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The BRECKINRIDGE PROJECT

Initial Effort

REPORT VII

ENVIRONMENTAL, SOCIOECONOMIC, SAFETY AND HEALTH

VOLUME 3

CULTURAL RESOURCE ASSESSMENT SOCIOECONOMIC BACKGROUND DATA

**ASHLAND SYNTHETIC FUELS, INC.
AIRCO ENERGY COMPANY, INC.**

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A CULTURAL RESOURCE ASSESSMENT
OF THE PROPOSED COAL CONVERSION FACILITY
AND TWO ALTERNATE SOLID WASTE DISPOSAL
SITES, BRECKINRIDGE COUNTY, KENTUCKY
FOR ASHLAND SYNTHETIC FUELS, INC.

Archaeology Report
D&M/LX - 1.80

by

Heather Macfarlane

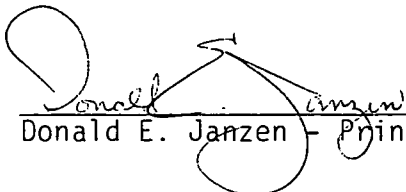
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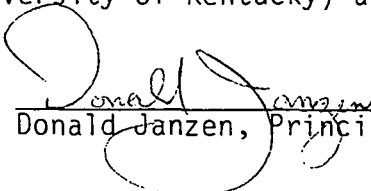
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ABSTRACT

This report has been prepared in conjunction with an environmental baseline study for a commercial coal conversion facility being conducted by Ashland Synthetic Fuels, Inc. (ASFI) and Airco Energy Company (AECO). The report represents a cultural resource assessment for the proposed plant site and two potential solid waste disposal areas. This assessment presents data collected by Dames & Moore during a recent archaeological reconnaissance of the unsurveyed southeastern portion of the proposed plant site and two potential solid waste disposal areas. Also, results of two previous surveys on the northern and southwestern portion of the plant site for American Smelting and Refining Company (ASARCO) and Kentucky Utilities are included.

The Dames & Moore survey of the southeastern portion of the plant site identified one archaeological site, three standing structures and one historic cemetery. In addition 47 archaeological sites and six standing structures are known from two previous surveys of the remainder of the plant site (Cowan 1975 and Turnbow et al 1980). Eleven of the previously recorded archaeological sites were recommended for further assessment to evaluate their potential for inclusion within the Holt Bottoms Archaeological District currently listed on the National Register of Historic Places. None of the archaeological sites or standing structures located within the plant site during the Dames & Moore survey were recommended for further assessment.

A total of 8 archaeological sites were located during the Dames & Moore survey of the two potential solid waste disposal areas. Of this total only 2 sites were recommended for further assessment. Also, one previously unknown historic cemetery was located in the southernmost potential waste disposal area.

PART I
CULTURAL RESOURCE ASSESSMENT
Table of Contents

	Page
LIST OF FIGURES	iii
LIST OF TABLES	iii
1.0 INTRODUCTION	1
2.0 MANAGEMENT SUMMARY	8
2.1 Plant Site	8
2.2 Potential Waste Disposal Sites	13
3.0 ENVIRONMENTAL BACKGROUND	16
3.1 Topography	16
3.2 Geology	17
3.3 Soils	18
3.4 Flora	18
3.5 Fauna	19
3.6 Culture History	21
3.6.1 Paleo-Indian Tradition	22
3.6.2 Archaic Period	23
3.6.3 Woodland Tradition	26
3.6.4 Village Farming Tradition	28
3.6.5 Historic Period	30
4.0 PREVIOUS ARCHAEOLOGICAL RESEARCH	35
5.0 PROJECT SITE INVESTIGATIONS	40
5.1 Survey Results	42
5.1.1 Archaeological Sites	42
5.1.2 Standing Structures	50
5.1.3 Cemeteries	53
6.0 CULTURAL RESOURCE ANALYSIS AND RECOMMENDATIONS	54
7.0 REFERENCES	62
8.0 VITAE	67

PART 1 CULTURAL RESOURCE ASSESSMENT

LIST OF FIGURES

- Figure 1.0-1 Ashland Synthetic Fuels Project Site Showing Location of Plant Site and Potential Waste Disposal Areas.
- Figure 1.0-2 Ashland Synthetic Fuels Proposed Plant Site.
- Figure 1.0-3 Proposed Boundary of Potential Northern Waste Disposal Area.
- Figure 1.0-4 Proposed Boundary of Potential Southern Waste Disposal Area.

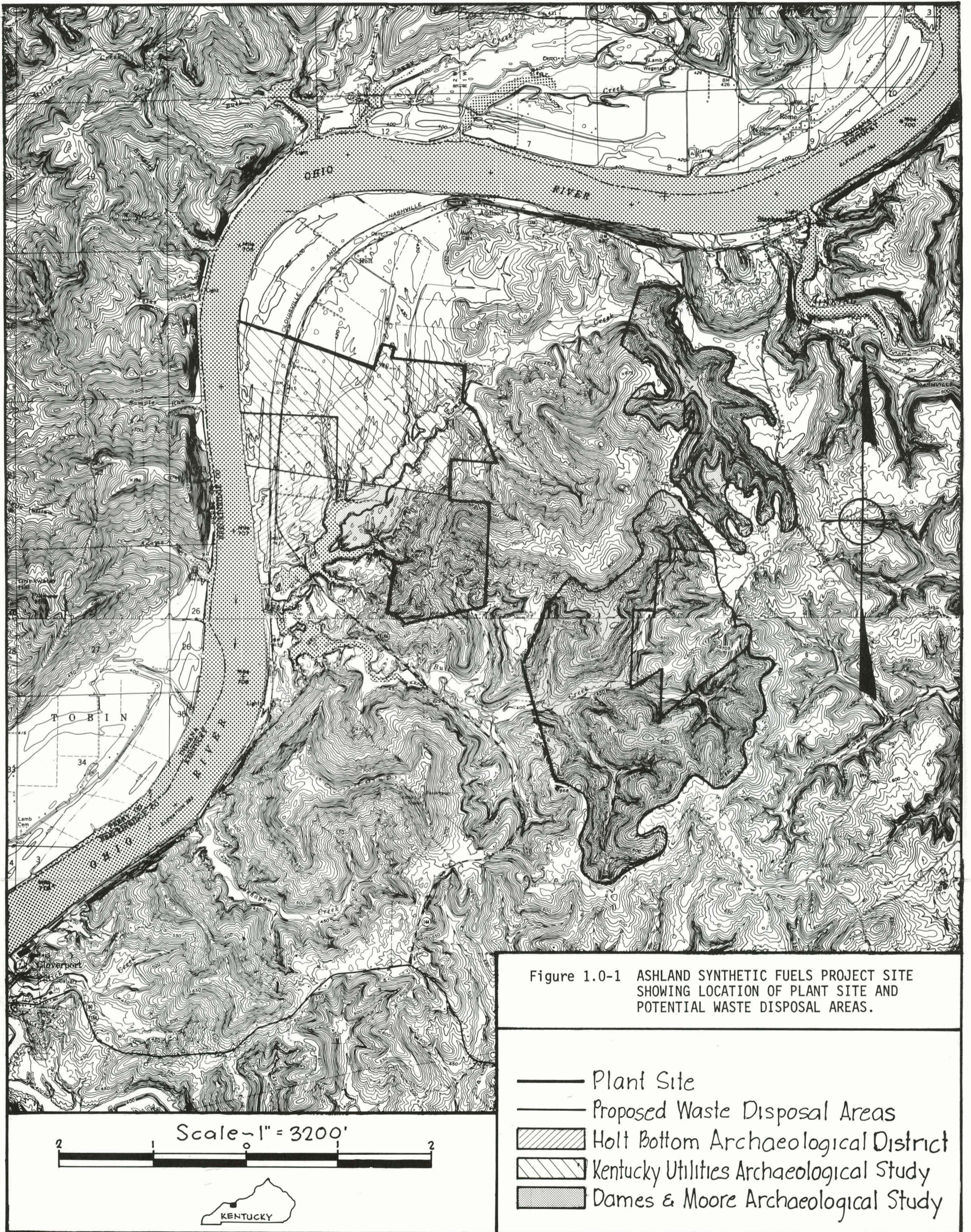
LIST OF TABLES

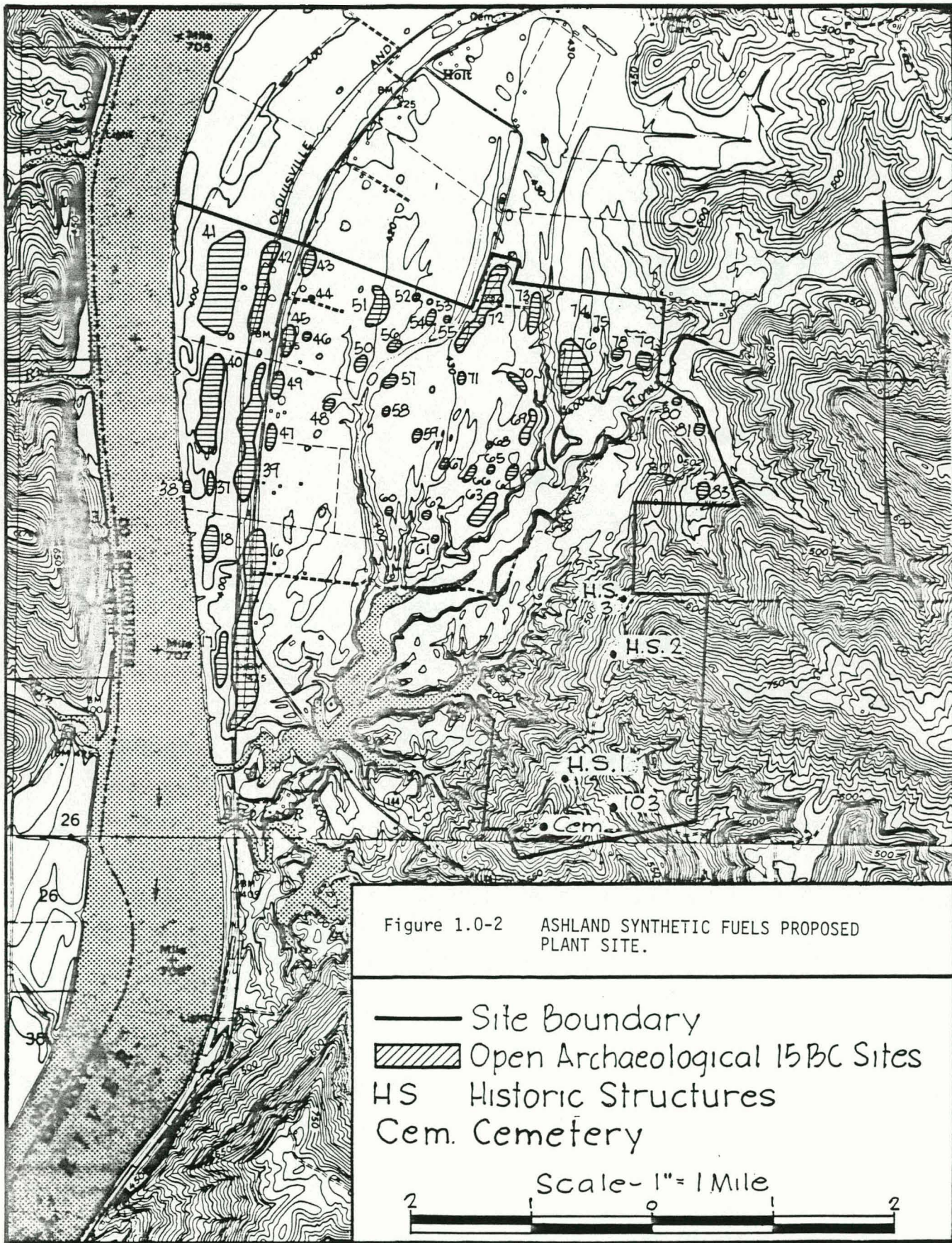
- Table 2.1-1 Plant Site: Cultural Resources Recommended for Additional Assessment.
- Table 2.1-2 Plant Site: Cultural Resources for Which No Further Work is Recommended.
- Table 2.1-3 Standing Structure Recommendations
- Table 2.2-1 Potential Waste Disposal Areas. Cultural Resources Recommended for Additional Assessment
- Table 2.2-2 Potential Waste Disposal Areas. Cultural Resources for Which No Further Work is Recommended
- Table 5.1-1 Tabulation of Materials Recovered from Archaeological Sites
- Table 6.0-1 Plant Site. Archaeological Sites Discovered during Surveys Conducted in 1975 and 1980

1.0 INTRODUCTION

This report has been prepared in conjunction with an environmental baseline study for a commercial coal conversion facility being conducted by Ashland Synthetic Fuels, Inc. (ASFI) and Airco Energy Company (AECO) under United States Department of Energy Cooperative Agreement No. DE-FC05-80OR20717. As part of this study, Dames & Moore has been asked to prepare a baseline environmental inventory of the site. The following report represents the cultural resource assessment for the proposed plant site and two potential solid waste disposal sites. This assessment includes a summary of data obtained during two previously conducted cultural resource assessments of the project area prepared for American Smelting and Refining Company (ASARCO) by Cowan (1975) and for Kentucky Utilities by Turnbow, et. al. (1980) (Fig. 1.0-1). In addition to this summary, this assessment presents new data collected by Dames & Moore during a recent archaeological reconnaissance of the previously unsurveyed southeastern portion of the proposed plant site (Fig. 1.0-2) and two potential solid waste disposal areas (Fig. 1.0-3 and Fig. 1.0-4).

Construction plans for the facility are presently in the initial design stage and may be changed. Due to the preliminary design of the project, a site specific evaluation of potential impacts is not practical at this time. However, it can be assumed for the purpose of this assessment that construction of the facility will result in direct impact on several known archaeological sites on both the upper and lower floodplain terraces to approximately the 430' contour elevation. Direct impact in the uplands above the 430' contour elevation will be confined to specific corridors in which possible access roads, conveyor structures, pipelines and transmission lines may be placed. When





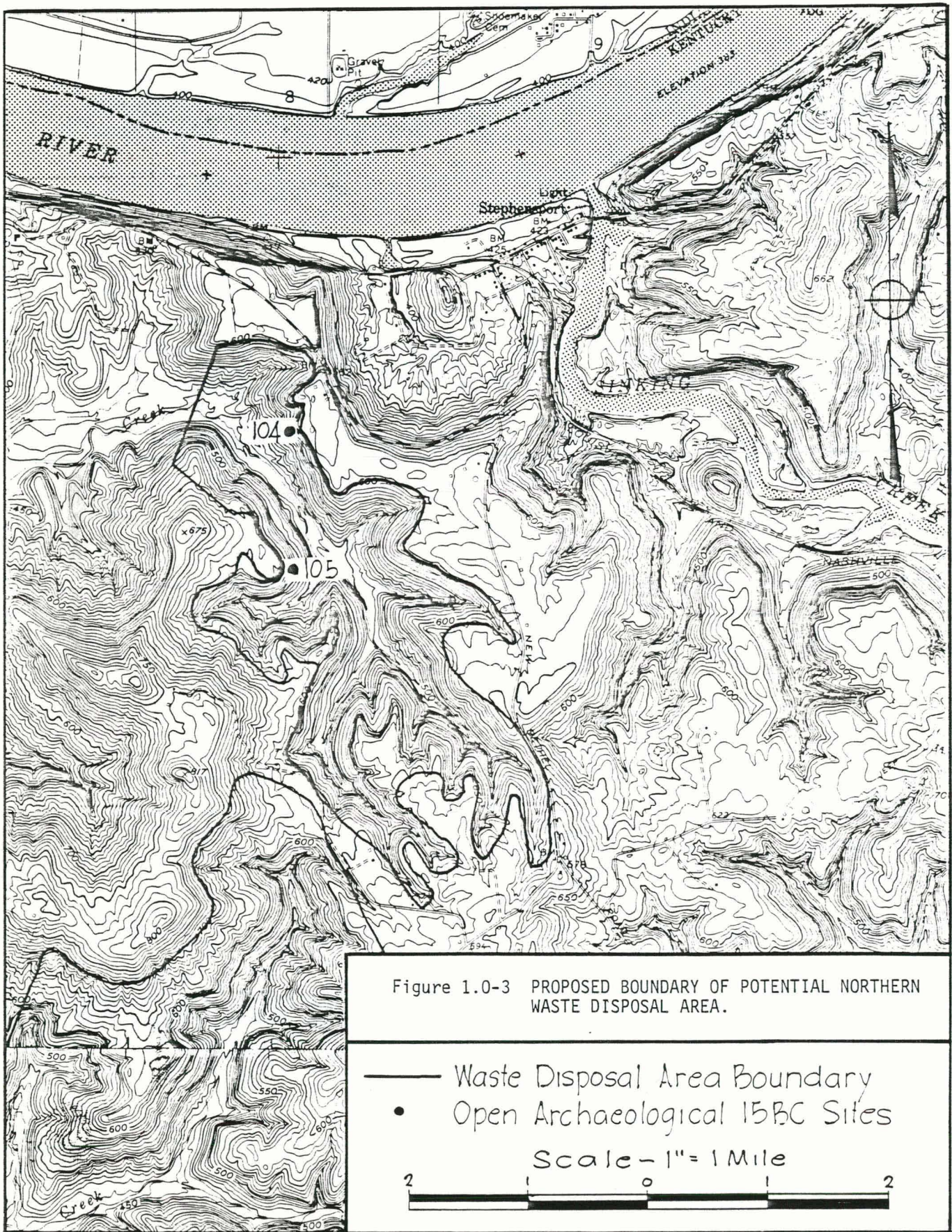
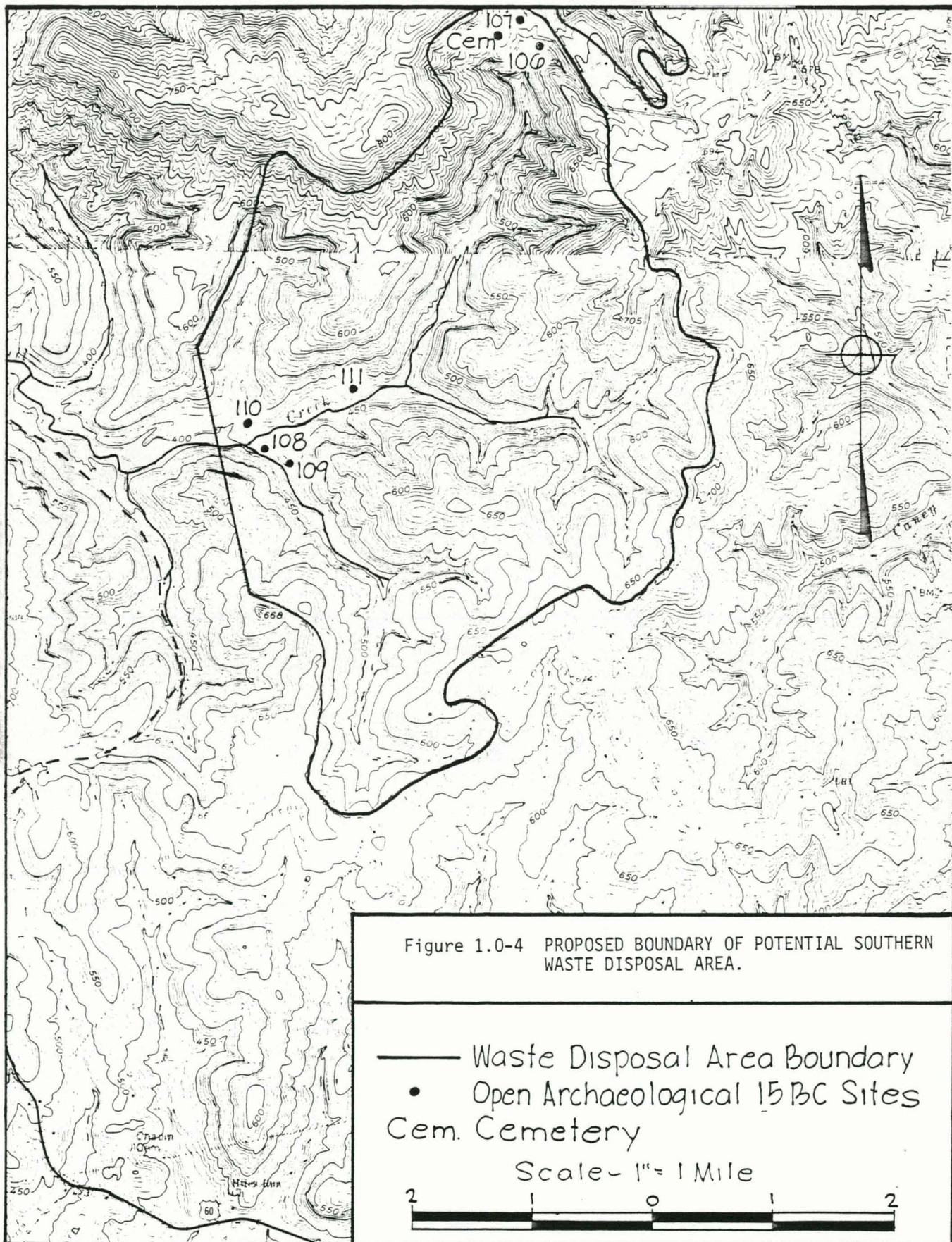


Figure 1.0-3 PROPOSED BOUNDARY OF POTENTIAL NORTHERN WASTE DISPOSAL AREA.

- Waste Disposal Area Boundary
 - Open Archaeological 15BC Sites
- Scale - 1" = 1 Mile
-



plans for the facility reach the final design stage and avoidance of specific cultural resources can be assured, the recommendations discussed in this report can be tailored to specific impact areas.

The proposed plant site is located on the banks of the Ohio River at mile 706 in northwestern Kentucky (Fig. 1.0-1). At this location the Ohio River forms the border with the State of Indiana to the north and west. The proposed site lies entirely in Breckinridge County and is situated within and adjacent to an area known locally at Holt Bottoms. The potential solid waste disposal areas are located in the uplands east of the plant site (Fig. 1.0-1). Breckinridge County is bordered by Perry County, Indiana, across the Ohio River to the northwest, Meade County to the northeast, Hardin County to the east, Grayson County across the Rough River to the south, and by Hancock and Ohio Counties to the west.

The communities nearest the proposed site are the hamlet of Stevensport, Kentucky, located approximately 5.6 km (3½ mi) northeast of the site, and Cloverport, Kentucky, located 9.7 km (6 mi) to the southwest.

The cultural resource investigation of the unsurveyed portion of the proposed plant site and potential waste disposal areas included an extensive literature search of the prehistoric and historic cultural history, an intensive, on-foot inspection of the project area and identification of the prehistoric and historic archaeological sites, as well as the documentation of standing structures and cemeteries remaining in the area. As the result of field work accomplished from August 9 to August 25, 1980, and August 31 to September 2, 1980, a total of 9 archaeological sites, 3 standing structures, and 2 cemeteries were located and inspected. The 47 previously documented sites and 6 standing structures located during 1975 and 1980 were not relocated as these sites had already been adequately assessed (Bob Brooks,

Office of State Archaeology, personal communication, 1980). The previously documented sites were found to represent an aboriginal occupation during pre-historic times from Paleo-Indian through Mississippian periods and historically from circa 1807 to the present (Turnbow, et al. 1980). Sites located during the Dames & Moore survey provide additional evidence of aboriginal and historic occupation in this area.

