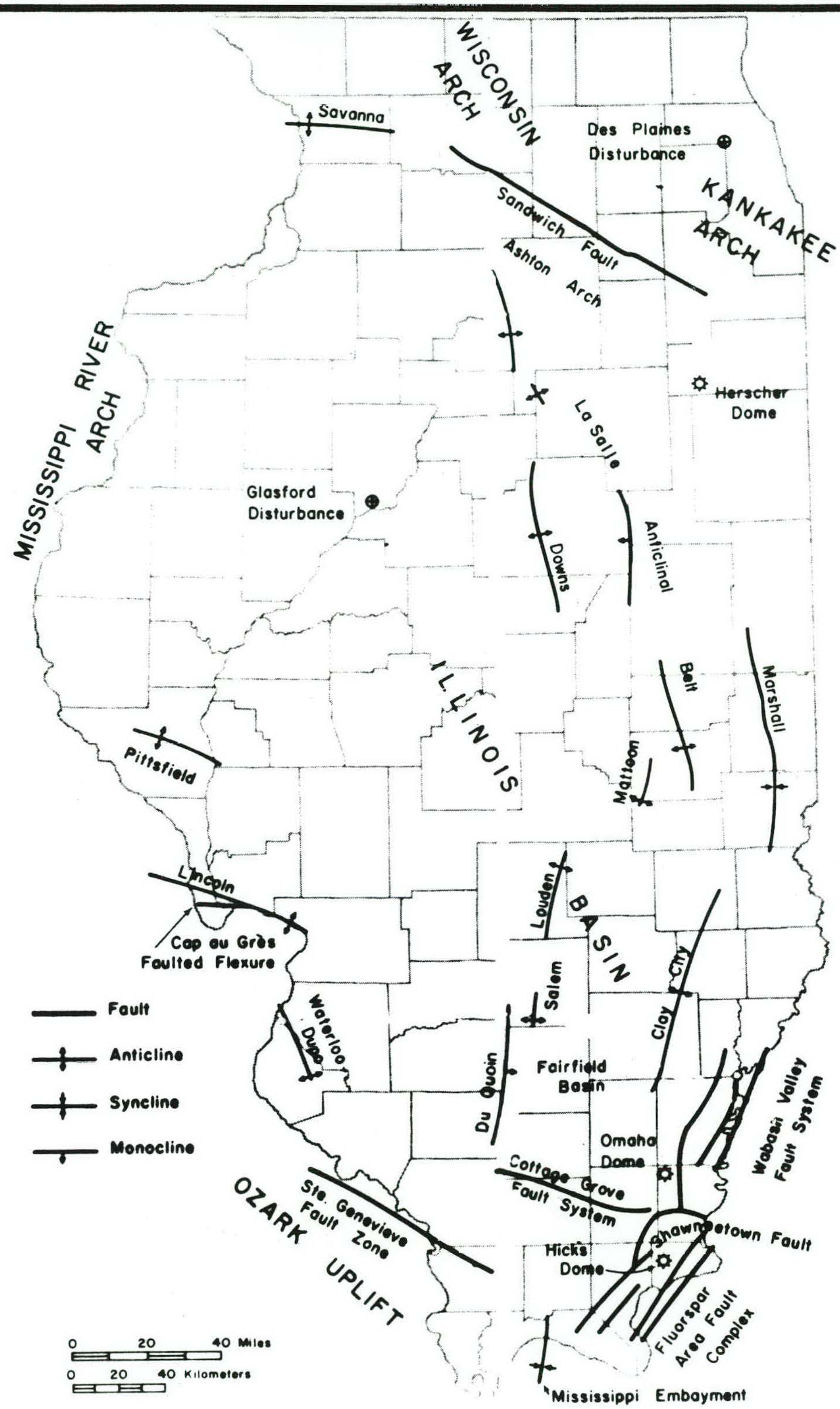
CLARK OIL AND REFINING CORPORATION

GASOLINE FROM COAL FEASIBILITY STUDY

DETAILED SITE TOPOGRAPHY

EXHIBIT II-2

envirosphere company
A DIVISION OF EBASCO SERVICES INCORPORATED



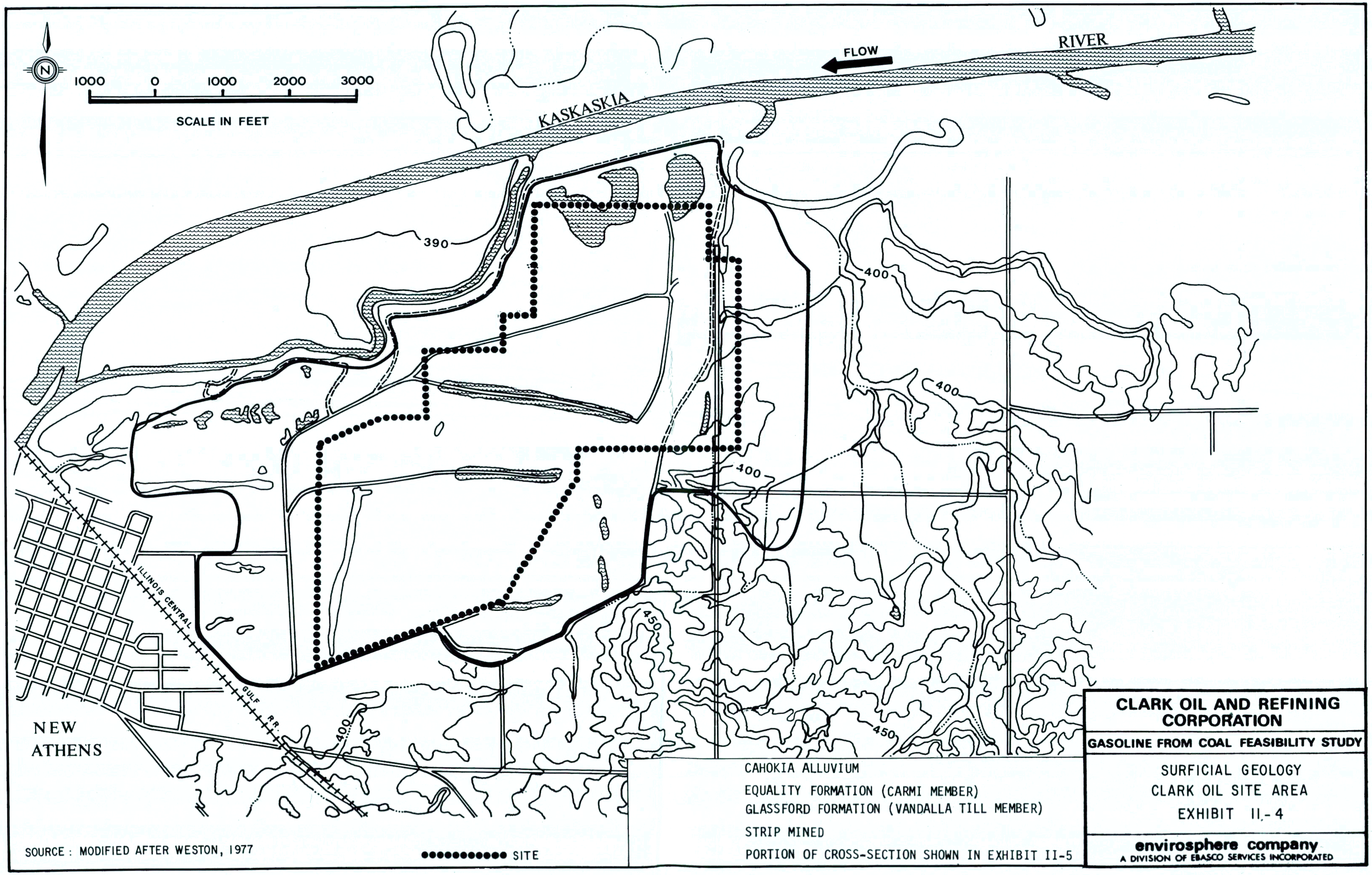
CLARK OIL AND REFINING CORPORATION

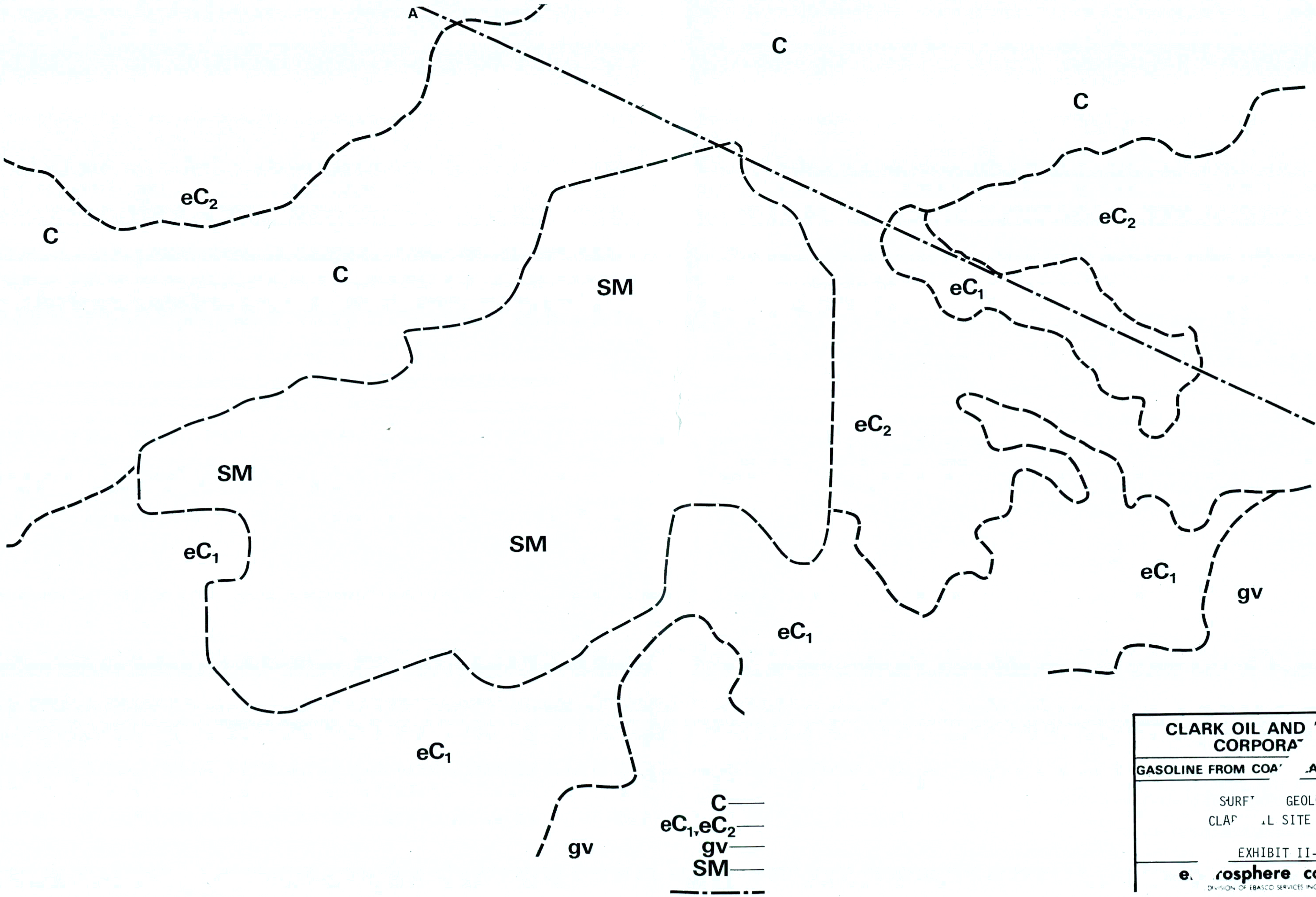
GASOLINE FROM COAL FEASIBILITY STUDY

PRINCIPAL GEOLOGIC STRUCTURES OF ILLINOIS

EXHIBIT II-3

envirosphere company
A DIVISION OF EBASCO SERVICES INCORPORATED


N
1000 0 1000 2000 3000
SCALE IN FEET
KASKASKIA
RIVER
FLOW
390
400
400
400
450
450
400
NEW ATHENS
ILLINOIS CENTRAL GULF RR.
SOURCE : MODIFIED AFTER WESTON, 1977
SITE
CAHOKIA ALLUVIUM
EQUALITY FORMATION (CARMI MEMBER)
GLASSFORD FORMATION (VANDALLA TILL MEMBER)
STRIP MINED
PORTION OF CROSS-SECTION SHOWN IN EXHIBIT II-5
CLARK OIL AND REFINING CORPORATION
GASOLINE FROM COAL FEASIBILITY STUDY
SURFICIAL GEOLOGY
CLARK OIL SITE AREA
EXHIBIT II.-4
envirosphere company
A DIVISION OF EBASCO SERVICES INCORPORATED