2.0 MANAGEMENT SUMMARY

The following cultural resource assessment was executed in compliance with current regulations and procedures of the Advisory Council on Historic Preservation (36 CFR 800), provisions of the National Historic Preservation Act of 1966 (Public Law 89-665 as amended by 16 USC 470), the National Environmental Policy Act of 1969 (Public Law 91-190), Executive Order 11593 of May 13, 1971 (36 FR 9821, 16 USC 470), and "Specifications for Archaeological Reports" promulgated jointly by the Kentucky Office for State Archaeology and the Kentucky State Historic Preservation Office (Kentucky Heritage Commission). The following summary and tables briefly outline a suggested cultural resource management program and recommendations. These recommendations are discussed in more detail in Section 6.0 of this report.

2.1 Plant Site

A program of systematic testing of alluvial and eolian deposits is recommended for the lower and upper terraces in the area of the plant site (Turnbow, et al., 1980:2). The purpose of this testing is to determine the nature and extent of the known buried sites in this area and to determine the presence of geologically sealed and, therefore, relatively undisturbed or intact cultural deposits. Additional investigations are recommended for those archaeological sites with a moderate to high potential for undisturbed (i.e., intact) cultural deposits or features, and/or where significant artifact assemblages on the surface exist. Of the 47 previously recorded archaeological sites and 6 standing structures occurring in the plant site, 11 archaeological

sites have been recommended for further assessment in order to evaluate their potential for inclusion in the National Register of Historic Places (Table 2.1-1). No further work has been recommended for the 6 previously recorded standing structures (Table 2.1-3). In addition, one archaeological site and 3 standing structures located during the Dames & Moore survey of the southeastern portion of the plant site are not recommended for additional assessment.

A recommendation of no further work has been suggested for those archaeological sites that exhibit: (1) minimal cultural material; (2) low potential for intact cultural deposits or features; and/or (3) are determined not to be of scientific or historic significance. Such resources, therefore, are not believed to meet the minimal criteria for nomination to the National Register of Historic Places (Table 2.1-2).

In addition, a recommendation of no further work is suggested for those structures which are either common to the region or appear to be of limited historic value. These structures, therefore, are not considered potentially eligible to the National Register of Historic Places (Table 2.1-3).

The cemeteries encountered during the survey are under the protection of state law. Therefore, any construction in the area of these cemeteries must comply with procedures established by those laws.

It should be noted that cultural resources of potential National Register quality have been located on the lower terraces where alluvial deposition may protect buried cultural deposits. Subsurface testing is required to accurately assess the significance of the other surface sites. Also the testing will confirm the exact nature and extent of the site. Results of subsurface testing could then facilitate in the development of a management program to lessen potential impact to these resources from project development.

Table 2.1-1 Plant site: Assessment¹ Cultural Resources Recommended for Additional

<u>Site No.</u>	<u>Visibility</u>	<u>Approx. Area</u>	<u>Cultural Component</u>	<u>Recommendations</u> ²
15 BC 37	85%	.64 ha.	P	4 test units
15 BC 39	85%	10.4 ha.	P (A,W),H	5 test units
15 BC 40	85%	4.75 ha.	P (W)	5 test units
15 BC 41	85%	12.5 ha.	P	5 test units
15 BC 42	90%	5.0 ha.	P (A)	5 test units
15 BC 43	85%	1.0 ha.	P (A), H	1 test unit
15 BC 51	85%	2.4 ha.	P	1 test unit
15 BC 63	85%	2.0 ha.	P (A)	1 test unit
15 BC 64	90%	0.6 ha.	P	1 test unit
15 BC 72	85%	7.84 ha	P (W,M)	10 meters of BHT
15 BC 76	85%	4.37 ha	P (A)	3 test units

P = prehistoric
A = archaic
W = woodland
M = Mississippian
H = historic
BHT = backhoe trench

¹Recommendation for all sites below are currently being evaluated by the Cultural Heritage Commission for inclusion in the Holt Archaeological District.

²Recommendations based on Turnbow, et al. (1980:7) and test units are to measure 1 x 2 meters and be hand dug.

Table 2.1-2 Plant Site. Cultural Resources for which no further work is recommended.

<u>Site No.</u>	<u>Visibility</u>	<u>Approx. Area</u>	<u>Cultural Component</u>
15 BC 38	90%	.02 ha.	P
15 BC 44	85%	size not determined	P (A)
15 BC 45	85%	.88 ha.	P, H
15 BC 46	85%	.12 ha.	P
15 BC 47	85%	.70 ha.	P
15 BC 48	85%	.001 ha.	P
15 BC 49	85%	.0009 ha.	P
15 BC 50	85%	.48 ha.	P
15 BC 52	85%	.02 ha.	P
15 BC 53	90%	?	P (A)
15 BC 54	95%	.06 ha.	P (W-M)
15 BC 55	90%	.02 ha.	P
15 BC 56	85%	.06 ha.	P
15 BC 57	85%	.24 ha.	P
15 BC 58	95%	.0004 ha.	P
15 BC 59	90%	.06 ha.	P
15 BC 60	75%	.0015 ha.	P
15 BC 61	85%	?	P
15 BC 62	75%	.24 ha.	P
15 BC 65	85%	.16 ha.	P
15 BC 66	50%	.06 ha.	P
15 BC 67	75%	.10 ha.	P
15 BC 68	85%	?	P
15 BC 69	85%	.8 ha.	P, H
15 BC 70	85%	.12 ha.	P
15 BC 71	85%	.0016 ha.	P
15 BC 73	85%	1.9 ha.	P, H
15 BC 74	85%	.01 ha.	P
15 BC 75	85%	.0004 ha.	P
15 BC 77	60%	.12 ha.	H
15 BC 78	50%	.03 ha.	P
15 BC 79	85%	.8 ha.	P
15 BC 80	0	.03 ha.	P, H
15 BC 81	15%	.04 ha.	P
15 BC 82	0	?	P
15 BC 83	0	.015 ha.	P
15 BC 103			P

? = indeterminate
P = prehistoric
A = archaic
W = woodland
M = Mississippian
H = historic

Table 2.1-3. Standing Structure Recommendations

<u>Structure</u>	<u>Description</u>	<u>Recommendations</u>
1*	Log House	No further work
2*	Frame House	No further work
3*	Frame House	No further work
4*	Modern Stone House	No further work
5*	Modern Stone House	No further work
6*	Single Story, Concrete House	No further work
Historic Structure 1	Frame House	No further work
Historic Structure 2	Frame House	No further work
Historic Structure 3	Frame House	No further work

* From Turnbow, et al. 1980:10.

2.2 Potential Waste Disposal Areas

Two previously unrecorded archaeological sites were located during the Dames & Moore survey of the northern potential waste disposal areas. One site within this area (15 BC 105) is recommended for further assessment in order to evaluate its potential for inclusion in the National Register of Historic Places (Tables 2.2-1 and 2.2-2). However, a portion of the survey area was not accessible at the time of the on-site investigation (Fig. 1.0-1). This area has an extremely high potential for the presence of rockshelter sites, and several such sites were reported to occur in this area. Should the northern area be selected for development, an additional walkover survey of the unsurveyed section will be required.

A total of 6 previously unrecorded archaeological sites were found to occur within the southern potential waste disposal area during the Dames & Moore survey. One site within this area (15 BC 106) is recommended for further assessment (Tables 2.2-1 and 2.2-2). However, a portion of the area was inaccessible at the time of the survey (Fig. 1.0-1). Should this area be selected for development, an additional walkover survey of the unsurveyed sections will be required. In addition, dense vegetation in the southeastern portion of this area may have prevented surveyors from locating and documenting sites in that regions. Since this area has a moderate to high potential for the occurrence of archaeological sites, it is suggested that it be re-evaluated prior to development.

Table 2.2-1. Potential Waste Disposal Areas. Cultural Resources Recommended for Additional Assessment.

Northern Waste Disposal Area

Site No.	Visibility	App. Area (Sq. Meters)	Cultural Component	Recommendation
15 BC 105	0-5%	18	P (W)	two hand dug 1 x 2 meter test units and one hand dug 1 x 1 meter test unit located down slope of the shelter

Southern Waste Disposal Area

15 BC 106	0-40%	45	P	two hand dug 1 x 1 meter test units
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P = prehistoric
W = woodland

Table 2.2-2. Potential Waste Disposal Areas. Cultural Resource for Which No Further Work is Recommended.

Northern Waste Disposal Area

Site No.	Visibility	Approx. Area (Square Meters)	Cultural Component
15 BC 104	100%	5	P

Southern Waste Disposal Area

15 BC 107	0-60%	100	P, H
15 BC 108	40-60%	100	P
15 BC 109	60-100%	100	P
15 BC 110	40-60%	25	P
15 BC 111	40-60%	100	P, H

P = prehistoric
H - historic

3.0 ENVIRONMENTAL BACKGROUND

3.1 Topography

The topography of the proposed plant site in Breckinridge County, Kentucky, is a flat, alluvial plain along the Ohio River ranging from 122 to 131 m (400-430 ft.) above mean sea level, and rising gradually to over 210 m (700 ft.) toward the southeast corner of the site. The land across the Ohio River in Perry County, Indiana, to the west of the site rises steeply from the river to elevations of over 210 m (700 ft.) and is part of Hoosier National Forest. The land to the east and south of the plant site also increases in elevation to over 244 m (800 ft.). Drainage from the site is into Town Creek which flows southeast through the site and into the Ohio River. A number of small agricultural ponds dot the site as well.

In summary, the basic site topography is the alluvial plain of the Ohio River with uplands away from the river. The Ohio River is now controlled by the Channelton Locks & Dam, approximately 26 km (16 mi.) downstream.

The northern potential solid waste disposal area is located to the east and northeast of the proposal plant site and consists of the upland drainage of Town Creek. Elevations in this area range from 182.88 m (600 ft.) above mean sea level on slopes, ridges and plateaus to 128.02 m (420 ft.) at creek level in the north and 152.4 m (500 ft.) in the south. The southern potential disposal area is located to the east and southeast of the proposed plant site and consists of the upland drainage of Bull Creek. Elevations in this area range from 213.4 m (700 ft.) on hill tops and plateaus to 122 m (400 ft.) at creek level.

3.2 Geology

The project area and potential disposal areas are located in the Mammoth Cave plateau region of the Mississippian Plateaus. The geological deposits in the project region consist primarily of Upper Mississippian sandstones, limestone, siltstones and shales with quaternary older alluvium and lacustrine and terrace deposits and younger alluvial and eolian deposits near the river. Erosion of resistant sandstones has resulted in the formation of steep overhangs, cliffs and large flat top ridges (McFarlan 1943:191). McGrain and Currens (1978: 14-15) have reported cliff formations present along many streams in this area. Two of the predominant outcrop formations, the Buffalo Wallow Formation and the Haney Limestone member of the Golconda formation in Breckinridge County are reported to be chert bearing deposits. Chert cobbles which have eroded out of older alluvium, lacustrine and terrace deposits are also present. However, Turnbow, et al (1980:14) reports that no local cherts were utilized prehistorically.

Shales are also present in thin beds in certain sandstone formations. The shale beds of the Tar Springs sandstone formation contain asphaltum which has been utilized historically and prehistorically by inhabitants of the region (Collins 1979:1020; McGrain 1976:1). Prehistorically this substance was utilized as an adhesive for hafting projectile points and other tools as evidenced by artifacts from Indian Knoll in Ohio County and the Rosenberger site in Jefferson County (Collins 1979B:1020). Locally, prehistoric lithic artifacts recovered from the Holt Bottoms show evidence of asphaltum utilization

(Turnbow, et al 1980:14-18). Historically this petroleum product has been used for axle grease and as an asphalt surfacing material for roadways (McGrain 1976:1).

3.3 Soils

Although a county soils map has not yet been published by the Breckinridge County Soil Conservation Service, it can be generalized that soils in this region will be similar to those mapped for nearby Daviess and Hancock Counties (Cox 1974). Therefore, the Elk-Otwell-Genat association comprised of numerous silty-loam series can be expected to occur on the terraces and floodplain of the Ohio River; and the Wellston-Frondork-Zanesville association derived from loess deposits and bedrock weathering can be expected to occur on upland slopes.

3.4 Flora

Breckinridge County is situated within the Western Mesophytic Forest Region (Braun, 1950). This region is characterized by secondary to tertiary forest growth dominated by oak and hickory communities with beech, sugar maple, tulip poplar, ash, sycamore and sweet gum also present (Braun 1950: 146-147). In western Kentucky the original native vegetation was reported to have been predominately black and white oak forest containing beech, tulip poplar, sugar maple, hickory, elm, cherry, dogwood, mulberry, chestnut, black walnut, paw-paw, sweet gum, black gum and spicebush (Owen 1861). Riparian species along the Ohio and smaller tributaries included cottonwood, sycamore,

american and red elm, willow, box elder and alder, hornbeam, river birch, ash, red maple, black maple, hackberry, mulberry, black locust and false indigo (University of Louisville 1973:3-10, 11). Little is known of the exploitation of floral resources by the local prehistoric inhabitants due to the low preservation potential of most plant remains. However, inferences can be made based on early ethnohistoric accounts and the few sites in which plant remains have been recovered from charred or dry deposits. These show an abundance of nuts (hickory and acorn), seeds (sumac, panic grass, knotweed, poke, maygrass and amaranth), and fruits (grape, strawberry, blackberry, blueberry). In addition, possible cultigens recovered from Salts Cave include sunflower, chenopods, marsh elder, gourd, and squash (Watson 1976:46).

It is also known that cane was utilized in basket making and arrow shaft production; cordage, fiber logs, slippers were made from the inner bark of paw-paw, cattail, hemp, grass, brasswood inner bark, and elyspery elm bark (Watson 1969:38). Black (1967:577) reports grass was collected for bedding and thatched roofs and various woods were utilized for firewood, pestles and posts (see also Cowan 1976:99-103; Vickery 1970:82; Turnbow et al. 1980:23).

3.5 Fauna

The fauna in the upland forest and riparian habitats in the vicinity of the plant site is currently characterized by numerous species of mammals, birds, reptiles and amphibians, fish and invertebrates. The mammals of this region include opossum, eastern cottontail, muskrat, eastern chipmunk, woodchuck, red and grey fox, raccoon, long-tailed weasel, mink, striped skunk,

bobcat, white-tailed deer and a number of species of mice, voles, squirrels, shrews, and bats (Barbour & Davis, 1974; University of Louisville, 1973). Bird species common to the region include both permanent and transient species of ducks, geese, vultures, hawks, cranes, herons, owls, woodpeckers, doves, quail, and numerous other small birds (Turnbow et al. 1980:22). Common amphibians in the area include frogs, toads, salamanders, mudpuppy and hellbender. Reptiles are represented by several species of turtles, lizards and snakes. The Ohio River provides an abundant and diverse range of fishes including gar, paddlefish, shad, carp, chub, shiners, minnows, suckers, darters, catfish, rock bass, warmouth, sunfishes, smallmouth bass, largemouth bass, crappie and freshwater drum. Invertebrates include several species of triclad flatworms, leaches, crayfishes, dragonflys and other insect larvae, snails, sphaeriid clams and unionid mussels (Turnbow et al. 1980:21).

The presence of bison, elk, wolf, dog and mountain lion in this region has been documented by written accounts of early explorers and faunal remains from excavated archaeological sites (Funkhouser 1925:33-34; Webb 1946; Turnbow et al. 1980:22). Based on faunal remains, prehistoric groups along the Ohio River drainage are known to have exploited amphibians and reptiles (Winters 1969:140; Webb 1946:339; Black 1967:481). The remains of birds exploited include turkeys, geese, ducks, hawks, swans, passenger pigeons, herons and eagles (Winters 1969:140; Black 1967:482). Turnbow et al. (1980:22) indicates that although rare, wild turkey may still occur in this region. Extensive shell middens along the Ohio River and its tributaries attests to the prehistoric exploitation of mussels. One such site occurs approximately 2 km (1.7 mi)

north of the proposed plant site, and is known locally as the Addison shell mound (15 BC 19). Fish remains and bone fish hooks are common in archaeological sites in this region and indicate that this was an important food source.

Pleistocene fauna in this area included giant ground sloth, small glacial ground sloth, horse, taper, musk-ox, bison, mastodon, mammoth and bear (Funkhouser 1925). After the termination of the Pleistocene epoch of the Wisconsin glaciation (c. 10,000 BC) several species no longer ranged as far south as Kentucky. These included reindeer, moose, caribou, and musk-ox, although other species such as Virginia deer, Roosevelt elk, modern bison, and American black bear are reported to have been present (McFarlan 1943:245). Archaeological evidence indicates that it was during this period that man first migrated into the area (Turnbow et al. 1980:21).

3.6 Culture History

The Ohio River Valley was a favored locale for prehistoric occupation. The Ohio River provided both abundant food resources and a transportation route for prehistoric inhabitants of the area. Other ecozones surrounding the river provided a variety of additional food and other resources including chert, bitumen, shell, salt and clay. Therefore, it can be expected that archaeological resources in the region of the proposed project would be abundant. This has been ascertained by the previous cultural resources assessments prepared by Cowan (1975); Allen and Cowan (1976) and Turnbow et al. (1980). In addition, the potential for preservation of such resources can be expected to be excellent both in areas of alluviation and in the area of dry rock

overhangs. Therefore, many sites in the area if undisturbed may be of potential significance to the archaeological record. In order to evaluate this potential significance these sites must be considered in terms of their cultural setting and place in the archaeological record.

Prehistory in Kentucky and the eastern and midwestern United States is characterized by five cultural traditions. They are the Paleo-Indian tradition (c. 13,000-9,000 BC), the Archaic period (c. 8000-1000 BC), the Woodland tradition (c. 1000 BC - 900 AD), and the Village Farming tradition [Mississippian and Fort Ancient] (AD 900-16,500). These traditions are summarized as follows.

3.6.1 Paleo-Indian Tradition

The Paleo-Indian tradition represents the earliest inhabitants of Kentucky (c. 15,000 years B.P.). It has been postulated that they were migratory hunter-gatherers who exploited a wide range of wild plants and animals, including the megafauna of the late Pleistocene period. The earliest evidence of Paleo-Indian occupation in the eastern United States dates to circa 15,000 years B.P. (13,000 BC) (Adaviso et al., 1978). Other sites containing evidence of Paleo-Indian occupation date to at least 8,000-10,000 BC (Rolingson & Swartz 1966) and probably as early as 20,000 BC. However, this early date has not yet been confirmed by any reliable absolute dating method.

Evidence of Paleo-Indian occupation in Kentucky consists primarily of lithic tools. Large lanceolate projectile points such as the Clovis, Quad, Cumberland and Meserve types are considered diagnostic of this period. Other lithic implements recovered from sites of this period include large blades, scrapers and knives.

Distribution of Paleo-Indian projectile points in Kentucky appears to be concentrated in the Bluegrass, Western Coal Fields and Jackson Purchase regions of central and western Kentucky (Rolingson 1964). Rolingson (1964:72) correlates the distribution of these artifacts with animal trails in the Commonwealth and suggests that Paleo-Indian groups may have been drawn into the region by game.

Dorwin (1966) has determined that the distribution of Paleo-Indian projectile points in Indiana is concentrated in the Ohio River Valley. He also indicates that most of the finds have been from ridges and higher bluffs near the river rather than in the floodplain (Dorwin 1966:152). Although this does not entirely rule out the possibility that undisturbed Paleo-Indian sites may occur under alluvial deposits, along the floodplain Paleo-Indian remains are primarily limited to surface artifacts and sites that are not well preserved. However, intact single-component Paleo-Indian sites in Kentucky are extremely rare and to date none have been professionally excavated.

3.6.2 Archaic Period

Beginning approximately 10,000 years ago a gradual but distinctive change in the patterning of settlement and subsistence systems occurred in eastern North America. This was probably a response to climatic changes resulting from the termination of the glacial periods. The most notable changes were the disappearance of the megafauna and the establishment of temperate deciduous forests. This change is also reflected in the evolution of new styles and types of artifacts and social adaptations to local environmental conditions.

The name Archaic has been given to this time period and traditionally an early, middle and late subdivision has been made.

The Early Archaic period (8,000-6,000 BC) is characterized by a generalized hunting tradition which extended throughout the eastern United States. Peoples of this period relied heavily on the hunting of deer and other forest animals. Similar projectile point styles have been found in sites ranging from the Hardaway site in North Carolina (Coe 1964), the Eva site in Tennessee (Lewis and Lewis 1961), the St. Albans site in West Virginia (Broyles 1971), the Koster site in Illinois (Streuver and Holton 1979) to the nearby Longworth-Gick site in southwest Jefferson County (Collins 1979b). All of these sites occurred in deeply buried stratified deposits of alluvium similar to sites in the Holt Bottoms area of Breckinridge County. Lithics from Early Archaic sites include projectile points, scrapers, knives and other tools. A common diagnostic projectile point for this period is the serrated Kirk point. A common feature associated with Early Archaic sites is the small hearth and fire pits (Collins 1979b; Chapman 1973) which appear to represent remnants of small temporary campsites.

Based on lithic tools, features and types of sites (i.e., temporary camp sites) a migratory hunting and gathering economy can be inferred. Although recent studies in Kentucky (see Collins 1979) has added generally to our knowledge and understanding of this period, many problems remain to be addressed. As most well preserved Early Archaic sites occur in alluvial deposits, the Ohio River Valley is a particularly sensitive location for the occurrence of intact sites of this period.

The Middle Archaic period (6,000-4,000 BC) is characterized by an intensification and diversification of the earlier migratory hunter/gatherer subsistence pattern, resulting in exploitation of a wide variety of food and other resources. Evidence for the exploitation of fish and shellfish dates from this period and

is exemplified by the shell mounds of the Green River in Kentucky (Webb 1946). Deer continues as an important resource during this period and deer bone awls, pins and tools are not uncommon. In addition, the utilization of ground stone artifacts begins during this period. Ground stone implements include atlatl weights, celts and axes for chopping, and grinding slabs, pestles and nutting stones for plant processing. Chipped stone tools continue to be an important component throughout the Archaic period.

The Late Archaic period (c. 4,000-1,000 BC) is characterized by more intensive systematic exploitation of resources and seasonal movement across biotic zones to obtain these resources. Yarnell (1976) cites this intensive exploitation of selected vegetal species as possibly the stimulus for the development of horticulture. There is an increase in population during this period as evidenced by the fact that Late Archaic site components in the central Ohio Valley of Kentucky outnumber other cultural traditions (Robinson, et al. 1979:477; Collins and Driskell 1979:1027-28; O'Malley and Levy 1979). This increase in size and social complexity is further substantiated by evidence of exchange between groups. Copper, marine shell and mica are known exchange commodities and there is the possibility that such locally available resources such as chert and salt may also have been trade items. Generalizations regarding sociopolitical aspects of Late Archaic groups are difficult to make based on current evidence. Differential ranking or status can be inferred from the presence and quantity of grave goods (Driskell 1979). However, more information is required regarding house type, settlement pattern and social organization. Lithic tools from Late Archaic sites are varied both in functional type and style. The geographical range of certain projectile point forms of this period are widespread over much of the eastern and midwestern United States,

while other forms are only known regionally. Several regional expressions of the Late Archaic have been noted in the Ohio River Valley and elsewhere in Kentucky. The Green River Archaic appears to be the best known (Webb 1946, Winters 1974). This regional style reflects an adaptation to a specific biotic zone or ecosystem along the Green River and Ohio River drainages of south central Kentucky. Another expression of the Late Archaic is the "Riverton Culture" defined by Winters (1969) along the Wabash River in southern Illinois. Sites with components similar to Riverton have been located throughout the Ohio River Valley (Robinson and Smith 1979; Vickery 1974).

Investigations of Late Archaic in west central Kentucky and the Falls of the Ohio River region have been extensive in comparison to similar research in other parts of the state (see Jobe, Allen & Boisvert 1979; Marquardt 1979; Janzen 1971, 1972; Collins 1979a, 1979b; Robinson and Smith 1979; Boisvert 1979; Driskell 1979; Robinson et al. 1979; Sorenson et al. n.d.; and O'Malley and Levy 1979).

3.6.3 Woodland Tradition

The Woodland Tradition (1,000 BC - AD 200-900) is characterized by an increase in social complexity as evidenced by the introduction of pottery, construction of burial mounds and other earthworks and the introduction of agriculture, with a continuation of some Archaic traits. Hunter-gatherer subsistence systems continued to be employed and long distance trade remained important. As with the Archaic, the Woodland tradition can be divided into early, middle and late stages.

The Early Woodland period is best represented by the Adena culture responsible for the many mounds and other earthworks in central Kentucky. The

Adena mounds appear to have been ceremonial in function with some constructed over specially prepared burials or burned structures (Webb and Snow, 1945). A few of these mounds occur in association with large village sites or other earthworks. Burials recovered from these Adena mounds reflect differential status and often contain elaborate grave goods often made of exotic materials such as copper, shell and mica in addition to caches of chipped stone tools. Most information on the Adena culture comes from this context with little known concerning every day life. Sites of the Early Woodland period, of Adena culture, are uncommon in western Kentucky and, therefore, little is known in that area. Based on ceramic styles the Early Woodland Baumer and Crab Orchard cultures have been identified in western Kentucky, southern Illinois and southern Indiana. Although little is known about these cultures there is some evidence suggesting that they may have built square houses with fire pits located outside of the structures (Cole et al. 1951:8). In addition, Early Woodland materials from the Yankeetown site in Warrick County, Indiana, have affinities to Adena or Baumer cultures (Blossingham 1965).

Although mounds are rare in the middle Ohio River Valley, diagnostic Early Woodland contracting stem projectile points are common. While other distinctive Early Woodland point styles are also found, the diversity of styles prevalent in the Late Archaic is no longer apparent. Ceramics from this period are generally crude, thick and simple in form and usually tempered with chert or sand. Turnbow, et al (1980:142-158) has documented Early Woodland ceramics from the Holt Bottoms area in Breckinridge County.

The Middle Woodland period is best known for the Hopewell culture in Ohio and Illinois and elsewhere along the lower and middle Ohio River Valley (Brose and Greber 1979). Like Adena groups, the Hopewell constructed mounds and buried

their dead with elaborate funerary offerings. As with the Adena these grave goods reflect both a stratified society and long distance exchange systems of exotic goods. Distinctive regional styles of Middle Woodland ceramics have been recovered from the region surrounding Breckinridge County. The most prevalent form is the Crab Orchard type defined by fabric or cord-dowel-impressed decoration (Keller 1978:27). Middle Woodland ceramics have also been recovered from the Yankeetown site (Vickery 1970). A late manifestation of Woodland tradition in northern Kentucky and Ohio is represented by the Newtown phase (Oehler 1950). A village site comprised of rectangular houses was excavated at the Turpin farm site. Although the termination date for the Woodland tradition is generally cited as AD 900, in some areas of Kentucky this pattern persisted until historic times. The best example of a Middle Woodland site is represented by the Mann site in Posey County, Indiana, in the Ohio River Valley. At this site 15 earthworks extend parallel to the Ohio River over 2000 meters (Kellar 1978). This locality is situated only a few kilometers downstream from the Holt Bottoms Archaeological District. Overall, the Late Woodland manifestation in this area appears to have been fairly homogenized in nature (Kellar 1973).

3.6.4 Village Farming Tradition (AD 900-1650)

The Village Farming tradition (AD 900-1650) is represented by two late prehistoric cultural manifestations, the Mississippian and Fort Ancient. Mississippian culture appears to have extended northward along the Ohio River Valley and spread throughout western, southern and southcentral Kentucky. The Fort Ancient culture appears to have extended through eastern Kentucky and the central

Bluegrass region and is represented by village farming subsistence patterns. The Fort Ancient culture appears to be a regional manifestation which developed out of the Woodland tradition. However, Breckinridge County can generally be regarded as a marginal area between these two cultural manifestations. It can be assumed that the Mississippian manifestation originated in the Lower Mississippi River Valley. Like most groups influenced by Meso-american contacts, the Mississippian subsistence pattern is based on the bean-squash-maize agricultural complex. A regional example of this culture can be found in the Angel mounds site near Evansville, Indiana. It has been postulated that this site was a sociopolitical center supported by outlying farming villages and hamlets.

Green and Munson (in Smith 1978) have identified three phases of the Mississippian tradition in southern Indiana and western Kentucky. The earliest or Yankeetown phase is represented by small formative stage sites. The middle Mississippian manifestation, or Angel phase is represented at the Angel Mounds site (near Henderson, Kentucky) (Black 1967). This central site appears to have been the focus of a settlement system supported of numerous villages, hamlets and farmstead and hunting camps. Ceramics of this period include shell tempered ceramics, bowls and jars. Stone hoes and small Mississippian triangular arrow points are diagnostic of this period. The Caborn-Welborn phase is similar to the Angel phase in organization but differs in the introduction of southern cult motifs on discus, gorgets, and other artifacts (Green and Munsen 1978:302-303).

The Fort Ancient culture, while sharing numerous traits with the Mississippian, such as maize agriculture, small triangular projectile points, and shell tempered ceramics, appears to have retained a more Woodland subsistence pattern (Griffen 1966; Essenpreis 1978:152). These groups, which were

influenced by the Mississippian, appear to have retained the Village Farming pattern of maximizing local resources rather than serving as a regional socio-political center (Essenpreis 1978:161). Clark (1974) cites the Fort Ancient culture as the antecedents of the historic Shawnee and Delaware groups.

3.6.5 Historic Period

The beginning of European expansion into the region to become Kentucky found no large aboriginal populations, and the few Indian settlements that were located by white explorers and traders were relatively small. The inhabitants of the state at the time of Euro-American expansion were not the peoples who prehistorically occupied the state, but rather recent immigrants into the area. Their movement into the unoccupied regions of Kentucky was in response to displacement from their native territories by white colonists further to the east. The fate of these inhabitants of Kentucky lies obscured in the past, however, it is speculated that European diseases and conquest by more powerful tribes contributed to their disappearance.

The Iroquois nation held political sway over a vast area of the Eastern Seaboard including the territory of Kentucky. Although their towns were primarily located in Pennsylvania and New York (Clark 1974:107), their claim to Kentucky was as a hunting province. Policing such a large area was a difficult task and small camps of Indian groups such as the Cherokee, Delaware, Shawnee and Miami poached the land.

Euro-American exploration of the project area was initiated by Andrew Hymes, Benjamin Lynn, and the Pearman Expedition in 1776 (Bolin 1976:3). Soon afterwards attempts at permanent white settlements were made. Many early settlers hailed from Botetourt, Bedford, Fannin, Loudon, and Culpepper

Counties in Virginia. The earliest headquarters for explorers, surveying crews, and land locators in the pre-Breckinridge County area was Hardin's Station, located on a bluff approximately 1 mile southwest of the present town of Hardinsburg. The original cabin at Hardin's Station was built by a man named Leighton White, but was taken over by William Hardin, for whom the site is named (Breckinridge County Herald-News 1976).

William Hardin came to the area from the Redstone Valley of the Monogahela River in Pennsylvania. He was, according to family tradition, descended from French Huguenots who fled to America to avoid religious persecution. After his arrival in Kentucky he became a land locator for the May Brothers Land Speculation Company and apparently obtained thousands of acres of his own land through this association. He did not retain title however, as the bonds of conveyance he received from John May for the property perished in a fire at his home sometime between 1810 and 1815. He was unable to win a settlement against the May heirs for ownership.

Many of the earliest white settlements in the pre-Breckinridge County area endured continual harrassment and in some cases were forced into abandonment as a result of raids by hostile Indians. The tribe more frequently named in the documents are the Shawnee.

Ill feelings on both sides culminated in August of 1786. Word spread among the white communities that a Shawnee settlement was being built on Saline Creek, a location considered entirely too close for comfort. William Hardin called for volunteers to meet at Yellow Banks for a raid on the Shawnee. The small party, thereafter referred to as the Saline Creek Expedition, consisted of approximately 34 men. They gathered in the night and made their way down the Ohio in flatboats to within a couple of miles of the mouth of Saline Creek. From there they proceeded on foot until reaching the site of the village. The

surprise attack lasted less than 5 minutes but the Indians sustained heavy casualties. Eighteen Indians were killed, six wounded, as contrasted to white loss of a single man and 7 wounded, including Hardin himself (Breckinridge County Herald-News 1979).

Prior to this time Virginia had officially claimed Kentucky as Fincastle County, Virginia, and then created Kentucky County out of a portion of Fincastle. In 1780 a subsequent division of Kentucky County was made, resulting in the creation of Lincoln, Fayette and Jefferson Counties. At the time of the Saline Creek Expedition, Nelson County had just been created from part of Jefferson, and encompassed the project area. In 1792 Kentucky was declared a state separate from Virginia and admitted to the Union.

The greatest influx of settlers in the area was after 1790 when the larger land grants began to undergo division into smaller plots. In 1793 Hardin County was formed from portions of Nelson County and by 1800 Breckinridge County was founded from a division of Hardin. John Breckinridge, for whom the county is named, was a prominent lawyer and politician in Kentucky during the period from 1793 to 1806.

Use of the Ohio River as a major source of transportation in the movement of goods, services, and people led to the rapid expansion of small communities located on the river banks. This phenomenon was enhanced by the flourishing river flatboat trade. River ports on the Ohio boomed with the construction of docks and boatyards, often in conjunction with the beginnings of ferry boat businesses. Local produce grown in the fertile river bottoms and surrounding uplands were shipped out from the docks, which also served as distribution centers for goods and services secured upriver. Stephensport and Cloverport are two such boom towns in Breckinridge County. After the Civil War the development of the railroads diminished the importance of the riverboat trade, and these

towns experienced a period of economic decline.

Construction of railway lines in Breckinridge County coincided with the expansion of the coal industry within the county and in Hancock County to the west. The first railway was built in the 1840's and was called the Breckinridge Coal Road. It ran from the docks of Cloverport to mines in Hancock County. Eventually this line was connected with the Louisville, St. Louis, and Texas Railway. Reorganized in 1896, the line was joined with the Louisville and Nashville in 1905. The establishment of the railways led to the founding of small depots which eventually grew into larger communities. Holt and Addison are two such towns in the vicinity of the survey area.

Breckinridge County's participation in the Civil War was relatively minimal. The only military maneuvers occurring in the area was a very brief visit by Morgan and his Raiders on their fourth foray into the state. They were either dodging or pursuing Union forces and passed through rather quickly. Young men from the county enlisted on both sides.

Until about fifteen years ago, Breckinridge County was basically agricultural in economic orientation. A few industries were begun, but none on a very large scale. Near Addison a small distillery was operational, producing both cider and brandy. The destruction of fruit orchards by a blight caused this business to cease, although this was somewhat relieved by construction of a dam at Addison by the Corps of Engineers in 1920 (Gedling 1976).

The town of Cloverport became the site of brick manufacturing when J. K. McCrackin, an English entrepreneur, financed the building of the Cloverport Brick and Paving Company in 1887. Later two more brick companies were constructed near Cloverport. These were the Patton Brick Company and the Acme Brick Company. Acme eventually became the Murray Tile Company which is still in operation. In 1906 the first roofing tile was produced at Murray Tile and

for several years these were the only items made. In the 1920's floor tile was added. Murray Tile merged with American Olean in 1959, which is a subsidiary of the National Gypsum Company (Breckinridge County Herald-News). More recently the Holt Bottoms has received the interest of several large industrial concerns. Development of their businesses in the area will undoubtedly enhance the county's economic prospects, in the future.

4.0 PREVIOUS ARCHAEOLOGICAL RESEARCH

The following is a brief review of archaeological research previously conducted in the vicinity of the project area. Additional information regarding this region can be found in Turnbow et al. 1980:52-57; Cowan 1975; and Allen and Cowan 1976.

Collins (1847:334) was responsible for the first report of aboriginal remains in the vicinity of the proposed project. This site was situated on the banks of the Ohio River near Cloverport. Erosion caused by a period of high water resulted in the discovery of three burials and associated grave goods. Webb and Funkhouser (1932:51) later assigned this site the number 15 BC 1. In 1929 and again in 1932 Webb and Funkhouser reported four site locations including a series of rockshelter sites with associated bedrock mortars (or hominy holes as they are called locally) which were designated 15 BC 2 and 15 BC 4 and are located in Deyer and 3 miles south of the town of Constantine, respectively (Webb and Funkhouser 1932:53). They also reported the presence of a village site in the county. Collins (1847:306) reported visiting a rockshelter in which human bone was present located near Tar Springs in Breckinridge County. In addition, Webb and Funkhouser working under the auspices of the WPA excavated several sites in nearby Ohio, McClean and Hancock Counties (see Jobe, Allan, and Boisvert 1979:24-25). However, Breckinridge County was not included in any of these WPA sponsored investigations.

Archaeological investigations in Breckinridge County were not resumed until the late 1950's and early 1960's. This research, initiated by the University of Kentucky, Museum of Anthropology (Schwartz, Sloan and Walker 1958), consisted of a survey of the proposed Rough River Dam & Reservoir. Of the six sites located during this investigation, only one was located in Breckinridge County.

This site was not recommended for additional work; however, one of the sites in nearby Grayson County was a rockshelter of some significance. Test excavations at this site (Schwartz and Sloan 1958) revealed the presence of animal remains (shellfish, deer, rodents), human skeletal remains, and numerous artifacts including pottery and ground stone, and chipped stone tools. Occupation of this site was determined to be primarily Archaic and Woodland, with Mississippian also present.

The presence of petroglyphs near Tar Springs in Breckinridge County was noted in the 1960's by Coy and Fuller (1968:30). They suggested that the petroglyphs (designs pecked into rock surfaces) are usually found near rockshelters and very often in proximity to hominy holes. The Tar Springs petroglyphs (northwestern Breckinridge County) consisted of "bird tracks", circles, spirals, and several geometric designs. Other petroglyphs in the region (Hardin County, Grayson County) included motifs such as birds and animal and human foot and hand prints, as well as rectangles and other geometric designs. Petroglyphs are also known in Breckinridge County about 1.4 miles from Mattingly, Hardin County, Kentucky.

Following this was another period of relatively little archaeological research. It was not until 1973 that archaeological research resumed in the form of cultural resource management projects instigated by Federal environmental protection legislation. In 1973 the University of Louisville (1973) found seven sites (15 BC 202 through 15 BC 208) in Breckinridge County which were to be impacted by the construction of the Cannelton locks, dam, and pool. These were found on the bank of the Ohio River. One site (15 BC 206) was identified as Woodland. Another site, 15 BC 208, was located in the project area surveyed by the University of Kentucky in 1979 (Turnbow et al 1980). Shock (1974) conducted

a survey east of Hardinsburg for a proposed airport runway extension and found six prehistoric "localities" and one historic location (Site 15 BC 206). However, no prehistoric cultural material was recovered and no further work was recommended for the site.

In the late summer of 1979, the University of Kentucky performed a sample reconnaissance of a proposed transmission line, railroad spur, and new plant site in Breckinridge, Hancock, Ohio, McClure, Hopkins and Webster Counties. The investigations in Breckinridge County were all south of Hardinsburg and not near the area of concern in this report. A total of 48 sites were found and 31 recommended for testing. Those recommended included 8 sites near streams or rivers with potential for buried deposits (none of these were in Breckinridge County), 9 rockshelter sites (8 in Breckinridge County), and 2 shell middens (none in Breckinridge County). Additionally, outside of Breckinridge County, 12 other sites were recommended. For the Mississippian Plateau Region (the region in which the Holt Bottoms project site is located) it was found that cliff-lined hollows had a "high" site density. The results would suggest that similar areas, such as the uplands adjacent to the Holt Bottoms area, would be likely to contain numerous archaeological sites.

On June 15, 1976, the Kentucky Historic Preservation Review Board voted to approve the nomination of the Holt Bottoms Archaeological District in Breckinridge County, Kentucky, to the National Register of Historic Places. This action was based on data derived from an archaeological survey made by C. Wesley Cowan for the American Smelting and Refining Corporation (Cowan: 1975). On the basis of an on-site walking survey three sites and fourteen small activity locales were defined (Cowan 1975:1). Although Cowan (1975:39) recommended that before the sites (15 BC 16, 15 BC 17 and 15 BC 18) be nominated to the National Register of Historic Places a testing program be undertaken to, ". . . better

determine the cultural and historical significance of these sites", Dr. William Morgan of the Review Board stated that unlike buildings or battlefield, archaeological sites deserve protection before their value is assessed (Kentucky Historic Preservation Review Board transcript of June 15, 1976, page 14).

Between July 12 and 21, 1976, test excavations were conducted at 15 BC 16, 15 BC 17 and 15 BC 18 (Allen and Cowan 1976). These excavations demonstrated that only a small portion of the largest site, 15 BC 16, had cultural deposits that might be significant (Allen and Cowan 1976: 52-56). On the basis of the site map of 15 BC 16 (Allen and Cowan 1976:42) it is estimated that the total area of this site is 121,000 square meters. However, the test excavations on 15 BC 16 concluded that only a small portion of this site had significant cultural deposits (Allen and Cowan 1976: 59-60). Preliminary calculations indicate that only 6%, or 7,500 square meters of 15 BC 16 has been assessed as significant. The test excavations also concluded that only the southern half of 15 BC 17 contained significant undisturbed cultural deposits (Allen and Cowan 1976: 59). Six test units excavated in 15 BC 18 indicated that two areas of the site have undisturbed cultural deposits (Allen and Cowan 1976: 58). On the basis of the data it appears that only 50% of 15 BC 18 is potentially significant.

In their report Allen and Cowan did not make a re-assessment of any of these sites in order to justify their being nominated to the National Register of Historic Places. In 1979 they were officially placed on the National Register as the Holt Bottoms Archaeological District.

The University of Kentucky recently continued work in this area in the form of an archaeological reconnaissance for the proposed Kentucky Utilities power plant site adjacent to the Holt Bottoms Archaeological District (Turnbow et al 1980) and at an alternate power plant location in Hancock County.

In both areas extensive evidence of prehistoric and historic occupation was found, representing Paleo-Indian through Historic occupation. Sixty-eight archaeological sites and 14 standing structures (Turnbow et al 1980:11; p.324) were documented in the Holt Bottoms area. Sixteen of these sites were recommended for further assessment. Two historic structures within the Kentucky Utilities survey area - The Joseph Holt House and Chapel - were previously nominated to the National Register of Historic Places. During the University of Kentucky project the boundaries of the project area were modified to accommodate a proposed coal conversion plant to be built in the southern portion of the Holt Bottoms area. A wide variety of site types were found to occur in this area, including shell middens, rockshelter sites and open sites of all sizes with cultural material ranging from Paleo-Indian to Historic. Artifactual materials recovered during this investigation included chipped stone, ground stone, ceramics and petroglyphs.

The Addison Shell Mound (Site 15 BC 19) situated a mile north of the project area is a mussel shell midden of considerable depth and has been assigned to the Middle to Late Archaic periods (Turnbow et al 1980:56). The site occupies a hill next to the Ohio River and extends for several hundred meters around the hill. Although not situated within the project area, the Addison Shell Mound is a unique resource in the area.

5.0 PROJECT SITE INVESTIGATIONS

In order to assess the archaeological and historical resources of the proposed project area, a thorough site record and literature search was conducted to determine the presence of known cultural/historical sites within or near the project area. Archaeological site records, maps and manuscripts, and technical reports were evaluated at the Office of State Archaeology at the University of Kentucky, the Kentucky Heritage Commission, the Breckinridge County Public Library and Centre College. Also contacted were the Department of Anthropology and the Museum of Anthropology at the University of Kentucky.

The Office of State Archaeology currently functions as the regional repository and clearinghouse for the State of Kentucky. Files are maintained at this facility, and current information on sites and locations is available for the entire State. The National Register of Historic Places, a listing maintained by the National Park Service was also reviewed.

The literature search revealed that no previously identified historical or cultural sites of local, state or national significance occur with the designated survey area, specifically the southeastern portion of the proposed plant site and two alternate disposal sites. However, several archaeological and historical sites are located within and adjacent to the remaining portion of the project site and within the general vicinity which encompasses the Holt Bottoms Archaeological District currently on the National Register of Historic Places. Additional information regarding these known sites within or near the project area can be obtained from Turnbow, et al (1980).

On August 9, 1980, a field reconnaissance was initiated to determine the presence of cultural resources within the impact area. The survey area consists

of the plant site and two potential waste disposal areas. This reconnaissance was conducted by a team of three to four archaeologists walking in parallel transects no greater than 10-15 meters apart while visually inspecting the ground surface for indications of cultural remains. In addition, areas of limited visibility due to dense ground cover were systematically shovel tested in order to increase the reliability of the survey. Ground visibility during the survey varied from poor in areas of dense understory vegetation and areas in cover crops or pasture to good to very good in areas planted in corn and tobacco. Transects were selected on the basis of terrain and the relative potential for the presence of cultural resources. The crew remained on transect with the aid of a Brunton compass. Distances were judged on the basis of both physical and man-made landmarks located on the U.S. Geological Survey 7.5' topographic maps (Rome/Mattingly quadrangles). Particular attention was paid to exposed ground surface, the presence of intermittent stream channels which may have represented usable water sources during prehistoric or early historic times, the location of springs and/or limestone seeps, and areas of recent subsurface disturbances (i.e., disked areas, road and/or tractor cuts). Areas disturbed by recent animal activity were also checked for indication of subsurface cultural deposition. When an artifact or scatter of artifacts was located, the survey crew dispersed in order to visually define the areal extent of the site and to more closely examine its contents. In this manner, the general distribution of the material was tentatively defined. However, in most cases boundaries were difficult to determine because of ground cover and the low density of material observed. Both sketch maps and record forms were completed in the field and location of archaeological remains were noted on the topographic maps. In addition, some systematic collection of surface artifacts was undertaken.

5.1 Survey Results

Nine previously unrecorded archaeological sites and 3 standing structures were located during the field survey and were shovel tested. These sites were assigned temporary field numbers during the survey but have since been given permanent site numbers by the Office of State Archaeology.

The following temporary field designation numbers: Ashland 1, 6, 7 and 10 through 15, were eliminated either because they represented a previously documented site or because sites have been combined under one number as independent loci of the same site.

5.1.1 Archaeological Sites

Only one previously unrecorded archaeological site was encountered in the southeastern portion of the project area:

15 BC 103

Temporary Site Designation: Ashland 3
Location: Rome 7.5' quadrangle
UTM Zone 16
N 4192020/E 537848

Elevation: 580 MSL

Physiographic Setting: Bedrock outcrop on the eastern slope of hill below the Tinus farm (Ashland 2)

Vegetation: Pasture, low grasses

Visibility: poor to fair, 0-30%

Size: 1 m x 1 m

Description: Ashland 3 is an isolated food processing site located near the old Tinus farm (Ashland 2). The site consists of a bedrock outcrop exhibiting a ground circular depression identified as

a bedrock mortar and possible petroglyph situated on the eastern slope of hill, east southeast of the cemetery overlooking the old Tinuis farm approximately 500 m northeast of Highway 144. The site outcrops in a pastured field directly east of the slough which joins Town Creek to the Ohio River.