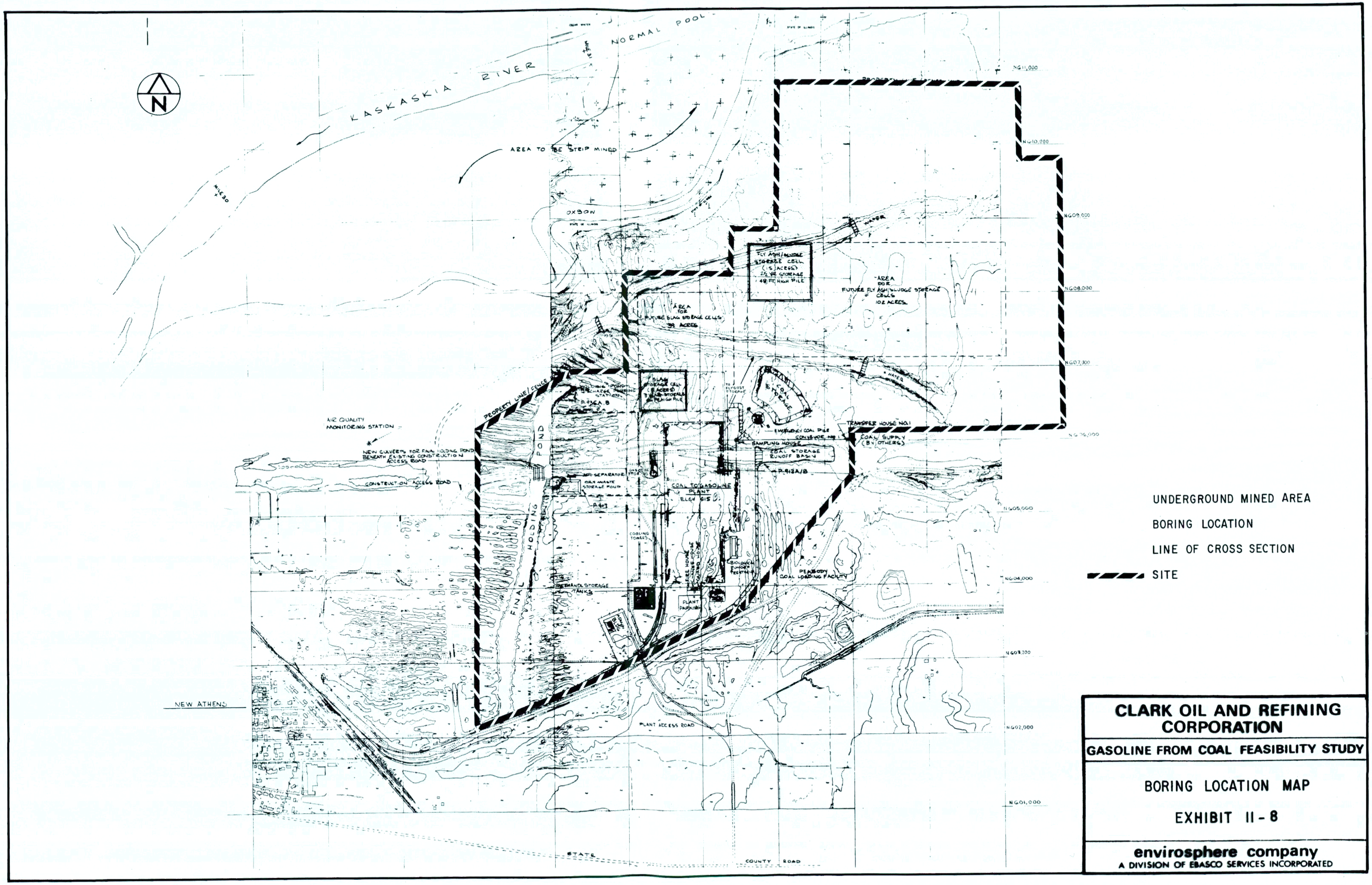
CLARK OIL AND ·INING CORPORAT N

GASOLINE FROM COA· ASIBILITY STUD

SURF· GEOLOGY
CLAR· ·L SITE AREA

EXHIBIT II-4

e· rosphere company
DIVISION OF EBASCO SERVICES INCORPORATED


KASKASKIA RIVER
NORMAL POOL
N
AREA TO BE STRIP MINED
OXBOW
AREA FOR FUTURE SLAG STORAGE CELLS 39 ACRES
AREA FOR FUTURE FLY ASH/SLUDGE STORAGE CELLS 102 ACRES
AIR QUALITY MONITORING STATION
NEW CULVERTS FOR FINAL HOLDING POND BENEATH EXISTING CONSTRUCTION ACCESS ROAD
CONSTRUCTION ACCESS ROAD
PROPERTY LINE/FENCE
FINAL HOLDING POND