Cultural Affiliation: unknown prehistoric

Material Recovered: None collected

Two previously unrecorded archaeological sites were encountered in the northern potential waste disposal area.

15 BC 104

Temporary Site Designation: Ashland 8

Location: Rome 7.5' quadrangle
UTM Zone 16
N 4195020/E 540400

Elevation: 600' MSL

Physiographic Setting: Sandstone cliffline overlooking upland drainage of Town Creek

Vegetation: High canopy deciduous hardwood forest

Visibility: shelter, excellent - 100%; vicinity, poor - 0%

Size: 5 square meters

Description: Shallow, high ceilinged rockshelter with rubble strewn, sandstone floor. Very sparse scatter of lithic debitage. Area appears intact (i.e., not disturbed by looters), but subsurface deposit is unlikely due to shallowness of soil above the sandstone floor.

Cultural Affiliation: unknown prehistoric

Material Recovered: 1 biface fragment, expanded at base and tip, lenticular
in cross section
12 unclassified waste flakes

15 BC 105

Temporary Site Designation: Ashland 9

Location: Rome 7.5' quadrangle
UTM Zone 16
N 4194390/E 540340

Elevation: 700' MSL

Physiographic Setting: rockshelter located in face of sandstone cliffline
on slopes above upland end of Town Creek

Vegetation: deciduous hardwood forest, dense understory vegetation

Visibility: poor to moderate, 0-50%

Size: 18 square meters

Description: Rockshelter located approximately .8 km southwest of steep bend south in Highway 144 just west of Stephensport. Approximately 1 km due west of new Bethel Road. Rockshelter is situated in face of sandstone cliffs bordering Town Creek. Shallow shelter faces east. Deposits on floor of shelter at least 1' in depth. A large quantity of organic debris present including leaf litter, branches and nut shells. Materials recovered in proximity to back wall. A possible feature may be a relatively modern hearth.

Cultural Affiliation: unknown prehistoric

Materials Recovered: 17 unclassified waste flakes
1 small triangular drill, broken at base, ground at tip
and laterally along one margin indicates may have been
utilized as knife
1 burned bone fragment, polishing is evident

Six previously unrecorded archaeological sites were encountered in the southern potential waste disposal area.

15 BC 106

Temporary Site Designation: Ashland 16

Location: Rome 7.5' quadrangle
UTM Zone 16
N 4192900/E 540480

Elevation: 600' MSL

Physiographic Setting: Located on fairly steep slope of a ravine in which an upland branch of Bull Creek is located

Vegetation: deciduous hardwood forest, beech, maple, dense to moderate understory vegetation

Visibility: poor to moderate, 0-40%

Size: 3 m N-S x 15 m E-W

Description: Site is located on slope of ravine approximately 100 m NW of Rednour house. Roughly 30 m from gravel access road. Site is a low, shallow rockshelter in a large sandstone bedrock outcrop eroding from cliffline. Overlooks the headwaters of a branch of Bull Creek. Heavy organic litter on floor; soil depth c. 10" with 2 soil layers visible (stratified). Only 2 artifacts were recovered (1 flake, 1 core) but similar to pattern of rockshelter habitation observed in area.

Cultural Affiliation: unknown prehistoric

Materials Recovered: 1 core, amorphous
1 unclassified flake

15 BC 107

Temporary Site Designation: Ashland 17

Location: Rome 7.5' quadrangle
UTM Zone 16
N 4193080/E 540450

Elevation: 640' MSL

Physiographic Setting: Upland plateau gradually sloping to the west dissected by an upland branch of Town Creek on the north and by an upland branch of Bull Creek on the south

Vegetation: cultivated corn and weeds, sassafrass, small saplings adjacent to the site

Visibility: in cornfield poor to good, 0-60%; outside field, poor - 0%

Size: 100 square meters

Description: Site is located 1/4 mile north of the entrance to gravel drive leading to the Rednour house; border gravel road which ends past the Snyder house at the Hendry farm. The site, which encompasses a large portion of the cornfield consists of a sparse lithic scatter uniformly distributed throughout the cornfield which borders ravine upland branch of Bull Creek. No artifact concentrations were noted. On the western end of the field about mid-way is a concentrated area of historic artifacts including glass and ceramic fragments. No structures remain, however, and no large historic objects such as farm equipment or machinery are present. On slight slope on the northwestern end of the field is a thicket of saplings in which a small cemetery is located. This cemetery contains 4 headstones and several unmarked graves.

Cultural Affiliation: unknown prehistoric; historic

Materials Recovered: Prehistoric

- 1 core
- 6 unclassified flakes
- 1 bifacial end scraper gray chert

Historic

- 2 pieces window glass (greenish tint)
- 3 pieces glazed cream ware buff part
- 1 piece milk glass
- 1 piece white porcelain (rim)
- 1 piece cut glass
- 1 amethyst glass stopper
- 1 lavender glass vase
- 1 glossed grey ware with blue lettering
- 1 piece glass brown ware, black exterior
- 1 piece brown ware with greenish brown exterior glaze
- 1 piece black ware glazed - buff rough interior

15 BC 108

Temporary Site Designation: Ashland 18

Location: Mattingly 7.5' quadrangle

UTM Zone 16

N 4190900/E 539075

Elevation: 400' MSL

Physiographic Setting: Site is located on the alluvial floodplain of Bull Creek approximately 15 m North from road, 10 m from Bull Creek and 400 m from house located on rise to the west of the site.

Vegetation: Cultivated tobacco and weeds

Visibility: moderate to good, 40-60%

Size: Approximately 20 m N-S, 25 m E-W

Description: Light lithic scatter interspersed with historic ceramics located on the alluvial plain 10 m north of Bull Creek, 15 m north of road and 200 m west of abandoned house and barn complex.

Cultural Affiliation: unknown prehistoric, historic

Materials Recovered: Prehistoric

- 1 modified flake, unifacial, secondary retouch bilaterally and at tip
- 13 unclassified flakes
- 1 spokeshave, notched and ground, unifacial margins, one corner pointed, broken at tip

Historic

- 1 greenish-blue bottle glass sherd
- 1 white glazed ware sherd, red pattern on exterior side
- 1 white glazed ware sherd, buff paste and interior unglazed

15 BC 109

Temporary Site Designation: Ashland 19

Location: Rome 7.5' quadrangle

UTM Zone 16

N 4190895/E 539185

Elevation: 400' MSL

Physiographic Setting: On floodplain of Bull Creek, approximately 125 m west of house. A freshwater spring is located approximately 10 m northeast of house.

Vegetation: Cultivated corn and weeds

Visibility: good, 60%

Size: 20 m N-S x 20 m E-W

Description: Ashland 19 is a small flake scatter located at the base of knoll overlooking alluvial floodplain, 20 m north of Bull Creek and approximately 125 m west of an abandoned house and barn. Area is disturbed by disking and probably habitually collected.

Cultural Affiliation: unknown prehistoric

Materials Recovered: 15 unclassified flakes

1 biface fragment, some fine retouch

2 white glazed sherds, one exhibits red crisscross pattern

15 BC 110

Temporary Site Designation: Ashland 20

Location: Mattingly 7.5' quadrangle

UTM Zone 16

N 4191005/E 539050

Elevation: 420' MSL

Physiographic Setting: At base of knoll overlooking alluvial floodplain of Bull Creek approximately 100 m south and southeast of site and approximately 100 m northeast of dirt road and 250 m northwest of abandoned house and barn complex.

Vegetation: Cultivated corn and weeds

Visibility: good, 60%

Size: 10 m N-S x 10 m E-W

Description: Light lithic scatter located in cornfield on small rise at base of knoll overlooking Bull Creek.

Cultural Affiliation: unknown prehistoric

Materials Recovered: 1 milky quartz, translucent flake
1 unclassified flake
1 modified flake, secondary flaking and ground on edge
1 white quartzite cobble core

15 BC 111

Temporary Site Designation: Ashland 21
Location: Mattingly 7.5' quadrangle (1970 rev.)
UTM Zone 16
N 4191250/E 539590

Elevation: 430' MSL

Physiographic Setting: Site is situated on a relatively flat cultivated field located on a small terrace on the lower slope of a ridge above the floodplain of Bull Creek.

Vegetation: Cultivated tobacco and weeds, hardwood forest, upland slopes with dense understory vegetation.

Visibility: moderate to good, 40-60%

Size: Approximately 25 m N-S x 30 m E-W

Description: The site is located in a tobacco field approximately .1 km north of Bull Creek and .4 km northeast of an abandoned house and barn, approximately .6 km northeast of a dirt road. The site consists of a large scatter of historic artifacts interspersed with some prehistoric lithics.

Cultural Affiliation: unknown prehistoric, historic

Materials Recovered: Prehistoric
2 pieces burned bone fragment
1 prismatic blade - retouch on end
2 lithic unclassified flakes
1 core fragment

Table 5.1-1 Tabulation of Materials Recovered from Archaeological Sites

<u>Site</u>	<u>Faunal Remains</u>	<u>Prehistoric</u>	<u>Historic</u>		
		<u>Lithics</u>	<u>Ceramics</u>	<u>Glass</u>	<u>Metal</u>
15 BC 103	--	--	--	--	--
15 BC 104	--	13	--	--	--
15 BC 105	1	18	--	--	--
15 BC 106	--	2	--	--	--
15 BC 107	--	8	8	6	--
15 BC 108	--	17	2	1	--
15 BC 109	--	16	2	--	--
15 BC 110	--	4	--	--	--
15 BC 111	--	6	20	12	1
<hr/>					
Totals	1	84	32	19	1

Historic

- 1 brick fragment
- 4 brown glaze sherd with light green
- 2 light brown speckled glaze on one side; greenish glass sherd-slipped brown interior
- 1 black glazed rim sherd - unglazed, slipped exterior
- 1 black glazed sherd, grey glaze
- 1 brown glazed sherd, black interior glaze
- 2 grey on white past slopped and glazed
- 1 fragment porcelain
- 1 fragment cream ware
- 1 cream ware with lavender design
- 2 fragments white ware
- 1 white ware - blue design china/1 rim
- 1 white ware - blue rim china with double rim
- 1 black glaze sherd exterior unslipped rough
- 1 shotgun cap
- 2 molded glass fragments (possibly melted)
- 1 cutglass sherd fragment
- 1 amber glass
- 2 clear bottle glass
- 1 opaque glass bottle rim
- 4 fragments green-blue glass
- 1 coke bottle fragment

5.1.2 Standing Structures

All standing structures or structural complexes encountered during the survey were documented. Three previously unrecorded structures or structural complexes were recorded within the project site and one within the potential waste disposal areas. As with all archaeological sites encountered each structure or structural complex was assigned a temporary field designation number (Ash. 1, Ash. 2 and Ash. 3) and described. In addition, 6 structures or structural complexes had been previously recorded within the project area (Turnbow et al 1980; Allen and Cowan 1976; Cowan 1975). None of these previously recorded structures within the project area are presently on, or nominated to, the National Register of Historic Places. However, two structures on the National Register of Historic Places are near the plant site, the Joseph Holt House (9/10

mile to the north) and the Holt Chapel (1/2 mile to the north). Neither of these two historically significant structures should be affected by construction of the proposed project. Descriptions of all previously recorded structures can be found in Turnbow, et al (1980:279-83).

Temporary Site Designation: Ashland 2 - Historic Structure 1

Location: Rome 7.5' quadrangle
UTM Zone 16
N 4192150/E 537600

Elevation: 600' MSL

Physiographic Setting: Lower northeastern slope of hill west of dirt road which joins Highway 144 to the southwest and north northeast of publically maintained cemetery.

Vegetation: Open grassland bordered by brush, vines and deciduous forest

Visibility: fair to poor, 30-0%

Size: Structure A 30' x 29'9" NS x EW
Structure B 37'8" x 21" NS x EW

Description: Tinuis farmstead complex. Structure A is a 1½ story frame dwelling, symmetrically planned facing east-west. Building rests on isolated foundation system made of stacked rubble sandstone. Structure lacks cellar. Lumber used in floor and ceiling joints show circular cuts. Some use of rough hewn floor and ceiling joints. Stud walls with planking on exterior and interior. Exterior is in two layers with (1) vertical boards nailed to frame and (2) horizontal weather straps exposed to elements. Rafters butted, no ridge beam. Tin sheeting applied to roof. Fascia and soffet applied to eaves. Chimney flue is centrally located, off-the-floor, and accommodates stoves for both rooms on each level. Stairway winds from front room entry to two rooms upstairs. Ceiling boards and upstairs partition are beaded. Both wire nails and machine cut nails are used throughout. In addition to this structure there is a well located about 300' south on dirt road west of house, and one dependency - a 7' x 8' corner pole shed located about 40' east-northeast of house. House structure is currently used to store hay. Part of the southeast wall of house is missing.

Structure B is a semi-subterranean structure consisting of foundation walls constructed of 7' thick mortated sandstone blocks. Possible additions or smaller adjacent rooms are located at the front of structure on each corner. Interior strewn with sandstone and brick rubble. Several square cut nails, crock sherds, and a depression era aluminum tea kettle were observed.

Cultural Affiliation: historic

Materials Recovered: 1 brick fragment
4 brown ware sherds
1 rim sherd, dark greenish brown glaze
1 roofing nail
2 long squarehead nails
1 machine made, wire nail

Temporary Site Designation: Ashland 4 - Historic Structure 2

Location: Rome 7.5' quadrangle

UTM Zone 16

N 4192775/E 537810

Physiographic Setting: Western face of heavily dissected ridge bordering the Ohio River floodplain.

Vegetation: Heavily forested with vines, deciduous trees and brush

Visibility: poor, 0%

Size: 20 m x 20 m

Description: Ashland 4 is a farmstead complex located on the southeastern side of a ridge which overlooks and is approximately 5/8 mile northeast of a large slough which joins Town Creek to the Ohio River. The site consists of a wooden frame house with horizontal board siding, built of machine cut boards and roofed with tin, a centrally located interior chimney and four rooms. There are two out buildings associated with this structure. These out buildings are located 6-10 m to the southwest. Both are built of machine cut boards and roofed with tin. The structure nearest the house is rectangular with bins on two walls and one shuttered window. The farthest structure is collapsed. A board fence encloses a small area to the front of the structure.

Cultural Affiliation: historic

Materials Recovered: None collected

Temporary Site Designation: Ashland 5 - Historic Structure 3

Location: Rome 7.5' quadrangle

UTM Zone 16

N 4193080/E 537945

Elevation: 580' MSL

Physiographic Setting: Located on western slope of a ridge overlooking the Ohio River floodplain to the west and the slough which joins Town Creek to the Ohio River to the southwest.

Vegetation: Deciduous forest with dense understory vegetation

Visibility: poor, 0-10%

Size: 50 square meters

Description: Frame structure with central chimney and addition added to back as a shelter for animals. Badly deteriorated.

Cultural Affiliation: historical

Material Recovered: None collected

5.1.3 Cemeteries

During the course of the investigations two historic cemeteries were encountered. Of these only one, the Tinius Family cemetery had been previously recorded. This cemetery was relocated during the survey and found to be publicly maintained and in good condition. One previously unrecorded cemetery was located on the property of Mr. Anthony Rednour. This cemetery is located in a copse of trees. Some of the graves have been partially obliterated. In addition, the presence of three depressions in the earth and two footstones indicate the possibility that additional graves are present. The headstones still in place read as follows:

"Mary Powers, wife of C. C. Powers b. 1844, d. 1909". (Headstone exhibits both dove and leaf motif.)

"Nancy J., wife of C. W. Merritt, b. 1865, d. 1904". (Headstone exhibits three three-pronged leaf motif.)

"Daughters of Wm. A. and Martha Ahl. Mary E., b. 1904, d. 1905; Monnie M., b. 1899, d. 1901". (None of the before mentioned motifs were engraved on headstone.)

"Irene, daughter of F. and E. Furrow, b. 1901, d. 1903". (Headstone exhibits flying dove motif.)

6.0 CULTURAL RESOURCE ANALYSIS AND RECOMMENDATION

In assessing the importance of archaeological sites the archaeologist views the data with respect to the dimensions of time, space and culture. Temporally there are gaps in the archaeological record and when sites are discovered that can contribute to an understanding of these time periods they are assessed as significant. Paleo-Indian sites, representing the earliest inhabitants of the Americas, are an example of sites that are temporally important to the archaeologist. The main criteria for identifying Paleo-Indian sites is the presence of a fluted projectile point. The term Clovis and Cumberland refer to two different types of fluted points.

A second factor that is considered in assessing the significance of a site is its location in relation to a larger geographical area. In Kentucky the focal point of Early Woodland development occurred in the northeastern portion of the state. The ensuing Middle Woodland period is well defined in Ohio and Illinois but is poorly known in Kentucky. For this reason, Woodland sites in Breckinridge County, Kentucky, have the potential of contributing information about the overall development of the Woodland period in the Ohio Valley.

Besides an interest in the temporal and spatial dimensions of archaeology the archaeologist is also interested in the cultural dimension of prehistoric societies. In most cases archaeological sites are discovered in areas where there has been intensive agricultural and construction activities, or where erosional processes have been in operation. This means that usually the archaeologist obtains data that is disturbed from its original context and therefore, interpretations have a weakened degree of validity. The importance

of some of the sites discovered in Breckinridge County is that they may have sealed, undisturbed cultural deposits.

The following is a summary of the known cultural resources within the project area and two potential waste disposal site areas. A total of 47 previously documented archaeological sites and six standing structures occur within the boundaries of the current Ashland project site. These sites were assessed previously by Turnbow et al (1980). Turnbow et al has assessed these resources as representing a significant contribution to the knowledge of the region. Based on that assessment, the Kentucky Heritage Commission is currently reviewing Turnbow's assessment and recommendations for further work in order to determine their potential eligibility for inclusion in the Holt Bottoms Archaeological District listed on the National Register of Historic Places. The Holt Bottoms Archaeological District also occurs within the boundaries of the proposed Ashland project site. Mitigation of these resources will be required prior to development of this area by Ashland Synthetic Fuels, Inc. A mitigation program has not yet been developed since it is contingent upon the result of further assessment in the form of site testing for the potentially significant sites. These sites are presented in Table 2.1-1.

In addition to previously documented archaeological sites and standing structures, the present Dames & Moore survey has documented one additional archaeological site in the form of an isolated food processing station (bed-rock mortar) and 3 structural complexes occurring in the southeastern portion of the plant site. However, none of these sites has been recommended for additional assessment.

A total of 2 archaeological sites were found within the northern potential waste disposal area as a result of the Dames & Moore survey. Of this total, only one has been recommended for further assessment (15 BC 105). However, a portion of the survey area was not accessible at the time of the survey. This area seems to have a high potential for the presence of rockshelter sites.

A total of 6 archaeological sites were found to occur within the southern potential waste disposal area as a result of the present survey. Only one of these sites, 15 BC 106, appears to have undisturbed stratigraphic deposits and has been recommended for additional assessment. However, large portions of this survey area were not covered because landlords denied access. Should this area be selected for use as a waste disposal area, an additional walk-over survey of those areas will be required as this area has a moderate to high potential for the occurrence of archaeological sites. In addition, dense vegetation in the southeastern plateau portion of this area may have prevented surveyors from documenting potential sites in that region. As this area has a moderate to high potential for the occurrence of archaeological sites, it is suggested that this area be re-evaluated prior to any development of the area.

The cultural resources surveys of the plant site by Dames & Moore and others has yielded 50 sites with prehistoric components (see Table 6.0-1). The cultural resources survey of the two potential upland waste disposal areas has yielded an additional 8 sites with prehistoric components.

The settlement pattern in the project area postulated by Turnbow et al (1980) is consistent with the findings of this survey. This pattern consists generally of large sites situated on the lower terraces and on the edges of the upper terraces. These sites produced a high frequency of cultural remains. In addition, there is the potential for further cultural deposits in the form

Table 6.0-1. Plant Site. Archaeological sites discovered during surveys conducted in 1975 and 1980.

<u>Survey</u>	<u>Sites</u>		
Cowan (1975)	15 BC 16 + 17 + 18 +		
Turnbow (1980)	15 BC 37 * 38 39 * 40 * 41 * 42 * 43 * 44 45 46 47 48 49 50 51 * 52	15 BC 53 54 55 56 57 58 59 60 61 62 63 * 64 * 65 66 67	15 BC 68 69 70 71 72 * 73 74 75 76 * 77 h 78 79 80 81 82 83
Dames & Moore (1980)	15 BC 103		

+ sites tested and mitigation recommended
 * additional testing recommended
 h historic site

of intact sites buried within the alluvium. Turnbow et al (1980) has postulated that these sites served as basecamps from which to exploit the surrounding region. The survey of the uplands by Dames & Moore produced additional evidence to support this theory in the form of numerous temporary campsites, rockshelters or special use. On upper terraces and ridges the presence of specialized campsites is suggested by the presence of bedrock mortar sites, and a number of isolated artifacts and small lithic scatters. In this group are included previously known sites such as 15 BC 52 and 15 BC 71 which produced a number of pitted stones and cobbles that can be interpreted as nut or seed processing areas, and newly recorded sites such as 15 BC 103. In the rockshelters occupation appears to have varied from small activity areas or campsites to basecamps with deep deposits, bedrock mortar and petroglyphs (Turnbow et al 1980).

Historic archaeological sites and standing structures dating from the 1800's, are generally located on upper terraces and ridges not prone to flooding. Historic archaeological sites are usually house locations which have fallen victim to fire or clearing as evidenced by early maps of the region (Turnbow et al 1980:297). Other structures remain standing or have been subsequently rebuilt.

The project area is known to have been occupied from Paleo-Indian through Mississippian periods. Paleo-Indian occupation of the survey area is evidenced by sites such as 15 BC 16 (Cowan 1975; Allen and Cowan 1976) at which a Clovis fluted point fragment was recovered. This site, situated upon the upper terraces, is located within the Holt Bottoms Archaeological District. Test excavations in 1976 (Allen and Cowan 1976:52-54) produced evidence of undisturbed cultural deposits. The age of these deposits, however, has not yet been determined. In addition, both a Cumberland fluted point fragment

and a Clovis fluted point have been reported at several locations in the vicinity of the project site (Turnbow et al 1980:298).

Turnbow et al (1980:301) reports Archaic cultural materials represented at several localities within and near the plant site. Sites 15 BC 39, 15 BC 40 and 15 BC 42 are reported to have Archaic components. All three sites are located on the lower terraces of the project area. In addition, three sites situated within the Holt Bottoms Archaeological District are reported to have intact cultural deposits of the Archaic period, 15 BC 16, 15 BC 17, and 15 BC 18. It should be noted that parts of sites 15 BC 39 and 15 BC 40 are located within the current boundaries of the Holt Bottoms Archaeological District and are thus protected under the provisions of the National Register. Turnbow et al (1980:301) has recommended that each of the three sites mentioned above (i.e., 15 BC 39, 15 BC 40, and 15 BC 42) should each receive 5 hand dug 1 x 2 m test units in order to explore the possibility of subsurface intact cultural deposits or features.

Two sites within the plant site are known to have artifacts assigned to the Early Woodland period (15 BC 30 and 15 BC 40) and the recommended testing has been outlined in the preceding paragraph. No sites in the Ashland project area were found to exhibit Middle Woodland characteristics (Turnbow, et al 1980:303).