COAL STORAGE
TRANSFER HOUSE NO.1
COAL SUPPLY (BY OTHERS)
SAMPLING HOUSE
COAL STORAGE RUNOFF BASIN
COAL TO GASOLINE PLANT
COOLING TOWERS
PEABODY COAL LOADING FACILITY
PLANT PARKING
PLANT ACCESS ROAD
NEW ATHENS
STATE
COUNTY ROAD
UNDERGROUND MINED AREA
BORING LOCATION
LINE OF CROSS SECTION
SITE
CLARK OIL AND REFINING CORPORATION
GASOLINE FROM COAL FEASIBILITY STUDY
BORING LOCATION MAP
EXHIBIT II - 8
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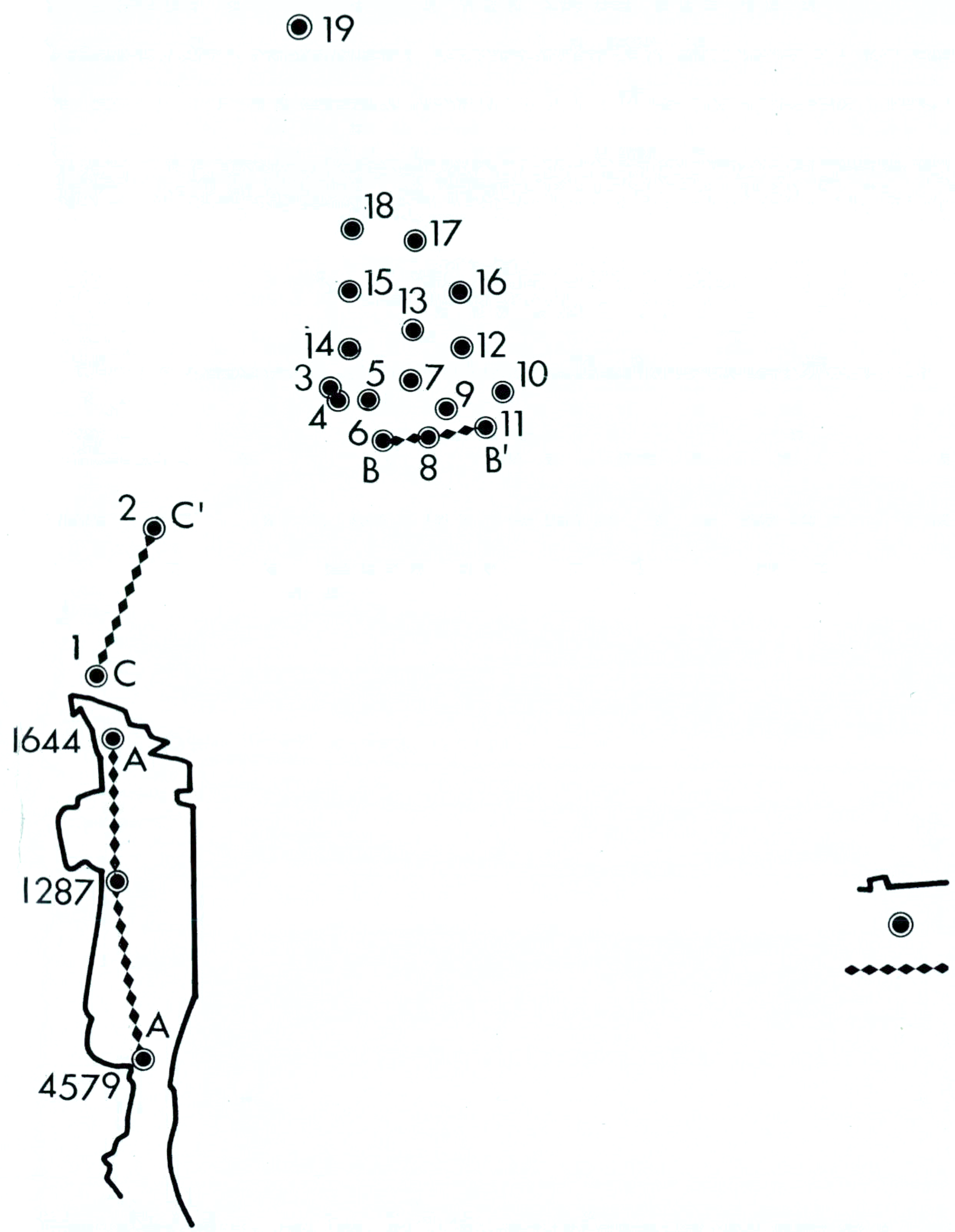
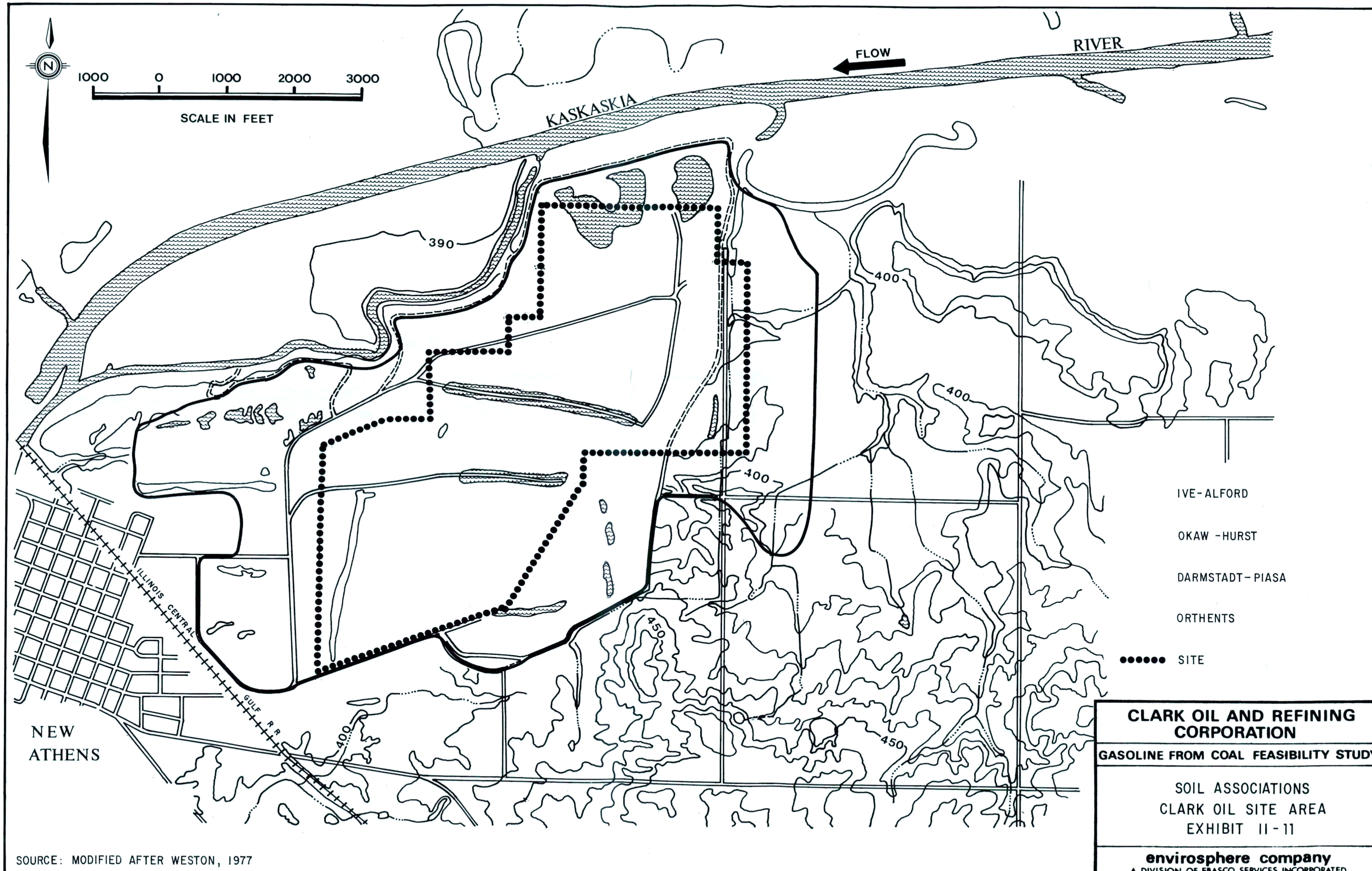