Two sites within the plant site exhibited the small triangular projectile points attributed to either Late Woodland or Mississippian period occupation, 15 BC 54 and 15 BC 72. Both sites have been interpreted as small hunting camps (Turnbow et al 1980:307).

Archaeological sites with historic components in the project area include 15 BC 39, 15 BC 43, 15 BC 45, 15 BC 69, 15 BC 73, 15 BC 80, and 15 BC 81 (Turnbow et al 1980:310). Archaeological sites within the southern waste disposal

area with historic components include 15 BC 107 and 15 BC 111. All of these sites are believed to represent farmsteads which date from the late 1800's and early 1900's. However, due to both the poor condition of these sites and their apparent recent age the historic components of these sites are considered of limited scientific or historic value. No further work, therefore, is recommended for these sites. The standing structures and structural complexes identified by both the University of Kentucky survey (Turnbow et al 1980:310) and the more recent Dames & Moore survey are all of similar regional architectural style, poor preservation and, therefore, of little historic value. As none of these structures meet the current criteria for nomination to the National Register of Historic Places, no further work is recommended for these structures. Although the structure identified by Turnbow et al (1980:310) as Breckinridge County Structure 1 is not of historic value, Turnbow indicates the log house is well preserved and a good example of a one and one-half story, rectangular pen, hand hewn log structure and suggests that the structure be salvageable for restoration at another location.

One of the two cemeteries encountered during the Dames & Moore survey is located within the present limits of the plant site (The Tinguis family Cemetery). It is recommended that this cemetery be avoided. In addition, one cemetery is located within the southern potential waste disposal area. It is recommended that this cemetery be avoided or its contents be relocated as provided by state law, should this area be selected for development.

The terrain of the project site can be divided into a lower and upper terrace area. In 1976 test excavations were conducted at three sites on the lower terrace, 15 BC 16, 15 BC 17 and 15 BC 18 (Allen and Cowan, 1976). The recommendations arising from these excavations were that 25% of the southern portions of 15 BC 16b, 15 BC 16c, and 15 BC 17, and 25% of 15 BC 18, be excavated

these areas are affected by construction. In addition, a deep testing research strategy, to be established by the archaeologist in charge of the excavation, was recommended for 15 BC 17 and 15 BC 18. Sites located on the lower terrace recommended by Turnbow et al (1980:7) for testing are 15 BC 37, 15 BC 39, 15 BC 40, 15 BC 41, and 15 BC 42. In all cases it is suspected that intact buried cultural deposits may be present at these sites.

On the upper terrace sites recommended for testing on the basis of possible intact buried cultural deposits are 15 BC 43, 15 BC 51, 15 BC 63, 15 BC 64, 15 BC 72 and 15 BC 76 (Turnbow et al 1980:7). No sites discovered in the Dames & Moore survey of the upper terrace are recommended for testing.

In the upland potential waste disposal areas two rockshelters may have buried cultural deposits and testing is recommended. In the northern area site 15 BC 108, and in the southern area 15 BC 109 should be excavated according to the recommendations given in Table 2.2-1.

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- Yarnell, Richard A. 1976. Early plant husbandry in eastern North America. In Cultural change and continuity, edited by Charles E. Cleland, pp. 265-273. Academic Press, N.Y.

8.0 VITAE

Donald Edward Janzen

Heather Macfarlane

Kenneth Wayne Robinson

Malinda Stafford

CURRICULUM VITAE

Name: Donald Edward Janzen

Address: 1111 Gleneagle Court, Danville, Kentucky 40422

Birth Date: May 20, 1936

Birth Place: Louisville, Kentucky

Marital Status: Married; Martha Keller Janzen

Children: Edward Carl Janzen III; February 18, 1970

Education

1950 - 1954 Eastern High School, Middletown, Kentucky
1954 - 1955 Purdue University
1955 - 1958 University of Louisville (B.S. Physics)
1959 - 1960 University of Louisville (M.S. Physics)
1963 - 1965 American University
1965 - 1968 University of Michigan (M.A., Ph.D. Anthropology)

Military Service: U.S. Army

February - August 1959 Active Duty
August 1959 - February 1965 - Reserve Duty
Honorable Discharge February 9, 1965

Professional Experience

1959 - 1960 General Electric Company, Evendale, Ohio
Heat Transfer Analyst
1960 - 1965 Department of Defense, Laboratory for Physical Sciences,
College Park, Maryland. Experimental Physicist.
1968 - 1971 Beloit College, Beloit, Wisconsin.
Assistant Professor of Anthropology and Associate
in Physical Anthropology, Logan Museum.

- 1971 - 1973 Centre College, Danville, Kentucky
Assistant Professor of Anthropology
- 1974 - Present Centre College
Associate Professor of Anthropology

Archaeological Field Work

- 1963 Two week field school, Fairfax County, Virginia.
American University
- 1965 Bussinger site, Saginaw County, Michigan (6 weeks)
University of Michigan Museum of Anthropology.
- Burnt Bluff, Delta County, Michigan (4 weeks)
University of Michigan Museum of Anthropology.
- 1966 Eastman site, Arenac County, Michigan (8 weeks)
University of Michigan Museum of Anthropology.
- 1967 Naomikong Point site, Chippewa County, Michigan (6 weeks)
University of Michigan Museum of Anthropology.
- 1969 Old Clarksville site, Clark County, Indiana (8 weeks)
Logan Museum, Beloit, Wisconsin.
- 1970 Miller site, Harrison County, Indiana; Hornug site,
Jefferson County, Kentucky; Riverwood Rockshelter,
Bullitt County, Kentucky (13 weeks)
Beloit College Archaeological Field School.
- Old Clarksville site, Clark County, Indiana (4 weeks)
Title III Summer Prehistory Project,
Clarksville Community Schools, Clarksville, Indiana.
- 1971 Prather site, Clark County, Indiana (9 weeks)
Title III Summer prehistory Project,
Clarksville Community Schools, Clarksville, Indiana.
- 1972 Hornung site, Jefferson County, Kentucky (6 weeks)
Centre College Archaeological Field School
- 1973 Hoke site and site survey at New Boston, Indiana.
Harrison County, Indiana (6 weeks)
Centre College Archaeological Field School
- 1974 Excavation and survey in the Salt River drainage of
Bullitt and Spencer Counties, Kentucky (4 weeks)
Centre College Archaeological Field School

Archaeological Field Work (cont'd)

- 1974 Excavation of Ice House at Locust Grove Plantation,
Jefferson County, Kentucky (2 weeks)
Centre College Archaeological Field School
- 1975 Excavation of the Mill Family area, Shakertown at
Pleasant Hill, Mercer County, Kentucky (9 weeks)
Centre College Program in Historical Archaeology.
- 1976 Excavation of the Mill Family area, Shakertown at
Pleasant Hill, Mercer County, Kentucky (8 weeks)
Centre College Program in Historical Archaeology.
- 1977 Excavation of the Mill Family area, Shakertown at
Pleasant Hill, Mercer County, Kentucky (7 weeks)
Centre College Program in Historical Archaeology.
- 1978 Excavation of the Mill Family area, Shakertown at
Pleasant Hill, Mercer County, Kentucky (8 weeks)
Centre College Program in Historical Archaeology.

Professional and Honorary Associations and Memberships

American Anthropological Association (Fellow)

Society for American Archaeology

Current Anthropology (Associate)

Society for Historical Archaeology

Kentucky Archaeological Association
(Secretary-Treasurer: 1971-72)

Michigan Archaeological Society

Kentucky Historical Society (Life Member)

Filson Club (Life Member)

Sigma Pi Sigma (Physics Honorary)

Publications

- 1968 Excavations and Survey at Burnt Bluff in 1965. In The Prehistory of the Burnt Bluff Area, Edited by James E. Fitting. Anthropological Paper No. 34, Museum of Anthropology, University of Michigan.

Publications Continued

- 1968 The Naomikong Point Site and the Dimensions of Laurel in the Lake Superior Region. Anthropological Paper No. 36, Museum of Anthropology, University of Michigan.
- 1971 The Concept of Type in American Archaeology. Occasional Papers in Anthropology No.2, Logan Museum of Anthropology, Beloit College.
- Excavations at the Falls of the Ohio River. The Filson Club History Quarterly, Vol. 45, No.4, pp. 373-380. Louisville, Kentucky.
- 1972 Archaeological Investigations in Louisville, Kentucky and Vicinity: A Historical Sketch. The Filson Club History Quarterly, Vol. 45, No.4 pp.305-321. Louisville, Kentucky.
- 1977 Late Archaic in the Falls of the Ohio River Area. In For the Director: Research Essays in Honor of James B. Griffin, Edited by Charles E. Cleland. Anthropological Paper No.61, Museum of Anthropology, University of Michigan.
- The Devil's Backbone of Clark County, Indiana and the Evolution of a Legend. Filson Club History Quarterly, Vol. 51, No.4, pp. 303-314. Louisville, Kentucky.

Reviews

- 1967 Review of The Laurel Tradition and the Middle Woodland Period by J.V. Wright. Michigan Archaeologist, Vol. 13, No.4. Ann Arbor, Michigan.
- 1975 Review of The Laurel Culture in Minnesota by James B. Stoltman. American Anthropologist, Vol. 77, No.2.
- 1977 Review of Field Methods in Archaeology by Thomas R. Hester, Robert F. Heizer and John A. Graham. American Anthropologist, Vol. 79, No.3 p. 712.

Unpublished Technical Reports

- 1973 A Reconnaissance and Evaluation of "Known" Prehistoric Sites in the Falls of the Ohio Region. Report Co-Authored with J.E. Granger and B.J. McGraw and submitted to the Falls of the Ohio Metropolitan Council of Governments. June, 1973.

Unpublished Technical Reports Continued

- 1975 An Archaeological and Historical Survey of the Proposed Louisville Gas and Electric Company Plant Site, Trimble County, Kentucky. Part 1. Report Co-authored with Frederick T. Wilson and submitted to Flour Pioneer, Chicago, Illinois. July, 1975.
- 1976 An Archaeological Survey of the Proposed Corridor on Highway 127 between Harrodsburg and Danville, Kentucky. Report submitted to the Kentucky Department of Transportation Division of Environmental Systems. March, 1976.
- An Archaeological Historical Survey of the Proposed Louisville Gas and Electric Company Plant Site, Trimble County, Kentucky. Part 2. Report submitted to the Louisville Gas and Electric Company, Louisville, Kentucky. September, 1976.
- 1977 An Archaeological Survey of the Little Pitman, Trace Fork, and Buckhorn Interceptor Sewers at Campbellsville, Kentucky. Report submitted to Hazelet and Erdal Consulting Engineers, Louisville, Kentucky. April 14, 1977.
- An Archaeological Survey of the Proposed Expansion Site and Construction Areas at the Frankfort Sewage Treatment Plant, Frankfort, Kentucky. Report submitted to Haworth and Associates Inc. Frankfort, Kentucky. April 21, 1977.
- An Archaeological Survey of the Louisa By-Pass, Lawrence County, Kentucky. Report submitted to Haworth and Associates Inc., Frankfort, Kentucky. September 29, 1977.
- An Archaeological Survey of the Danville Interceptor Sewer Extension and Waste Water Treatment Plant, Danville, Kentucky. Report submitted to Hazelet and Erdal Consulting Engineers, Louisville, Kentucky. November 30, 1977.
- 1978 An Archaeological Survey of the Arlington Drive - Bennington Court Sewer Project: Richmond, Kentucky. Report submitted to the Community Development Department, Richmond, Kentucky. January 20, 1978.

Unpublished Technical Reports Continued

- 1978 An Archaeological Survey of the Boyle County Community Park. Report submitted to the Boyle County Fiscal Court, Danville, Kentucky. April 7, 1978.

An Archaeological Survey of the Relocation Routes of U. S. Highway 127 between Danville and Hustonville, Kentucky. Report submitted to the Kentucky Department of Transportation. June, 1978.

Test Excavations at Liberty Hall, Frankfort, Kentucky. Report co-authored with Frederick T. Wilson and submitted to Liberty Hall, Inc., October, 1978.

An Archaeological Survey of the Southeast Richmond Sewer Project, Richmond, Kentucky. Report submitted to the Community Development Department, Richmond, Kentucky. November, 1978.

- 1980 Test Excavations at Bn44, Glasgow Municipal Airport, Glasgow, Kentucky. Report submitted to Hayworth and Associates, Frankfort, Kentucky. May 1980.

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Education:

University of Kentucky	Lexington, Kentucky	M.A. 1980 (expected) (1976 to present, enrolled in the Anthropology Graduate Program)
Wake Forest University	Winston-Salem, North Carolina	B.A. 1975

Academic Interests:

New World Archaeology and Culture History, Latin American Ethnology, Folk Studies

Archaeological Interests:

Southeastern United States, Mesoamerica, South America, Settlement Patterns, Cultural Resource Management

Member of:

Society for American Archaeology
Southeastern Archaeological Conference
Southern Anthropological Society
William S. Webb Archaeological Society

Presentations at Professional Meetings:

1977 Field Report: Recent Archaeological Research in the Falls Area of the Ohio Valley. Presented at the Midwestern Archaeological Conference, Beloit, Wisconsin (October 1977).

- 1979 The Villier Site: A Riverton-like Occupation in the Falls Area of Kentucky. Paper presented at the Southeastern Archaeological Conference, Atlanta, Georgia (November 1979).

Technical Reports and Publications:

Robinson, Kenneth W.

- 1980 Subsurface Testing of Sites 15HD33 and 15HD150 Within the Proposed Elizabethtown Wastewater Pipeline Corridor, Hardin County, Kentucky. University of Kentucky Department of Anthropology Archaeological Report 45.

Robinson, Kenneth W. and Steven D. Smith

- 1979 "The Villier Site (15JF110 Complex)" Chapter VI of Excavations at Four Archaic Sites in the Lower Ohio Valley, Jefferson County, Kentucky. Vol. II, Michael B. Collins, editor. Occasional Papers in Anthropology 1, Department of Anthropology, University of Kentucky, pp. 590-692.

Boisvert, Richard A., Boyce N. Driskell, Kenneth W. Robinson, Steven D. Smith, and Lathel F. Duffield

- 1979 "Materials Recovered" Chapter IV of Excavations at Four Archaic Sites in the Lower Ohio Valley, Jefferson County, Kentucky. Vol. I, Michael B. Collins, editor. Occasional Papers in Anthropology 1, Department of Anthropology, University of Kentucky, pp. 329-400.

Robinson, Kenneth W., Thomas W. Gatus, and Robert L. Brooks

- 1979 Interim Report: Archaeological Resources Reconnaissance, Survey, and Evaluation, Taylorsville Lake, Salt River Basin, Spencer, Anderson, and Nelson Counties, Kentucky: 1978 Season. Archaeological Report 7, University of Kentucky, Department of Anthropology. Report prepared for the U. S. Army Corps of Engineers, Louisville District, Louisville, Kentucky. (702 pp.)

Robinson, Kenneth W., Steven D. Smith, and Michael B. Collins

- 1978 A Cultural Resource Survey and Limited Subsurface Reconnaissance of the Proposed Synthesis Gas Demonstration Plant Area, Baskett, Henderson County, Kentucky. Report prepared by the University of Kentucky, Department of Anthropology for EBASCO Services, Inc. (113 pp.)

Robinson, Kenneth W., Christopher Turnbow, and Roger C. Allen

- 1977 An Archaeological Survey of Three Proposed Johnson County Water Supply System Facilities, Kentucky. Archaeological Services, Inc., of Kentucky. Report No. 39. (28 pp.)

Robinson, Kenneth W.

- (in preparation) Ground Stone Analysis at Xochicalco, Morelos, Mexico. Thesis Project, Department of Anthropology, University of Kentucky.

Positions Held:

- 1974-75 Secretary-Treasurer, Wake Forest University chapter of Lambda Alpha, undergraduate anthropology society.
- 1977-78 Research Assistant, Department of Anthropology, University of Kentucky. Analysis and write-up of portions of the Southwest Jefferson County Floodwall Archaeological Mitigation. M. B. Collins, Principal Investigator.
- 1978-79 Staff Archaeologist, Archaeology Program, Department of Anthropology, University of Kentucky.
- 1979-80 Teaching Assistant, Anthropology 120 (Human Ancestry). Professors E. C. Scott (Fall 1979), M. B. Collins (Spring 1980), Lathel F. Duffield (Fall 1980).

Field and Laboratory Experience:

Ethnographic:

- 1975 (Spring) Preparation of Museum Displays, Museum of Man, Wake Forest University, Winston-Salem, N.C.
- 1974 (June) Material Culture Inventory of Talamancan Indians, Talamancan Region, Costa Rica (Central America). Wake Forest University Overseas Research Centre, David K. Evans, Principal Investigator.
- 1973 (June) Material Culture Inventory of Talamancan Indians. Preliminary study of above project.

Archaeological:

- 1980 (July-August) Miscellaneous Field and Laboratory Work, Cultural Resource Assessment Program, University of Kentucky Department of Anthropology, Michael B. Collins, Faculty Advisor, Nancy O'Malley, Staff Administrative Archaeologist.
- 1980 (May-December) Thesis research and preparation, Ground Stone Analysis of Artifacts from Xochicalco, Morelos, Mexico.
- 1979 (July-August) Laboratory Analyst. Analysis of ground stone artifacts. Xochicalco, Morelos, Mexico. Kenneth G. Hirth, Principal Investigator.
- 1979 (October-December) Skeletal reconstruction and analysis of burials recovered from 15 LO 74, Logan County, Kentucky.
- 1978-79 (October-May) Project Director: Archaeological Reconnaissance, Survey (Intensive Testing), Evaluation, and Report Preparation of the Taylorsville Lake Project Area, Salt River Basin, Spencer, Anderson, and Nelson Counties, Kentucky. M. B. Collins and Boyce N. Driskell, Principal Investigators. University of Kentucky. Includes reconnaissance of 2600 acres and intensive testing of 30 archaeological sites and preparation of report.

- 1978 (May-June: 2 weeks) Project Supervisor: Archaeological Reconnaissance and Backhoe Testing of the Proposed Synthesis Gas Demonstration Plant Area, Baskett, Henderson County, Kentucky. Michael B. Collins, Principal Investigator, University of Kentucky. Included fieldwork, labwork, and report preparation.
- 1977 (November: 1 day) Survey Archaeologist: Survey of Proposed Johnson County Water Supply System Facilities, Johnson County, Kentucky. Archaeological Services of Kentucky.
- 1977 (April-September) Supervisor: Southwest Jefferson County Floodwall Archaeological Project, Archaeological Mitigation. Louisville, Kentucky. M. B. Collins, Principal Investigator. Fieldwork included extensive excavations at four sites.
- 1976 (May-July) Fieldworker and Labworker: Tomatlan Archaeological Salvage Project (Tomatlan, Jalisco, Mexico). S. R. H. and the University of North Carolina at Greensboro. Joseph B. Mountjoy, Principal Investigator.
- 1975 (October-November) Fieldworker: Alamance County Reservoir Archaeological Survey. Alamance County, North Carolina. Wake Forest University. J. Ned Woodall, Principal Investigator.
- 1975 (September-October) Fieldworker: Alamance County Pipeline Archaeological Survey. Alamance County, North Carolina. Wake Forest University. J. Ned Woodall, Principal Investigator.
- 1975 (January) Fieldworker: Winter-Term Class: Archaeological Testing on the banks of the Yadkin River. Winston-Salem, North Carolina. Wake Forest University. J. Ned Woodall, Director.

Field Methods:

Proficient in general archaeological survey, testing, and excavation skills, including field recovery of osteological material (burials), floatation, photography, mapping, drawing, backhoe testing, etc.

Have used heavy trucks, backhoe/frontend loader, tractors, large pumps.

Analytical and Laboratory Skills:

General laboratory processing, basic cartography, drawing, basic photography, lithic analysis, report preparation.

Abbreviated Curriculum Vitae

Malinda Stafford

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Personal Data

Date of Birth: July 15, 1952
Place of Birth: Hot Springs, South Dakota
Marital Status: Single

Educational Experience

1978 University of Florida
B.A. in Anthropology

Summary of Past Experience

1971-1979 Museum Technician
1979-present Staff Archaeologist

Memberships

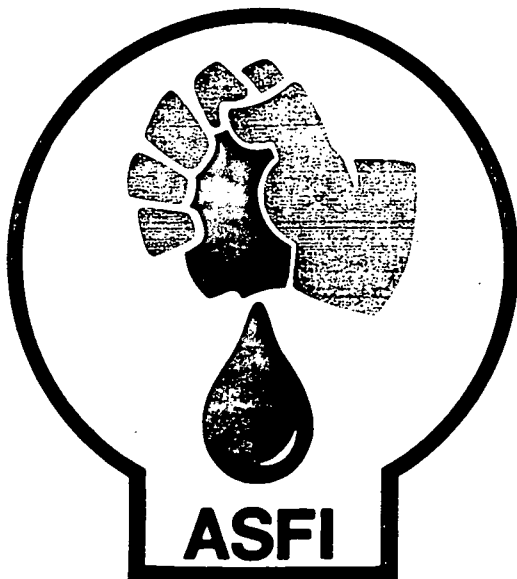
William S. Webb Society
Southeastern Archaeological Conference

Technical Reports

1979-present 3 reports. Geographical areas:
Florida and Kentucky.

Complete vita available upon request.

**Background Data
for use in
Socio-Economic Impact Analysis
for the
Breckinridge Project**



**WATKINS and ASSOCIATES, Inc.
Engineers—Architects—Planners
Lexington, Kentucky**

BRECKINRIDGE PROJECT
SOCIO-ECONOMIC ASSESSMENT

BACKGROUND DATA

Prepared in Conjunction With
the Activities Related to
U.S. DOE Cost Sharing Contract No.
DE-FC05-80OR20717

February, 1981

BRECKINRIDGE PROJECT
ASHLAND SYNTHETIC FUELS, INC.
AIRCO ENERGY CO., INC.

PREFACE

This report deals primarily with a brief history of the Breckinridge Project; an overview of the potentially impacted area; a brief history of growth and development in the area; and background data for the four-county area of Breckinridge County, Kentucky; Meade County, Kentucky; Hancock County, Kentucky; and Perry County, Indiana. This report represents the first step of a multiple step process in ultimately assessing the socioeconomic impacts related to the construction of a commercial coal liquefaction facility at Holt Bottoms in Breckinridge County, Kentucky. The second step of this overall process will be to conduct a socioeconomic impact assessment study and to develop a mitigation plan that uses input from this background data report and information such as work force requirements, availability, age, distribution, marital status of workers, and etc. The third step will be implementation of the mitigation plan as construction on the coal liquefaction plant begins.

The background data report was conducted by Watkins & Associates, Inc., a well-known Lexington, Kentucky planning and engineering firm that worked closely with cities, counties, regional planning districts, the Kentucky Department of Energy, and the Urban Studies Center of the University of Louisville in developing the report.

PART II SOCIOECONOMIC BACKGROUND DATA

TABLE OF CONTENTS

	<u>Pages</u>
Introduction	1
The Breckinridge Project	3
Project Schedule	6
Manpower Requirements	6
Plant and Site Features	6
Access Improvements	6
Materials Coming In	11
Utilities	11
Archaeology	11
Adjacent Development	12
Community Services Provided by Plant	12
Community Assistance	12
Medical Care	12
Police and Fire Protection	12
Education	12
Housing	13
Employment Assistance	13
Recreation	13
Food Services	13
Banking	13
Overview of Area Potentially Impacted	14
The General Area	14
The Four County Area	18
History of Growth and Development	22
Early Settlement (1776-1800)	23
The Pre-Civil War Era (1800-1860)	24
Mills	24
Communities	25
Riverboats	26
Coal Mining and Coal Oil	28
Agriculture	30
The Civil War Era (1861-1864)	30
The Post Civil War Era	32
The End of Slavery	32
Economic Decline	33
Railroads	34
Education	36
Entering the New Century	36
A Depression Between Two Wars	38
The Post World War II War Boom (1946-Present)	39

	<u>Pages</u>
Population	42
Historic Trends	42
Population Characteristics	47
Area Economy	50
Agriculture	50
Industry	52
Other Employment	56
Area Banks	56
Unemployment	56
Personal Income	56
Low Income Families	61
Skilled Labor and Labor Organizations	61
Tourism	67
Economic Development	67
Commercial Sales	69
Land Use	71
Area Overview	71
Land Use Classification	73
Forest Land	73
Agriculture	76
Urban Land Use	76
Transportation	79
Highways	79
Commuting Patterns	84
Rail System	87
Barge System	89
Airports	91
Schools and Education	93
Public and Private Schools	93
Water, Sewer and Solid Waste	101
Muldraugh (Meade County)	101
Water	101
Sewer	103
Solid Waste	103
Flaherty (Meade County)	103
Ekron (Meade County)	103
Doe Valley (Meade County)	103
Water	104
Sewer	104
Brandenburg (Meade County)	104
Water	104
Sewer	104
Solid Waste	105
Irvington (Breckinridge County)	105
Water	105
Sewer	105
Solid Waste	105

Page

Hardinsburg (Breckinridge County)	106
Water	106
Sewer	107
Solid Waste	107
Kingswood; Westview (Breckinridge County)	107
Cloverport (Breckinridge County)	108
Water	108
Sewer	108
Solid Waste	109
Hawesville (Hancock County)	109
Water	109
Sewer	110
Solid Waste	110
Lewisport (Hancock County)	110
Water	110
Sewer	111
Solid Waste	111
Tell City (Perry County)	111
Water	111
Sewer	111
Solid Waste	112
Cannelton (Perry County)	112
Other Perry County Cities	112
Summary Assessment	112
 Public Protection (Police, Fire Department)	114
Social Disturbances	114
Police Departments	114
Fire Departments	118
 Housing	120
Overview of Housing Trends in Kentucky	120
Area Housing Production	121
Housing Availability	122
Inventory of Present Homes	124
Homes Sales	128
Vacancy Rates	128
Subdivisions	128
Trailer Spaces Available	128
Area Economic Factors	133
Cost	133
Housing Assistance	133
 Health Care	137
Health Care Personnel	137
Health Care Facilities	137
Training and Recruitment	142
Health Conditions and Needs	144
Emergency Preparedness Plans	144

	<u>Page</u>
Cultural and Recreational Facilities	145
Major Recreation Areas	145
Inventory of City Cultural and Recreation Facilities	147
Church Assistance	147
Archaeological Features	150
Attitudes and Cultural Values	150
Government and Institutional - Financial Resources	152
Government Form and Structure	152
Government Financing	153
General Overview of Revenue	153
Property Tax	153
School Taxes	153
Other Tax Revenue	160
Comments on Revenue	160
Local Assessment of Capabilities	160
General Financing Problem	162
Impacts Associated with Industrial Growth During the Last 30 Years	171
Lewisport	171
Hawesville	174
Tell City	179
Cloverport	180
Hardinsburg	183
Irvington	183
Brandenburg	184
Muldraugh	185

FIGURES

	<u>Page</u>
Figure 1. Pilot Plant at Catlettsburg, Kentucky	3
Figure 2. Topographic Map: Plant Site	4
Figure 3. Preliminary Major Milestone Schedule	7
Figure 4. Preliminary Manpower Estimates	8
Figure 5. Regional Location of Four County Impact Area	15
Figure 6. General Area Potentially Impacted by Breckinridge Project	16
Figure 7. Approximate Site Locations for Proposed Synfuel Plants .	17
Figure 8. Four County Impact Area	19
Figure 9. Trend in Area Population, by County	44
Figure 10. Trend in Area Population, by City	46
Figure 11. Industrial Plant Locations within Four County Area . . .	53
Figure 12. Approximate Boundaries of Physiographic Regions in the Four County Area	72
Figure 13. Forest Area in Four County Area	75
Figure 14. Four County Area Map for Ashland Synfuel Project	80
Figure 15. General Area Potentially Impacted by Breckinridge Project	81
Figure 16. Major Railroads Serving Four County Area	88
Figure 17. Area Locks and Dams	90
Figure 18. Airports Serving Four County Area	92
Figure 19. School Locations in Four County Area	97
Figure 20. Water and Sewage Treatment Plants	102
Figure 21. Major Health Care Facilities	143
Figure 22. Major Recreation Areas	146

TABLES

	<u>Page</u>
Table 1. Manning Requirements Anticipated at Typical Synfuel Plants	9
Table 2. Estimated Manning Requirements for Breckinridge Project . .	10
Table 3. Major Cities and Towns in 4-County Region	21
Table 4. Trend in Area Population, by County	43
Table 5. Trend in Urban Population, by City	45
Table 6. Racial Composition of 4-County Population - 1970	48
Table 7. Composition, by Age of 4-County Population - 1970	48
Table 8. Number of Agricultural Jobs in 4-County Area during 1978, and the Percentage of Total Employment this Represents . .	51
Table 9. Number of Agricultural Jobs in 4-County Area during 1970, and the Percentage of Total Employment this Represents . .	51
Table 10. Major Area Industries	54
Table 11. Employment in 4-County Area for Various Employers of Interest (1978)	57
Table 12. Banks and Savings and Loan Institutions in the Four County Area	58
Table 13. Area Unemployment Rates (October, 1980)	59
Table 14. Per Capita Income for Area Cities & Counties (1977)	60
Table 15. Statistics Describing Status of Low Income Citizens in 4-County Area	62
Table 16. Representative Area Labor Unions	62
Table 17. Membership in Various Union Locals in Green River & Lincoln Trail Area Development District and Louisville Area	63
Table 18. Recent Rates (October 1, 1979 - July 31, 1980) Paid for Unskilled Labor in Lincoln Trail Area Development District	66
Table 19. Skilled Labor Rates for Union Workers in Louisville Area .	68
Table 20. Retail Sales in 1978, as Estimated by Editor and Publisher Market Guide, 1978 Edition	70

Table 21. Distribution of Land Use, by Use Classification, in the Four County Area	74.
Table 22. Number of Farms in 4-County Area from 1969-1974	77
Table 23. Acreage in Farmland in 4-County Area from 1969-1974	77
Table 24. Urban Land Use Features and Control in 4-County Area	78
Table 25. Highway Conditions & Traffic Counts in 4-County Area	82
Table 26. Percent of Employees Working Inside & Outside County of Residence	85
Table 27. Number of Employees Working in County of Residence & Commuting from County of Residence to Work in Other Counties	85
Table 28. Number of Employees Commuting Out of Each County to Work in Other Counties Within the 4-County Area	86
Table 29. Area Public and Private Schools	94
Table 30. Summary of Area Vocational Schools, Colleges & Day Care Centers	99
Table 31. Estimated Adequacy of Area Water, Sewer and Solid Waste Systems at the Present and for Handling Future Growth	113
Table 32. Recent Statistics on Various Social Disturbances in the Four County Area	115
Table 33. Current Staff and Equipment in the County Sheriff Departments in the 4-County Area	116
Table 34. Current Staff and Equipment in the City Police Departments	117
Table 35. Current Staff, Equipment, & Condition of Area Fire Departments	119
Table 36. Number of Plumbing Permits Issued in the Four-County Area from 1975-1979	123
Table 37. Estimate, According to a Model Developed by the Urban Studies Center, of the Number of Housing Starts in the Four County Area from 1970-1978	123
Table 38. 1980 Total Population and Number of Housing Units, 1980 Preliminary Results, U.S. Bureau of the Census	125
Table 39. 1980 Inventory of Housing Units, Preliminary Results, U.S. Bureau of the Census	125

	<u>Page</u>
Table 40. Estimate of the Number of Mobile Homes and Mobile Home Park Spaces in the Four County Area, from 1970-1978	126
Table 41. The Percentage of Housing Unit Additions, from 1970-1978, Which were Mobile Homes	126
Table 42. Distribution of Mobile Homes Located in Breckinridge County, Provided by the County Property Valuation Office on October 10, 1980	127
Table 43. Housing Sales in the Four-County Area from 1970-1978, as Reported by the Kentucky Dept. of Revenue	129
Table 43A. Growth in Estimated Number of Residential RECC Customers in Breckinridge County, 1970-1979	129
Table 44. Approximate Availability of Housing for Rent or Sale during October, 1980 as Estimated by Local Officials during Inter- views	130
Table 45. Approximate Present and Planned Availability of Subdivision Lots in the 8 Major Cities, as Reported by Local Officials during Interviews, October, 1980	131
Table 46. Approximate Availability of Spaces in Trailer Courts in the 8 Major Cities, as Estimated by Local Officials during Interviews, October, 1980	132
Table 47. Relative Changes in Housing Prices and Personal Income in the Four County Area During Recent Years	134
Table 48. Distribution of 1979 Housing Prices in the Four County Area	135
Table 49. Recent Housing Assistance by State and Federal Programs in the Four County Area	136
Table 50. Number of Fulltime Health Care Professionals in the Four County Area	138
Table 51. Per Capita Birth, Death and Physician Density Statistics for the Four County Area	138
Table 52. Number of Health Care Personnel in Each of the 8 Major Area Cities, as Reported by Local Officials During Interviews (October, 1980)	139
Table 53. Health Care Facilities in the Four County Area	140
Table 54. Emergency Medical Services in the Four County Area, as Reported by Local Officials during Interviews (October, 1980)	141

	<u>Page</u>
Table 55. Recreation Areas in Perry County, Within the Hoover National Forest	148
Table 56. Inventory of Cultural and Recreational Facilities in the Eight Major Cities, as Reported by Local Officials during Interviews (October, 1980).	149
Table 57. Total Revenue, and its Distribution for the Four Counties during the 1976-1977 Fiscal Year	154
Table 58. Property Tax Rates Per \$100 Assessed Valuation Levied by Area Counties Through the County Property Valuation Administrator, 1980	155
Table 59. Property Tax Rates (Per \$100 Assessed Valuation) Levied by Area Cities, 1980	156
Table 60. Calculation of Estimated County Income, for 1980, from Property Taxes (Prior to Appeals, Delinquency, etc.)	157
Table 61. Property Value Assessments, 1980, Prior to Appeals, Delinquency, etc.	158
Table 62. Property Tax Rate (Per \$100 of Assessed Valuation in the School District) Levied by Area School Districts, 1980 . . .	159
Table 63. Assessment of Local Finances, Planning, Bonding and Government Problems by Local Officials during Interviews in October, 1980	161

INTRODUCTION

Ashland Synthetic Fuels, Inc. (ASFI) and Airco Energy Co., Inc. (AECI) have jointly engaged to investigate the feasibility of constructing and operating a commercial-sized coal liquefaction plant at Holt Bottoms near the town of Addison in Breckinridge County, Kentucky. The project has been designated "The Breckinridge Project".

If constructed as presently planned, this plant will cost in excess of \$2 billion, require 6½ years to complete, and employ around 5,000 construction workers (at peak) and 1,500 permanent operational personnel. This will constitute a major influx of people, money and materials into a region of the state which is largely rural and sparsely populated. The project, therefore, has a large potential to induce growth-related changes which, if unplanned, could substantially exceed the area's capacity to absorb.

Adverse socio-economic impacts can be minimized, and problems can be constrained within manageable limits by anticipating the growth-related changes and developing a growth management plan so industry and the impacted communities can effectively cooperate to make the plant's impact a positive one.

The initial requirement for impact analysis and growth planning is an inventory of baseline data against which changes may be assessed. This document constitutes that initial inventory. The data contained herein describe the baseline or existing conditions in the potentially impacted

area, and thereby, serve as the reference conditions to be used in a separate impact assessment and growth management plan.

This report contains baseline information on the following items: The Breckinridge Project, an overview of the geographic area potentially impacted, a history of the 4-county area, population, area economy, land use, transportation, schools, housing, water systems, sewage system, solid waste system, police and fire protection, health care, cultural and recreational facilities, government structure, financial-institutional resources and growth related problems during recent industrial development.

The data contained herein have been compiled from government data banks, library archives, newspaper files, history books, industrial brochures and local records. In addition, on-site area tours were conducted throughout the 4-county impact area, and city and county officials were interviewed using an 11-page questionnaire, in the area's 9 major communities.

The data are believed to represent a reasonably accurate baseline against which to assess growth related impacts, but two factors should be borne in mind. First, the area's characteristics are not static; conditions tomorrow will differ from those today, and new updates of statistical data periodically become available. Second, the data and projections continued herein represent the anticipated situation in the absence of synfuel developments; the "baseline" against which to assess The Breckinridge Project will clearly be affected, however, by other synfuels activity anticipated for nearby counties along the Ohio River. It is beyond the scope of this data acquisition effort to analyze the effects on baseline conditions of other major, potential developments; these should be considered, however, in any analyses based upon this collection of data.

THE BRECKINRIDGE PROJECT

The Breckinridge Project being jointly undertaken by ASFI and AECI represents a commercial scale-up of the coal liquefaction pilot plant now operating at Catlettsburg, Kentucky.

Pilot Plant

The pilot plant at Catlettsburg began operation in 1980 and is scheduled to run for two years (see Figure 1). It was designed to produce up to 1,800 barrels (75,600 gallons) per day of hydrocarbon liquids, using the H-Coal[®] Technology, from a feedstock of 600 tons/day of coal. The purpose of the pilot plant is to demonstrate the technology, gain processing experience, and learn enough about potential operational problems to be able to design a properly operating, commercial-sized plant.

Breckinridge Plant

The full-scale commercial plant to be located in Breckinridge County will produce approximately 50,000 barrels (2.1 million gallons) per day of hydrocarbon liquids from 16,500 tons-per-day of washed coal. Additional saleable byproducts will include 540 tons/day of elemental sulfur (from the plant's sulfur recovery unit), 195 tons/day of ammonia from the sour water cleanup system, and 37 million standard cubic feet per day of pipeline quality synthetic natural gas. Other gases generated will be used on-site to fire the plant's process heaters, and steam will be generated by burning reject from the coal cleaning plant.

Plant Site

The plant is to be constructed on a 1,600 acre site at Holt Bottoms, near the town of Addison (see Figure 2). The option for the site was

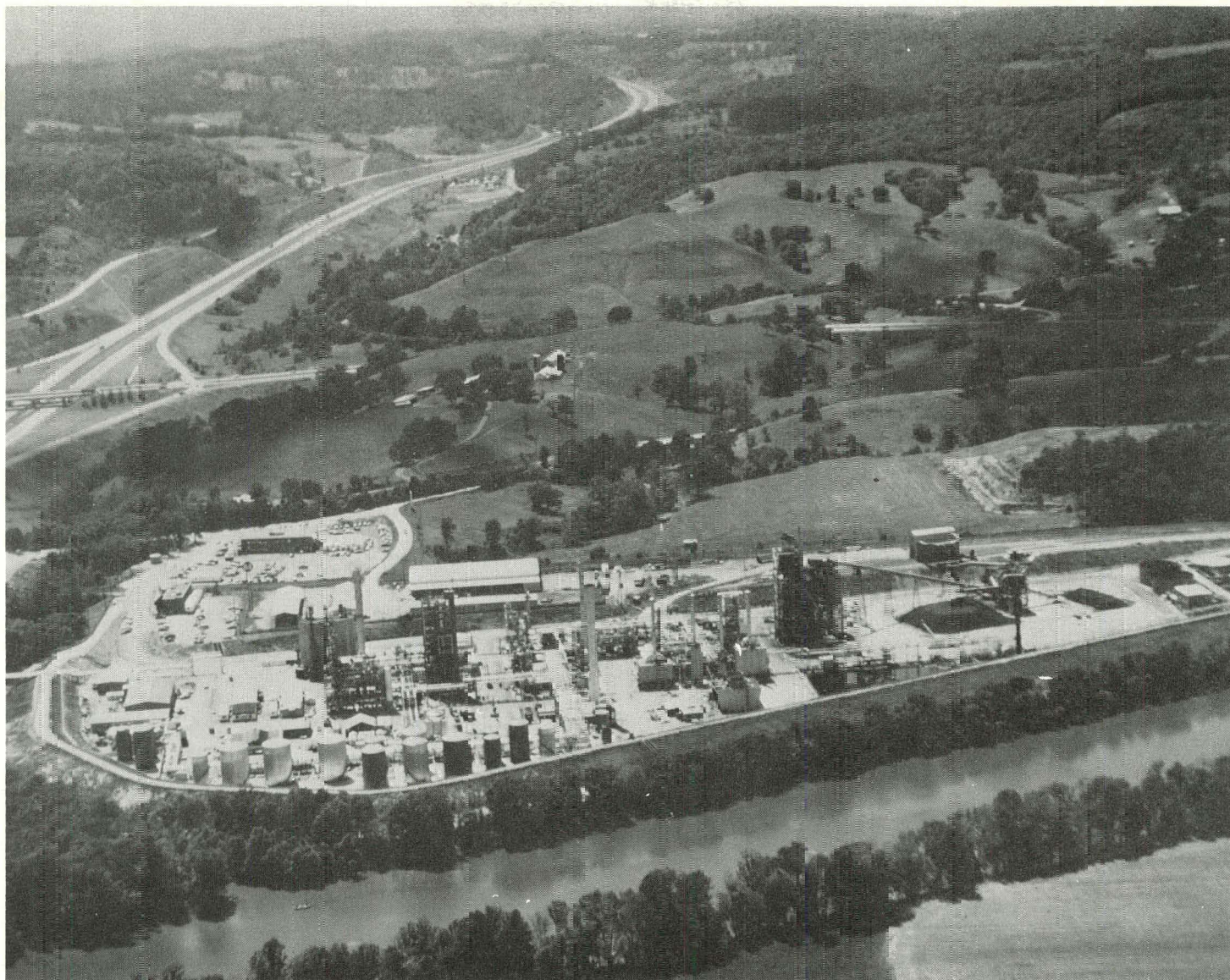


Figure 1. Pilot Plant at Catlettsburg, Kentucky

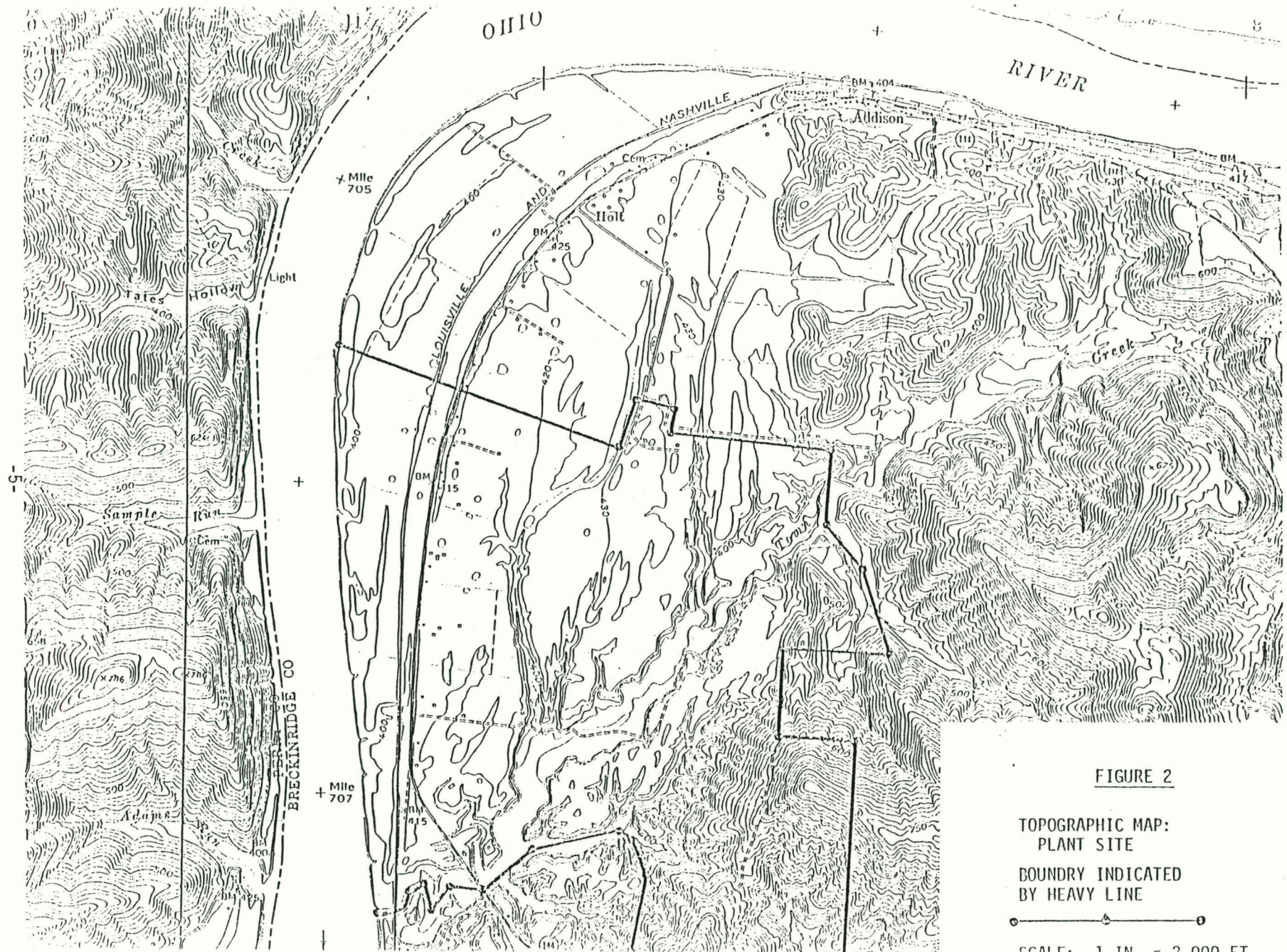
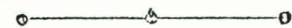


FIGURE 2

**TOPOGRAPHIC MAP:
PLANT SITE
BOUNDARY INDICATED
BY HEAVY LINE**



SCALE: 1 IN. = 2,000 FT

purchased on behalf of the Breckinridge Project, by the Commonwealth of Kentucky.

The site is on high ground, above the 100-year floodplain, at a bend in the Ohio River. It is traversed by Kentucky Highway 144 and the L & N Railroad, giving the site excellent access by barge, railroad or truck. It, and surrounding land, is presently used for agricultural purposes.

Project Schedule

The project is being developed in 4 phases, as follows (see Figure 3):

Phase 0. Preliminary Development. Includes detailed process design, preliminary engineering design, environmental monitoring, cost estimation, economic evaluation, and the formation of a consortium group. The present socio-economic data collection is being accomplished in Phase 0. Phase 0 began on April 1, 1980 and is anticipated to require 20 months.

Phase 1. Detailed Engineering.

Phase 2. Construction.

Phase 3. Mobilization and start-up.

Manpower Requirements

Construction of the plant, which will not be unlike a modern oil refinery, will require a large number of skilled workers. ASFI presently estimates the need for up to 5,000 construction workers, the peak requirement coming in 1986-87 (see the manpower curve, Figure 4).