11-8



SOURCE: MODIFIED AFTER WESTON, 1977

CLARK OIL AND REFINING CORPORATION

GASOLINE FROM COAL FEASIBILITY STUDY

SOIL ASSOCIATIONS
CLARK OIL SITE AREA
EXHIBIT II-11

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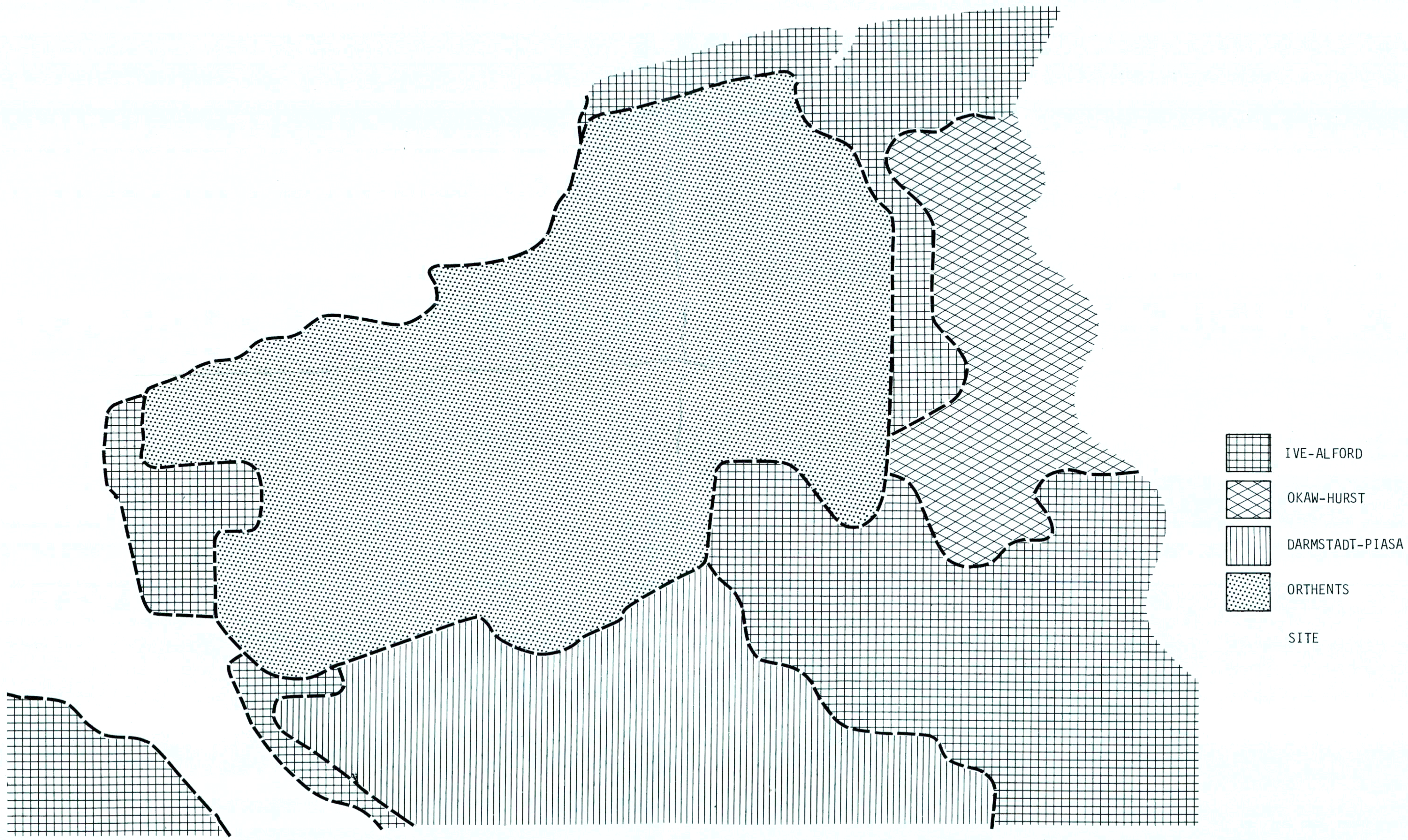
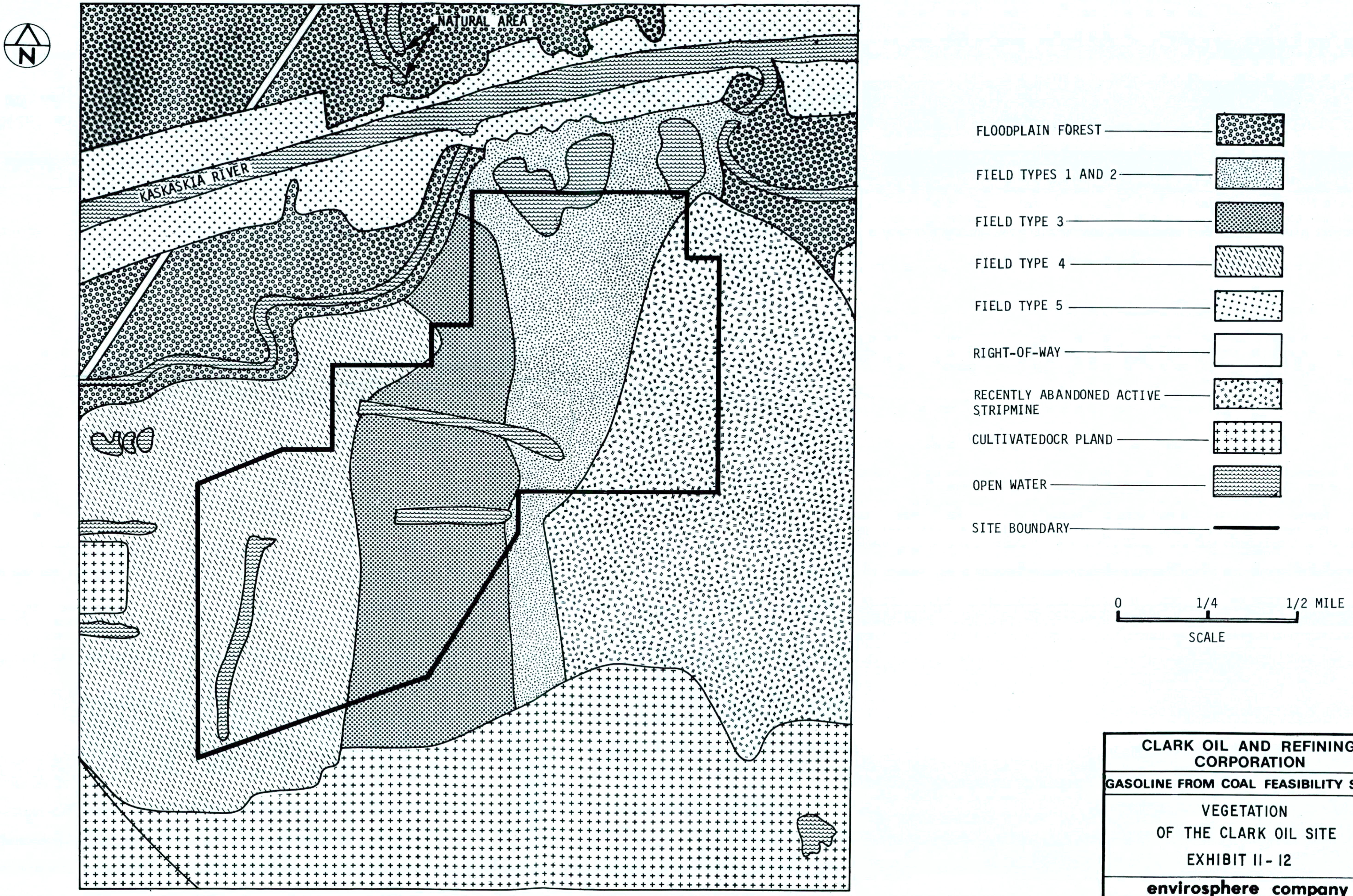