Tables 1 and 2 show the kinds of worker skills anticipated to be required. Very few semi-skilled or unskilled workers will be needed. Construction will require such skilled workers as boilermakers, high pressure welders, millwrights, pipe fitters, etc. Operation will require a broad range of professional, managerial and skilled labor workers.

Plant and Site Features

Access Improvements. The plant development will include a rail siding

THE BRECKINRIDGE PROJECT

PRELIMINARY MAJOR MILESTONE SCHEDULE

SEPTEMBER 1980

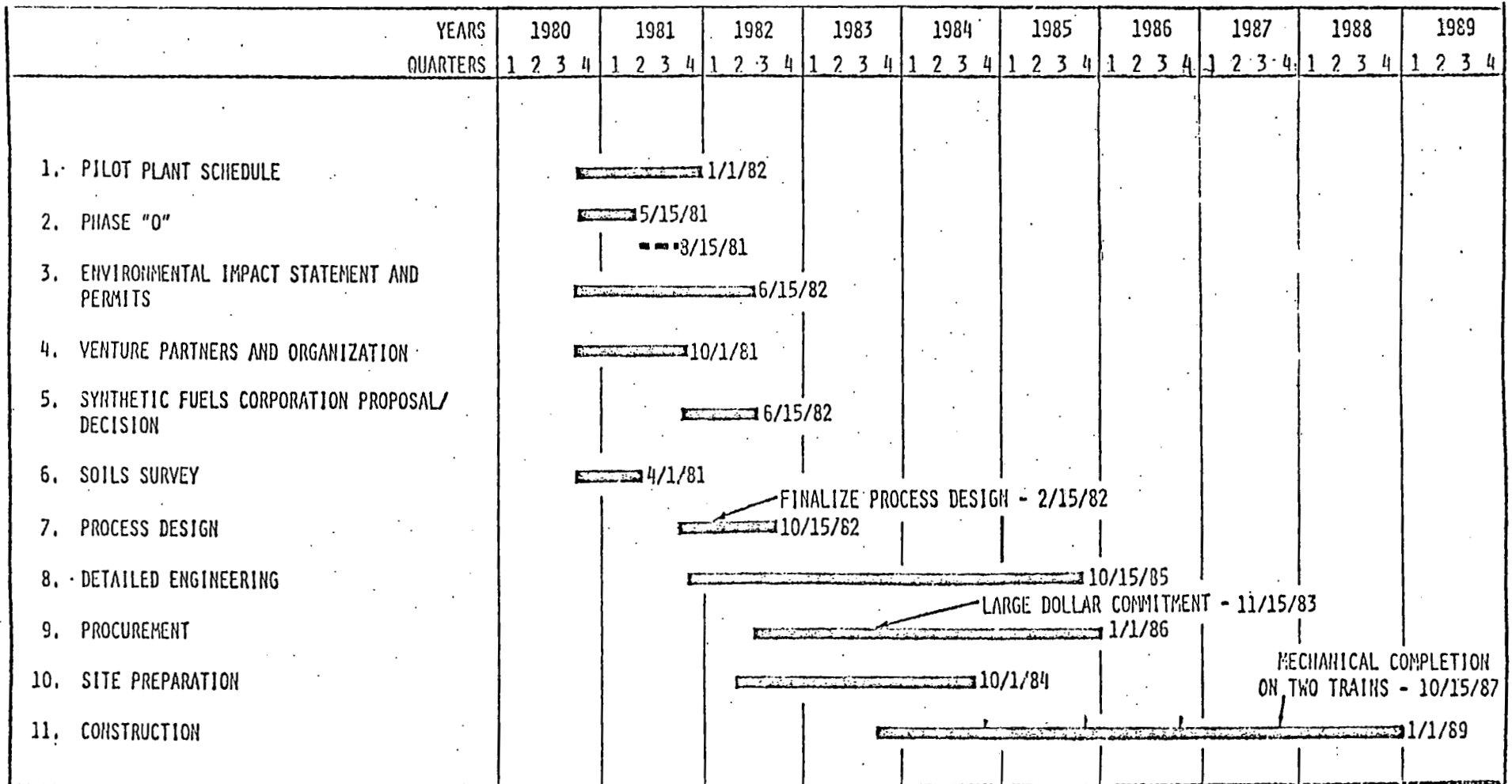
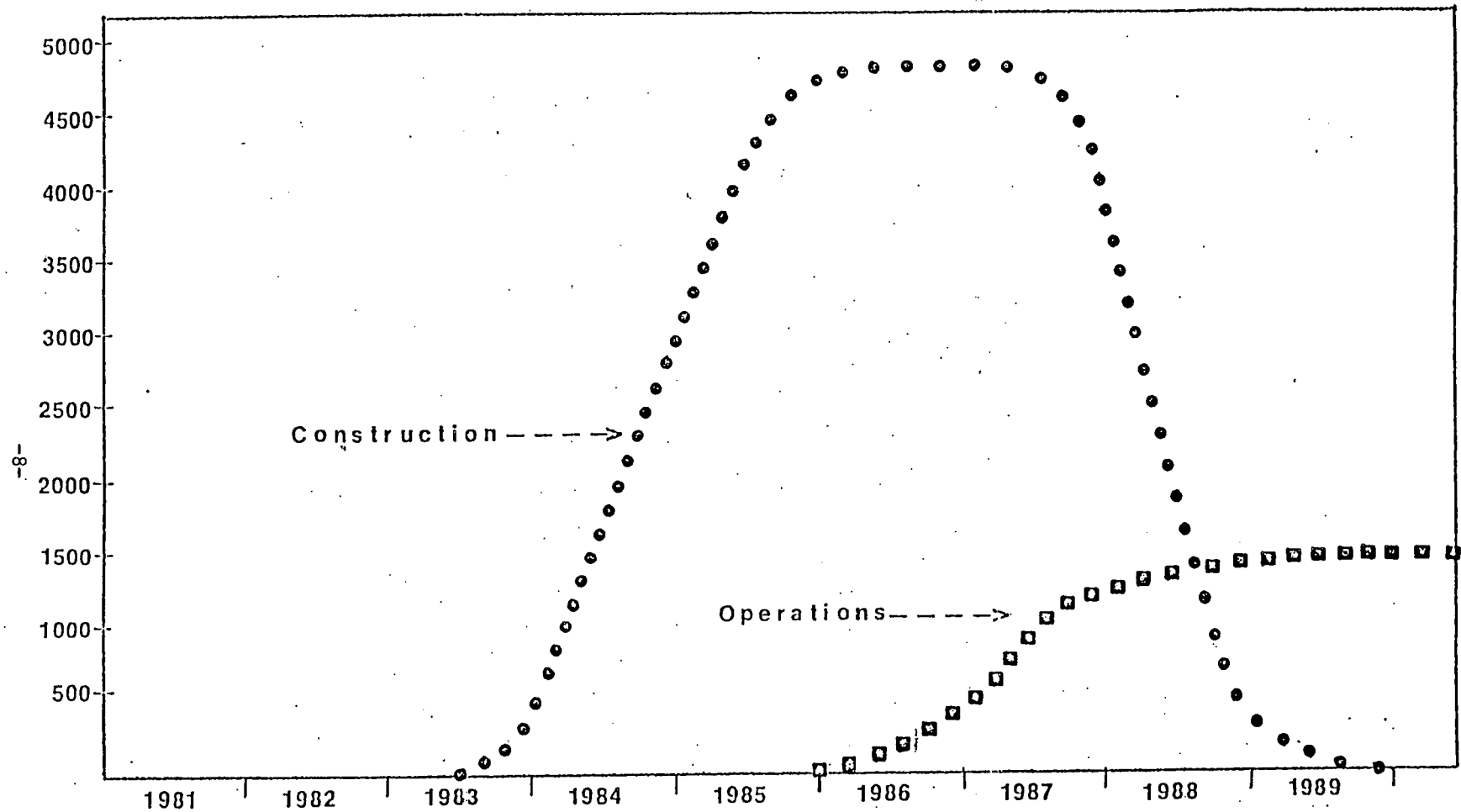


FIGURE No. 3



THE BRECKINRIDGE PROJECT

Preliminary Manpower Estimates

NOV. 1980

FIGURE NO. 4

Manpower Requirements for Construction of a Unit Liquid Fuel Plant, Other than Fischer-Tropsch

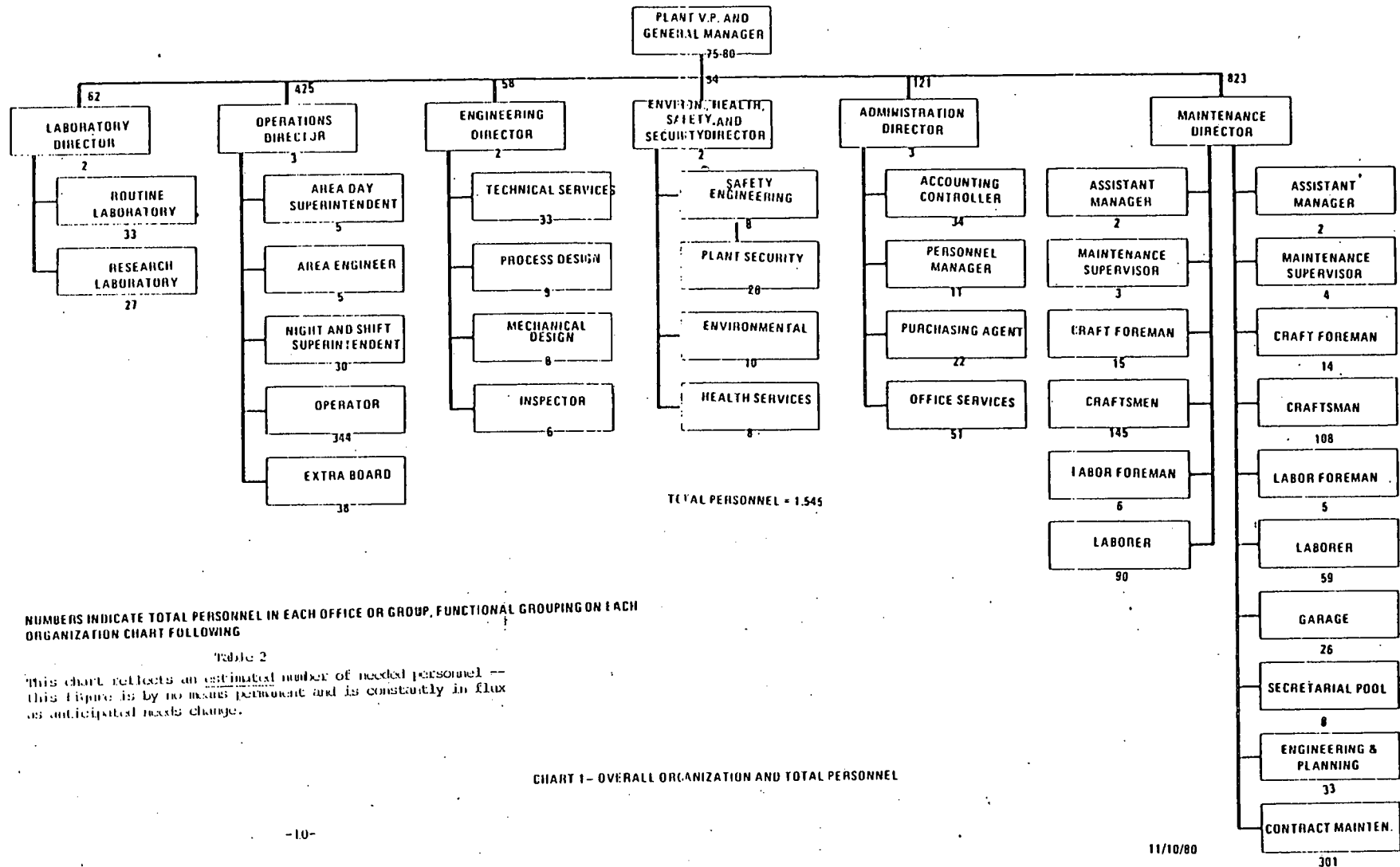
Occupational Groups/ SIC Code	Manpower Requirement					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Carpenter/415	18	42	23	29	6	118
Cement/Cons. Fin./421	3	7	10	7	3	30
Iron Workers/550	22	32	30	21	5	110
Laborer/751	27	35	39	33	14	148
Millwright/502	1	4	2	3	1	11
Exc. Equip. Op./412	54	27	17	6	6	110
Pipefitter/522	18	73	127	91	54	363
Electrician/430	18	40	38	92	26	214
Asb. Worker	4	16	16	24	12	72
Painter/510	0	2	15	18	2	37
Sheet Metal Worker/535	7	22	36	58	22	145
Masons/410	1	4	3	0	0	8
Teamster/715	7	12	7	4	5	35
Drafting/152	29	8	2	0	0	39
Surveying/161	5	0	0	0	0	5
Boilermaker/404	22	27	23	26	11	109
Welder/228	10	23	21	18	4	76
Engineering/010	5	30	15	10	5	65
011	10	40	35	10	5	100
012	5	25	25	10	5	70
014	5	30	25	10	0	70
021	0	10	10	5	0	25
002	15	60	50	15	0	140
Total All Occupations	286	569	569	490	186	2100

Source: Interagency Task Force on Synthetic Fuels from Coal, Federal Energy Administration Project Independence Blueprint Final Task Force Report, Washington, D. C., November, 1974.

Table 1

This table illustrates manning requirements anticipated at other typical synfuels plants.

THE BRECKINRIDGE PROJECT



with a coal unloading facility and a barge unloading facility on the north side of the site. Just south of that, there will be loading facilities for out-bound shipment of hydrocarbon products and byproducts.

Most of the syncrude is anticipated to be shipped out by barge, though some may go by railroad tank cars; products sold will include syncrude, propane butane naphtha, and both middle and heavy distillates.

There are no present plans for construction of a private air strip. The nearest private, general aviation airfield is the 3,500 foot runway at Hardinsburg. The nearest commuter and commercial flights are out of Louisville and Owensboro.

There are no present plans for major improvements on Highway Number 144.

Materials Coming In. Coal will be the major incoming raw material. Since the liquefaction process works well on high-sulfur, Western Kentucky type coal, it is anticipated that, for reasons of economy and logistics, the high-sulfur coal fields of Western Kentucky will be a primary source of supply. Most will be brought in by barge, but some may come by rail.

The appreciable quantity of process water required will be taken from the Ohio River.

Utilities. Initial discussions regarding the provision of electric power have been held with the Meade County Rural Electric Cooperative Corp. and the Big Rivers Electric Co. Drinking water will be supplied by on-site wells or by treated river water.

The plant will provide its own sewage treatment plant, water treatment plant and solid waste landfill. Therefore, no wastes will leave the plant site.

Archaeology. A potentially significant archaeological site exists on the plant property. Some test excavations have been done, and additional

studies are presently underway. A mitigation plan will be developed in concert with the State Historic Preservation Officer.

Adjacent Development. The Breckinridge Project plans no residential or commercial development on property adjacent to the plant site. No land use planning or zoning laws exist to regulate construction on adjacent land by private developers.

Community Services Provided by Plant. The liquefaction plant will provide a number of services to its personnel, or to the plant site, some of which might otherwise be provided by nearby communities:

1. Community Assistance. Present plans envision the plant providing a full-time person for plant/community liason. Such a position might serve both to receive public inquiries and to provide liason with local officials on surrounding community development needs.
2. Medical Care. The plant will provide its own staff to take care of the occupational health needs of employees. This service will not likely be extended to non-occupational illnesses; employees and their families would be expected to find their own family physician in a nearby community.
3. Police and Fire Protection. The plant will provide its own security and fire protection and, thus, will not require provision of such services from Breckinridge County or nearby communities.
4. Education. On-the-job and classroom training in job specific skills will be provided. Children of plant employees or construction workers will attend local public or private schools.

5. Housing. The Lincoln Trail Area Development District is presently conducting a comprehensive study of housing in the area. Planners for the Breckinridge Project will examine data from this and other studies before finalizing any housing plans, and will discuss housing plans with local citizens and government officials prior to the start of construction.
6. Employment Assistance. The plant will have an employment and personnel office.
7. Recreation. There are no present plans for development of on-site recreational facilities, such as parks, pools, tennis courts or movie theatres.
8. Food Services. The plant will provide a cafeteria and food vending service for use by employees. No plans exist for a restaurant-type facility open to the public.
9. Banking. As is the case with most large industrial plants, an employees' credit union will likely be provided.

OVERVIEW OF AREA POTENTIALLY IMPACTED

Two geographic areas have been defined for purposes of impact assessment: the 4-county area closest to the plant site, where the impacts, if any, should be greatest, and a wider, general area beyond this 4-county area where impacts should be small but from which construction or operational personnel might be drawn (see Figure 5).

The General Area

The general impact area can be generally defined as lying between Louisville, Kentucky and Evansville, Indiana, both of which lie beside the Ohio River (see Figure 6). Its boundaries have been arbitrarily defined by four-lane highways as follows: On the north by I-64, on the east by I-65, on the south by the Western Kentucky Parkway, and on the west by the Pennyryle Parkway. This area is rural, largely wooded, and includes portions of the Western Kentucky coal field.

This general area includes the cities of Louisville, Evansville and Owensboro, which would likely supply some skilled labor for plant construction. The extreme western portion of this area includes sites for three other, large-scale synfuels plants, now under various phases of study (see Figure 7), the nearest being at Newman, about 60 miles away. The plants are as follows:

1. The SASOL plant being developed by Texas Eastern Corporation of Houston and Texas Gas Transmission of Owensboro, to be located at Geneva in Western Henderson County. The plant will use the technology developed in South Africa to convert 30,000 tons/day of coal into 50,000 barrels/day of liquid hydrocarbon fuels, pipeline



FIGURE NO.5
REGIONAL LOCATION
OF
FOUR COUNTY IMPACT AREA
WATKINS AND ASSOCIATES, INC.
ENGINEERS - ARCHITECTS - PLANNERS
LEXINGTON, KENTUCKY

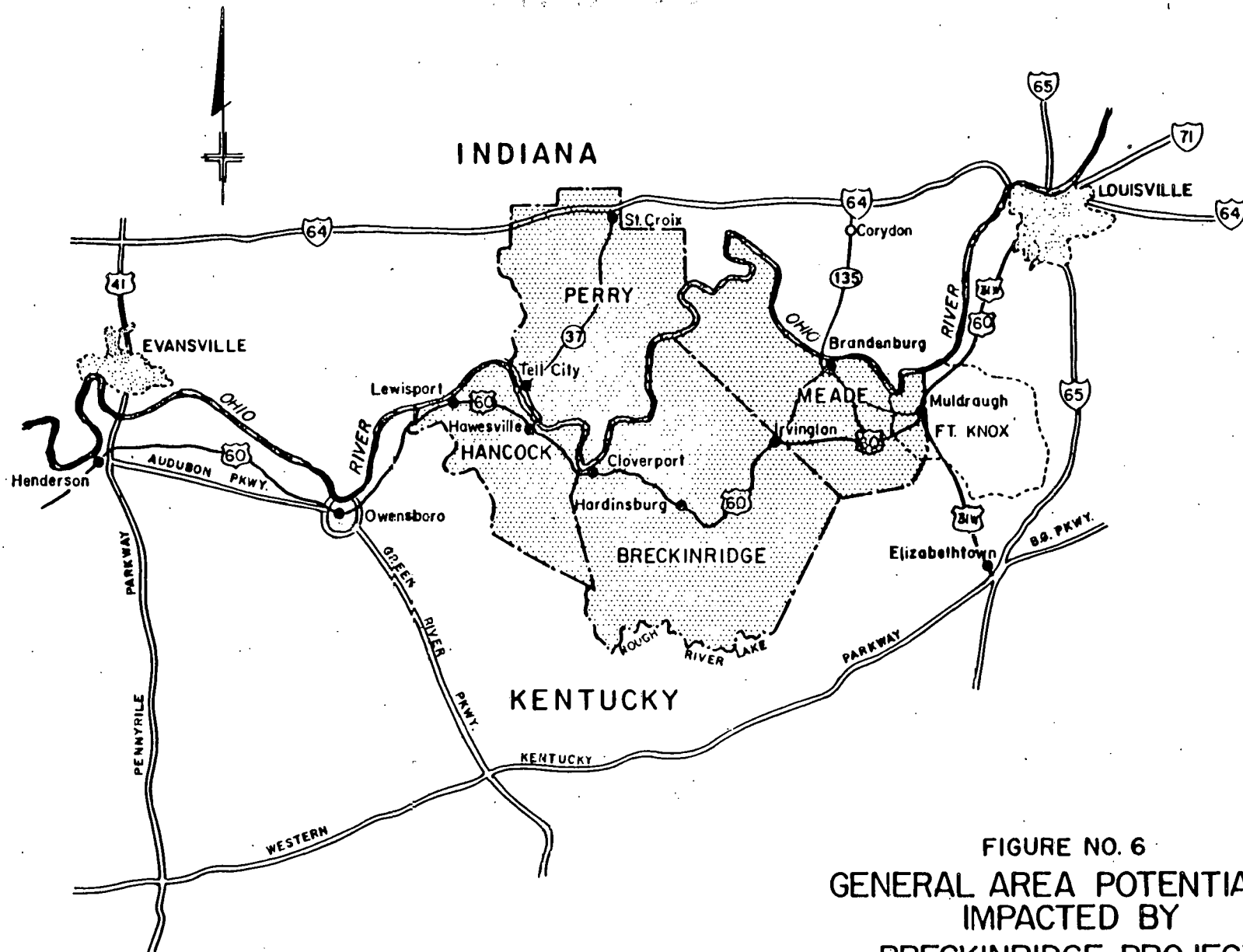


FIGURE NO. 6
GENERAL AREA POTENTIALLY
IMPACTED BY
BRECKINRIDGE PROJECT
WATKINS AND ASSOCIATES, INC.
ENGINEERS - ARCHITECTS - PLANNERS
LEXINGTON, KENTUCKY

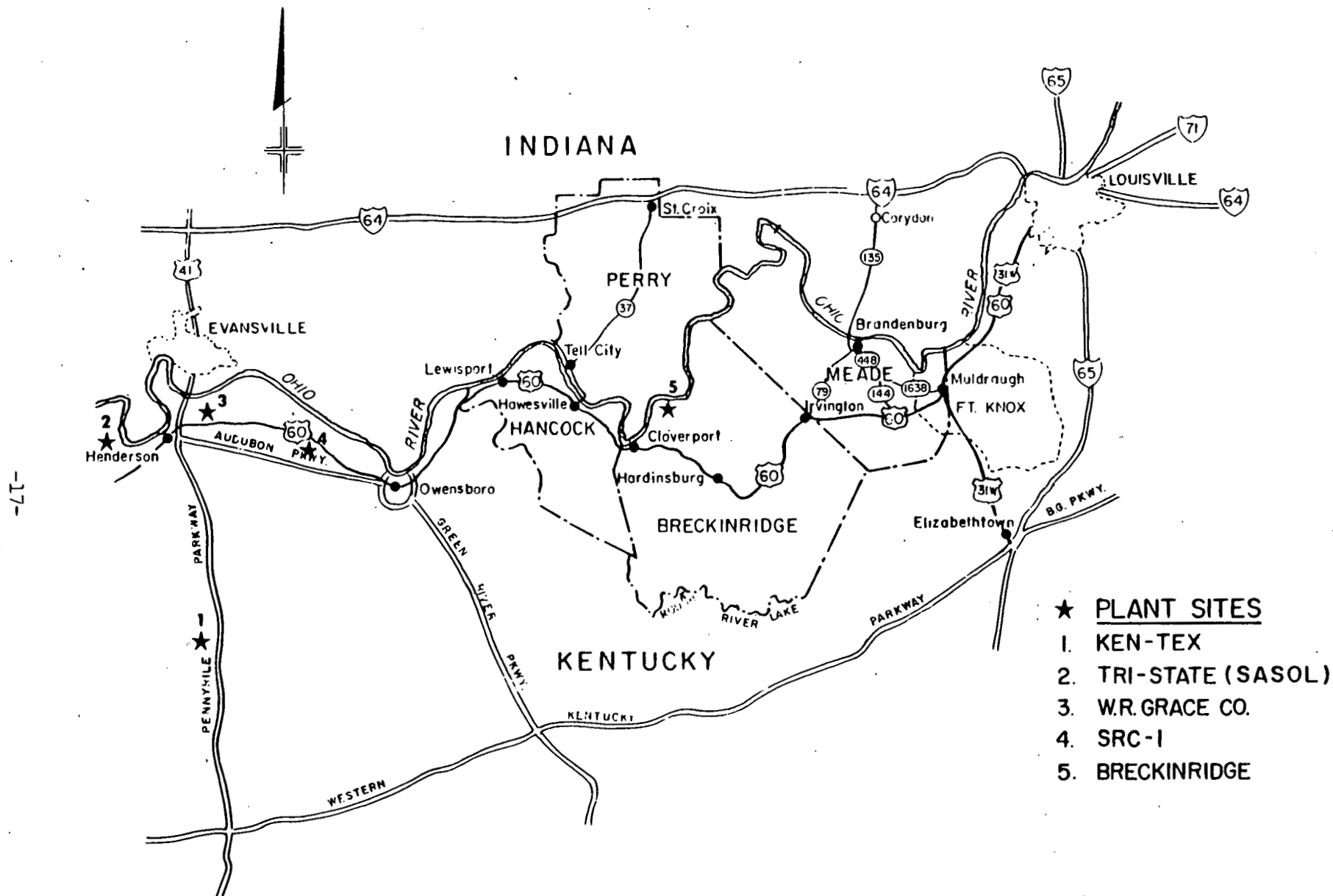


Fig. 7 APPROX. SITE LOCATIONS FOR PROPOSED SYN-FUEL PLANTS

gas and chemical feedstocks. It is estimated to cost \$3.5 - \$4.0 billion and to employ 15,000 construction workers and 3,000 permanent workers.