IVE-ALFORD
OKAW-HURST
DARMSTADT-PIASA
ORTHENTS
SITE



CLARK OIL AND REFINING CORPORATION

GASOLINE FROM COAL FEASIBILITY STUDY

VEGETATION OF THE CLARK OIL SITE

EXHIBIT II - 12

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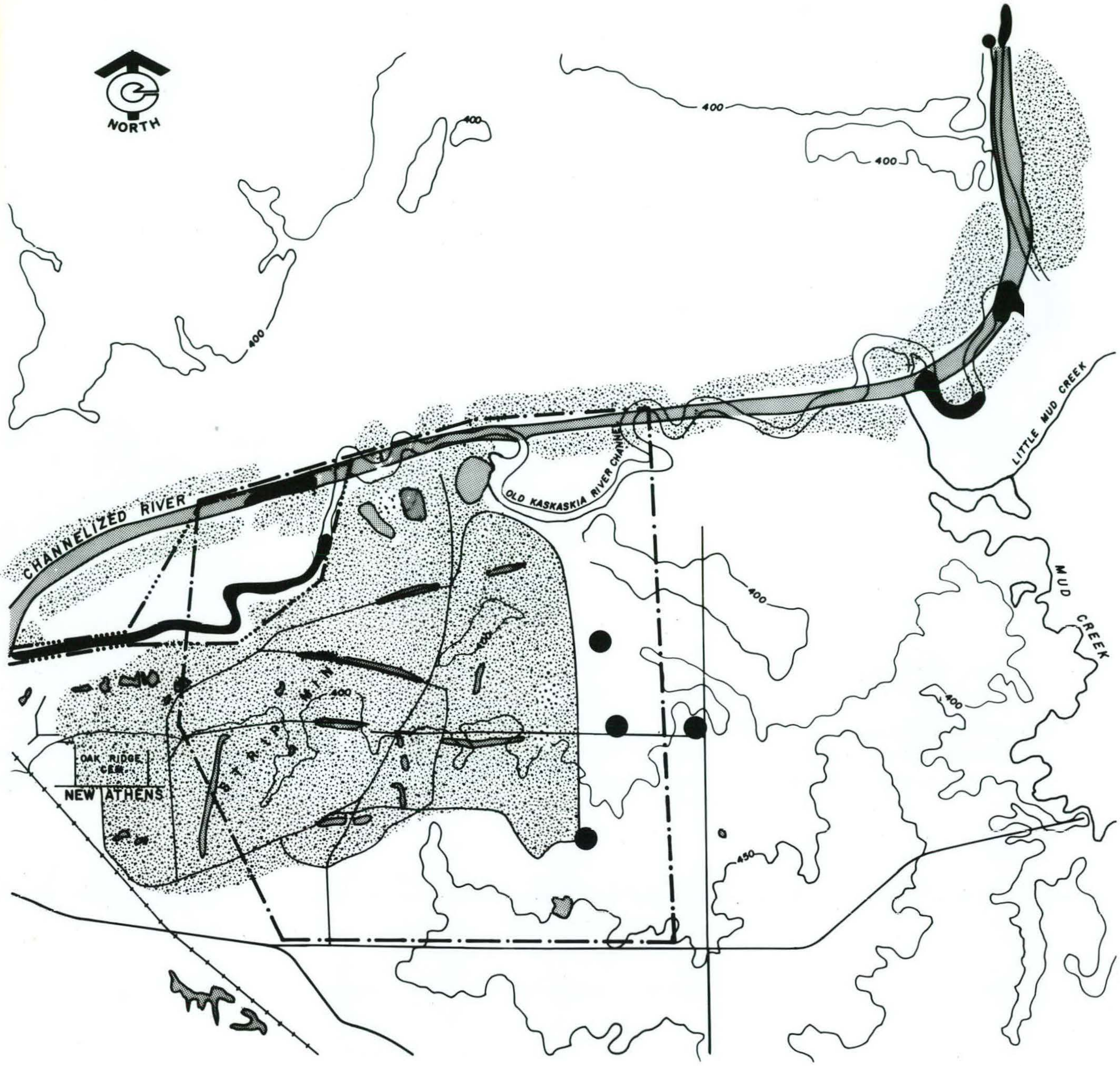

● Existing Surface Water Monitoring

Pit No. 3 E.I.R. Study Area

General Coal Con Study Area

Ongoing Aquatic Monitoring

0 1 2

MILES

CLARK OIL AND REFINING CORPORATION

GASOLINE FROM COAL FEASIBILITY STUDY

AQUATIC HABITATS AND SURFACE WATER MONITORING STATION INTO SITE AREA

EXHIBIT II-13

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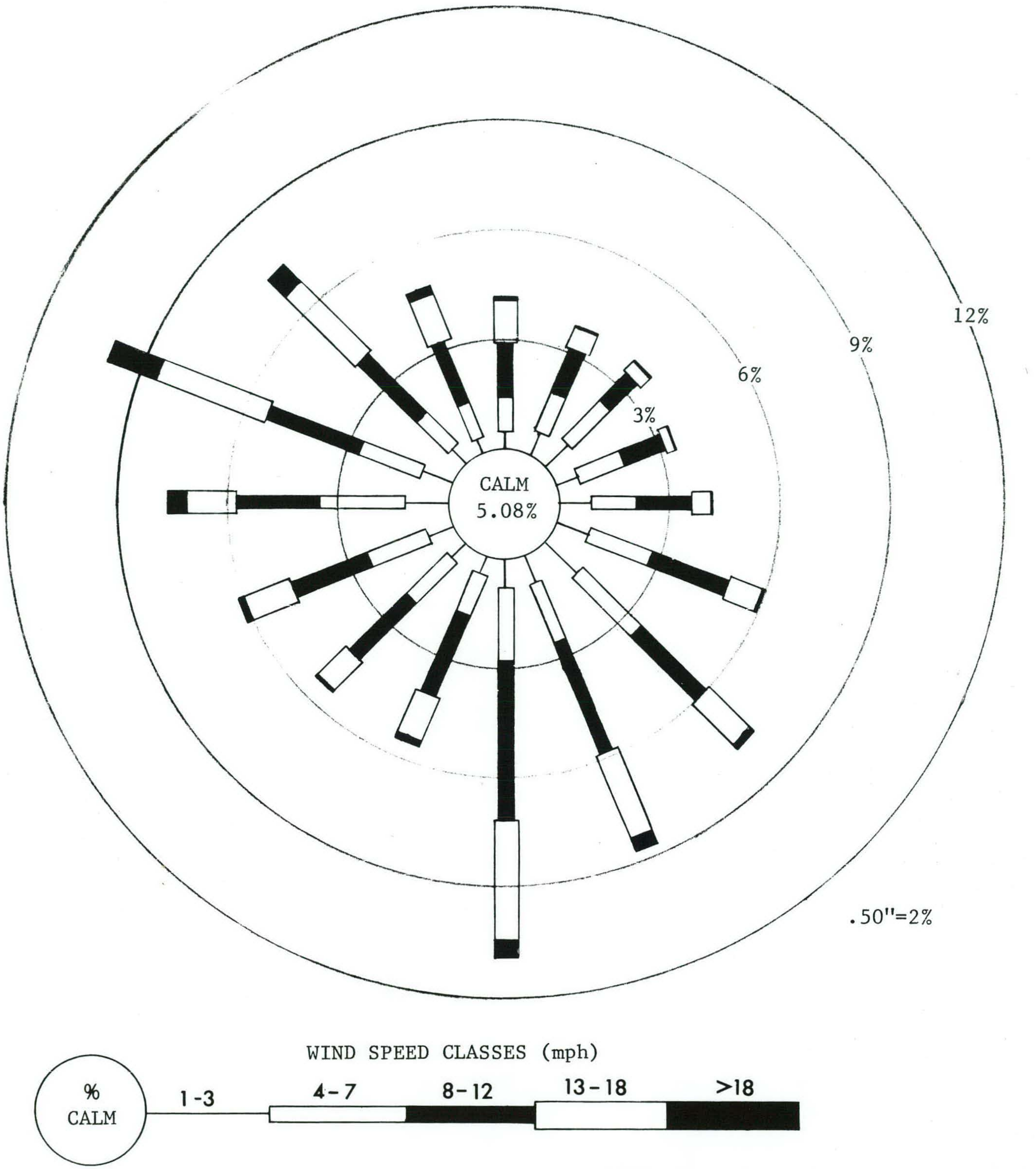

CLARK OIL AND REFINING CORPORATION

GASOLINE FROM COAL FEASIBILITY STUDY

WIND ROSE ST. LOUIS, Mo.

1960 - 1964

EXHIBIT II-14

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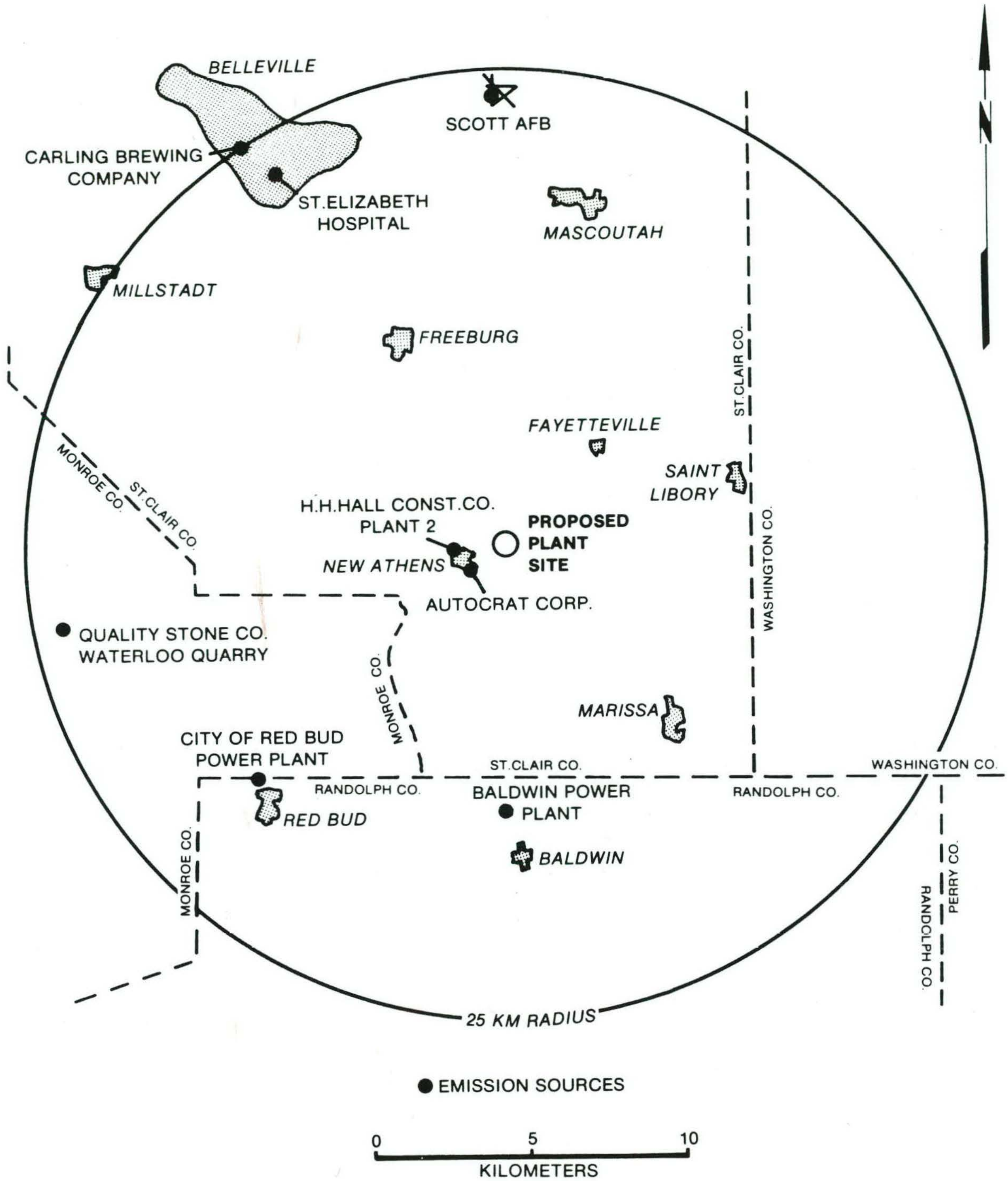

CLARK OIL AND REFINING CORPORATION

GASOLINE FROM COAL FEASIBILITY STUDY

LOCATION OF MAJOR EMISSION SOURCES

EXHIBIT II-15

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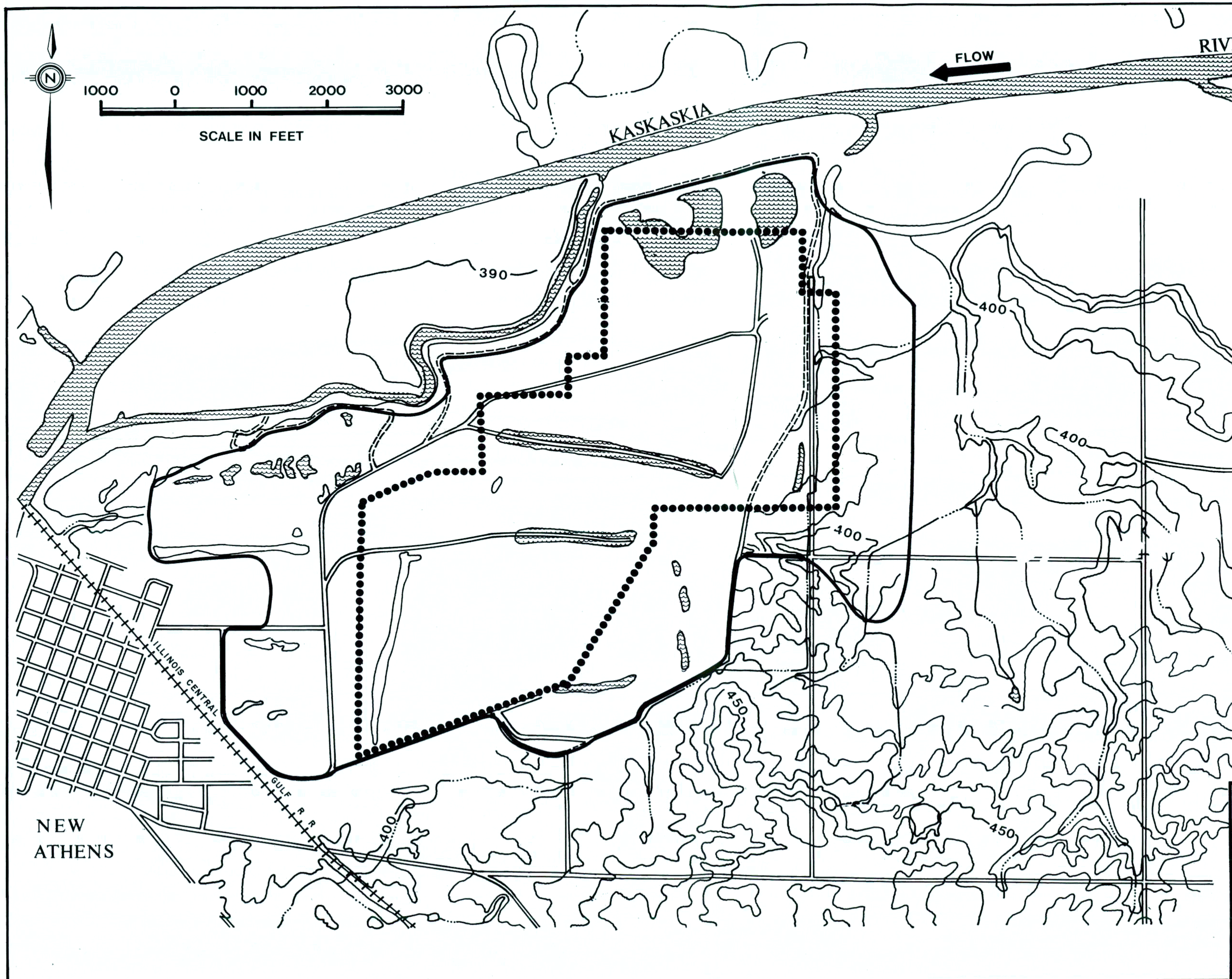

CLARK OIL AND REFINING CORPORATION

GASOLINE FROM COAL FEASIBILITY STUDY

PEABODY COAL COMPANY
GROUNDWATER MONITORING WELLS
EXHIBIT II-16

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