2. The W. R. Grace Co. plant to be located at Baskett just east of Henderson, Kentucky. This plant will use a Texaco gasification process and a Mobil Corp. methanol process to convert 28,000 tons/day of coal into 50,000 barrels/day of unleaded gasoline. It is estimated to cost \$3 - \$4 billion and employ 1,500 - 2,000 permanent workers.
3. The SRC-1 plant being developed by International Coal Refining Co., to be located at Newman in the western side of Daviess County. The plant is to be developed in two stages: demonstration and commercial. In the demonstration phase, 6,000 tons/day of coal will be converted into 20,000 barrels/day of boiler fuels, coke, naptha, and gases. If the demonstration is successful, the size of the plant will be scaled up by a factor of 5 (30,000 tons of coal to produce 100,000 barrels of fuel per day).

If any or all of these plants are constructed, intense competition will develop for the labor being sought by The Breckinridge Project.

The Four County Area

Most of the impact from the Breckinridge Project should be felt in the four nearest counties: Meade, Breckinridge, Hancock (which are in Kentucky) and Perry County (which is in Indiana). See Figure 8.

The three Kentucky counties are separated from Perry County by the Ohio River, and highway access across the river is provided by two bridges, one from Hawesville to Cannelton and one at Brandenburg.

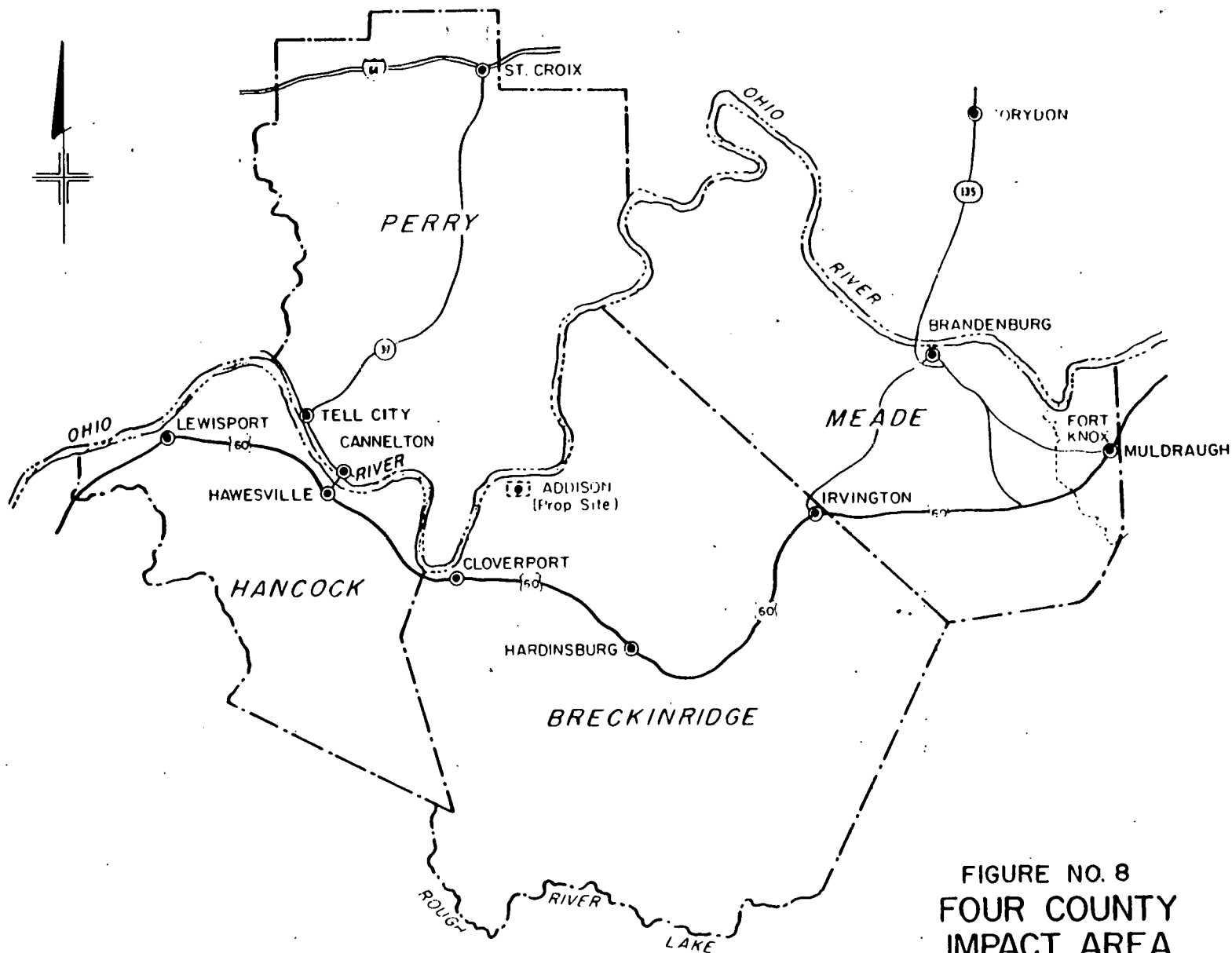


FIGURE NO. 8
FOUR COUNTY
IMPACT AREA

WATKINS AND ASSOCIATES, INC.
ENGINEERS - ARCHITECTS - PLANNERS
LEXINGTON, KENTUCKY

The major highway threading the four-county area is U.S. 60, which connects Owensboro on the west with 31-W on the east, leading to Louisville. Access from the north is provided by a good, new road (Indiana Highway 37) from I-64 to Tell City, and by Indiana Highway 135 from I-64 to Brandenburg.

The total 1980 population of the four counties is 63,323 - up from 59,740 in 1970. Meade County has the largest population (21,816), but the figure is artificially swelled by the military personnel of Fort Knox.

There are 9 major cities and towns in the four county area (see Table 3).

The area is rural, with agriculture being a major economic factor, and wooded land is abundant. Most of the industry is along the Ohio River, and Hancock County has the largest concentration of heavy industrial plants. Most of the area may be envisioned as rural with small towns and crossroads communities dotting the landscape. The appendix contains a number of photographs which illustrate the character of the area's farmland, towns, industry and other features.

City	County	Population	
		1970	1980
Tell City	Perry	7,933	8,707
Cannelton (c)	Perry	2,280	2,238
Hardinsburg (c)	Breckinridge	1,547	2,219
Brandenburg (c)	Meade	1,637	1,845
Lewisport	Hancock	1,595	1,824
Muldraugh	Meade	1,773	1,755
Cloverport	Breckinridge	1,388	1,457
Irvington	Breckinridge	1,300	1,405
Hawesville (c)	Hancock	1,262	1,029

Table 3. Major Cities and Towns in the Four County Region, in Order of 1980 Population.

(c) = county seat

HISTORY OF GROWTH AND DEVELOPMENT

If the Breckinridge Project builds the coal liquefaction plant on the Ohio River near Addison, it will help to usher in a region-wide synfuels development near the very spot where America's first plant was built to convert coal into a petroleum product. So it will not only enhance the stability of the river-based industry which has marked the area's recent history, but it will also help to continue a long and rich history of coal-related development.

It is especially appropriate for this development to fit so well into the region's historic character because it is an area well-steeped in history and tradition. Past events, personalities and developments have given the region a vigorous and colorful past. There were the Boones, Hardin, Breckinridge, Sacajawea and the Lincoln family. There was coal mining and coal oil. River boats and confederate raids. Railroads and plank roads. Old textile mills and new paper mills. Productive enterprises ranging from farms and tourists and cottage industries to chemical plants and aluminum mills. All of these have shaped the area's heritage and given it a unique flavor and character.

It is well, therefore, that the early planning for the Breckinridge Project should begin by developing a proper appreciation for the history of growth and development in this unique section of the Ohio River Valley. This section presents a modest historical overview.

Early Settlement (1776-1800)

The area's first outposts were established during the Revolutionary War (1775-1785), beginning in 1776 with the Pearman, Benjamin Lynn and Andrew Hynes expeditions. Squire Boone (Daniel's brother) and John McKinney discovered Doe Run Creek in 1778. And by 1780, prospective settlers were making serious penetrations into the area, including Captain William Hardin's expedition which settled near Sinking Creek.

At that time, the area was being governed by the State of Virginia, so its governor, Patrick Henry, signed the deed granting Squire Boone title to a tract of land on Doe Run in 1785.

Hardinsburg was the first of the area's settlements to be a real town, lots having been laid out in 1782. By 1790, it was well occupied, mostly by settlers from Pennsylvania's Mohongahela Valley. By the year 1800, larger groups of Virginians were coming into the area from the Blue Ridge, and a woolen mill was built on Squire Boone's Doe Run property - one of the mill's stone masons was Abraham Lincoln's father, Thomas. This building is now the site of the Doe Run Inn.

The year 1800 saw another event which seemed commonplace at the time but would become more widely known because it involved a soon-to-be historic personage. The Indian girl, Sacajawea, was taken captive by a tribe of Pawnees and taken to their trading post near modern day Cloverport. She was soon sold to a French surveyor, Toussaint Charboneau, who was laying out the town of Stephensport. Charboneau and Sacajawea were married in 1804, and later became guides for the Lewis and Clark expedition. Cloverport now conducts an annual "Sacajawea Festival" in her honor.

Breckinridge county was created by an act of the general assembly on January 1, 1800 with the town of Hardinsburg being incorporated as the

county seat. It was named for the distinguished Kentucky lawyer and statesman, John Breckinridge, of Lexington. The county name was originally spelled Breckenridge, but was changed in the 1820's to Breckinridge.

Hardinsburg became somewhat of a hub in 1801 when a simple road was constructed from Elizabethtown through Hardinsburg to the new town of Joesville (later named Cloverport) on the Ohio River. By 1809, there was a 17-mile road from the new settlement of Mauckport (across the Ohio from Brandenburg) to Corydon, soon to become Indiana's state capital.

During the early settlement era, the river was just beginning to become an important means of travel, and most new settlements were being reached by people coming in by flatboat, with a few crops going out the same way destined for sale in New Orleans and as far away as South America.

The Pre-Civil War Era (1800-1860)

As the earliest settlements became established, the country began to develop a stable, but spartan, life. This was soon accelerated, however, and the period leading up to the Civil War was marked by the growth of several mills, plantations and the coal business. This development was stimulated by the arrival of the steamboat and by the formation of several new towns and counties.

Mills. One of the first mills, on Squire Boone's property on Doe Run, was converted over the years from a woolen mill to a grist mill and then into a flour and grain mill. Coleman's Mill and many others were later opened on Doe Run Creek. Mills were also constructed on nearby Otter Creek. Boone also built a grist mill at Corydon in 1809, just north of Meade County. In the 1830's, a textile mill was built at Grahamton, a grain mill at Brandenburg, and in 1839, a textile mill in Brandenburg as well as a salt works. And in 1849, the Indiana cotton mill was built at Cannelton. This latter

mill was an especially imposing structure, and it still stands today as a landmark in Cannelton. It was built with sandstone slab walls, 5 feet thick. It featured 372 looms tended by 400 women who worked 12 hour days, 6 days a week, for \$4.50 per day. The primary product was cotton cloth, but it also later produced uniforms for the Union Army. It was not closed until 1965.

Communities. The number of towns and counties grew as population and industry increased. The county seat of Perry County was at Troy from 1818-1819, but then was moved to Rome, and in 1859, to Cannelton. Meade County was established on December 17, 1823 from part of Hardin County, and was named for Captain James Meade who gained fame at the Battle of Tippecanoe. Brandenburg became the county seat in 1825 having been named for Solomon Brandenburg, the owner of the land where it was built. The county seat had previously been at Buck Grove. One of Brandenburg's earliest industries was a salt works.

Hancock County was established on January 3, 1829, being formed from parts of the Ohio, Davis and Breckinridge Counties. It was named for John Hancock, patriot and President of the Continental Congress. Several new towns were also established, including Hawesville (1829), Cloverport (1828), Stephensport (1825), Lewisport (1839) and Tell City (1858). All these towns went through several stages of establishment, chartering and incorporation.

The founding of Tell City was somewhat unusual for the area, and has given this city a unique character which exists, in part, even today. It was founded in 1858 by a group calling itself "The Swiss Colonization Society" and named for the hero of Swiss legend, William Tell, whose statue still stands in front of the City Building. The original founders were of Swiss and German extraction, and they came downriver on flat boats from

Cincinnati. They planned and laid the town out to be a large, industrial community, and within 2 years (1858), it had built 300 homes and boasted a population exceeding 1,000. The area press termed the rapid development "a marvel". Tell City is now the largest city in the 4-county area, and still retains some of its heritage. For example, every year the city hosts its "Schweitzerfest", a week-long festival featuring a beer garden and German music.

Riverboats. One of the biggest stimulus to the area's pre-war growth and development was the coming of age of the steamboat. Invented in 1807 by Fulton, it was not long in coming to the Ohio River Valley. In fact, the area became quite well known for construction of, and traffic in, steamboats.

One of the first to be built in the area was the "Elizabeth", built in Brandenburg in 1814. It was only the second steamboat in the west, at that time, and became a commercial failure. But it helped to establish Brandenburg as a river port, and it was soon the most active post between Louisville and Owensboro.

One early steamboat incident brought temporary fame to the town of Cannelton. The Marquis de Lafayette, hero of the Revolutionary War, was touring the newly formed state aboard the steamboat, "Mechanic". The boat wrecked near Cannelton and Lafayette was rescued. Perry County pioneer, James Cavinder, was then able to host the famous guest, who spent the night in his rustic log cabin. A few years later, in 1834, the area's first ferry boat was chartered to carry passengers across the river from Hawesville to Cannelton. And, in 1859, an oak plank road was constructed northward out of Cannelton, passing through Troy and Jasper. It provided a relatively smooth and sturdy surface, but occasional flooding of the Ohio River ruined

it, and it was abandoned a few years later.

Cloverport also became prosperous during the emerging steamboat era, developing 2 wharves and a large warehouse to store transported goods. And from 1850 to 1860, nearby Perry County was experiencing the peak of its steamboat traffic.

Ohio river valley ferryboats also played a role during this era in the history of the Lincoln family. The Lincoln Heritage train passes through these parts today because of 2 events: the passage of the Lincoln family while en route to their Indiana home, and the ferry business operated for a while by young Abe Lincoln.

The Lincoln family passage was important because it marked an important transition in the life of the future president. Abe's father had experienced difficulty in proving title to his Kentucky farms at Sinking Springs and Knob Creek, and so had resolved to start over on new land where title would be easy to establish in Indiana. The family moved from their homestead and traveled from Elizabethtown to Hardinsburg. There, Mrs. Lincoln became quite ill, so the family tarried in Hardinsburg for 2 weeks while she recuperated. Then they departed north toward the Ohio River, in the direction of Cloverport. Whether they crossed at Cloverport or at the Thomas ferry between Lewisport and Hawesville has been disputed, but they did cross the Ohio and settle in Spencer County, Indiana.

While living in Indiana, young Abe Lincoln found employment between 1825 and 1830 as a ferryman on an Anderson River skiff near Troy, Indiana. Early during that period, the 17 year old Abe Lincoln was accused of operating a ferry on the Ohio without a permit. He was brought to trial at the home of Squire Samuel Pate near where the Harvey Aluminum plant is today. Lincoln chose to defend himself and succeeded in having the charge dismissed. It

was said that Squire Pate was so impressed with Abe's defense that he encouraged him to make a career of the law.

Coal Mining and Coal Oil. Beginning about the 1830's, the area between Hawesville and Cloverport experienced the early stages of an era of coal development which would last for 60 years, and have a major influence on the area's economic future. The area was found to have deposits of a special, shiny coal which was dubbed "cannel coal" (after the word "candle") because it could easily be ignited, without kindling, using only a match.

The first commercial mine was apparently the Revedy mine, located on an Ohio River bluff in Hancock county near Hawesville. It opened in 1832. Coal was hauled from the mine by wagon to a Hawesville loading dock for shipment down river. The coal was of such excellent quality that other nearby mines began to open up. One of them was the American Cannel Coal Company, which opened up in 1837 across the river at Coal Haven. The town this company founded there was later re-named Cannelton. Some 22 Cannelton buildings, notably the "Indiana Cotton Mill" described earlier, and the St. Michaels Church, were built of sandstone quarried from nearby hills. Cannelton still holds an annual "Cannorama" Festival to celebrate its founding.

Most of the steamboats travelling the Ohio were still using wood for fuel, in spite of this new supply of coal, since it was customary and since a small-scale, local industry had developed in which sawmills were built to harvest the abundant timber of the area. Cords of firewood were always stacked at ports; it was a familiar fuel and readily available.

But cannel coal had some unique properties which, as they became known, gradually increased the demand for it. First of all, it was very easy to mine. It came out of the ground in great slabs and, since it had a clean, smooth surface, was suited as a sort of decorative structural material

with uses similar to those for slate or black onyx. Manufacturers began to fashion it into table tops. And, perhaps from such industrial application, it was discovered to be very easy to carve. Some artisans, such as Bert Downs, began to support themselves by carving busts, statues, doorstops, etc. from cannel coal. It also made a marvelous solid fuel, burning with virtually no soot or smoke.

But the really important property of cannel coal proved to be its high content of waxes and light, volatile oils. It was soon determined that one could place the coal in a retort, apply heat, and thus drive off the volatiles to produce a kerosene fraction dubbed "coal oil".

It didn't take long for the commercial possibilities to be realized. And the area had, more-or-less, a corner on the market since the only other known deposit of cannel coal was, at that time, the Bogshead coal of Scotland.

As the mining progressed, the seam began to thicken toward the east, and the center of operations gradually worked its way toward Cloverport. This happened at about the same time that the demand for "coal oil" was realized. So, in 1851, the world's first coal-to-oil "refinery" was built near Cloverport. Mining increased, and the "Breckinridge Cannel Coal Co." was organized in 1854. Then in 1857, the small retort operation burned down, and the entire cannel coal operation was taken over by an agency for the British government. Its major stockholder was The Prince of Wales, who would later become King Edward VIII.

The newly organized company built a new, larger refinery at Cloverport, and was soon producing 6,000 gallons per week of "coal oil". With the coming of the railroad, the area boomed. Coal oil was shipped to England to light Queen Victoria's palace. And men came from England and Ireland to work in the mines. Soon a new town developed, which was styled "Victorian", after

the Queen. The associated mining operation became the largest in the area and later expanded into the production of normal bituminous coal.

Agriculture. As so often occurs, a rural area features a few well-to-do landowners and a lot of rather poor ones. The same was true here. As the area grew and prospered, there continued to be a large number of poor farmers, and they tended to become owners of hilly, unproductive land and seldom had slaves to make it productive. The scarcer, prime bottom land fell to those who could afford it, and they began to develop a few large operations similar to what people today think of as plantations. They were, during this era, beginning to make the land prosper, often with the inexpensive help of a large contingency of slaves.

One of the choicest parcels of land in the area was at "Holt Bottoms", owned by Joseph Holt. It was high, for river land, and never flooded. He was, before the civil war, building it into an "agricultural paradise". And on a nearby, overlooking hill, a rich Irishman was constructing a 30 to 40 room home. He also owned many slaves, and was in the process of building a fine plantation.

In the early days of the area's history, most folks scratched out a subsistence living and shipped their hemp, corn and tobacco down river to the markets in New Orleans. Boat loads of corn were shipped from the Lewisport area to as far away as South America as early as the 1840's, especially in Breckinridge County, which had several plantations, towns and a population of nearly 20,000.

The Civil War Era (1861-1864)

The industrious activity and prosperity of the area was dramatically interrupted by the advent of the Civil War. The boom in agriculture, coal and riverboat commerce came to a sudden end.

Union gunboats began to ply the Ohio River, martial law went into effect, and union soldiers began to take over the mines near Hawesville, tossing the coal down the riverbank for use as fuel in their boats. To counter that, confederate troops one night dynamited all the mine operations, sealing them shut for years. The mines were re-opened 75 years later, and the tools and coal-loaded shuttle cars were found just as they were left.

Perhaps the most famous civil war action revolved around John Hunt Morgan's raid at Brandenburg in July of 1863. Confederate guerillas were often making hit-and-run attacks in the area, keeping things generally stirred up. But Confederate General John Hunt Morgan had a more sustained purpose. His plan was to conduct raids not only in Kentucky, but in Indiana and Ohio as well, making it necessary to cross the Ohio River. So he marched on Brandenburg with a force exceeding 2,000 men. He captured 2 steamboats, the "Alice Dean" and the "John B. McComas" and compelled them to ferry his men over to Indiana. As they crossed, they had to repel attacks from the Indiana Militia and the gunboat "Elk". He burned and sank the "Alice Dean", and proceeded to carry his raid into Indiana.

As it did throughout the country, the Civil War created lasting divisions among peoples in the area. It tended to create strains between Kentuckians who followed southern traditions and their Indiana neighbors across the river. And another natural boundary became a cultural dividing line: Sinking Creek, which crossed northeast Breckinridge County, between Hardinsburg and Irvington, and entered the Ohio River at Stephensport. Irvington (not yet established), Brandenburg, and other towns east of Sinking Creek tended to side with the confederates, and Hardinsburg, Cloverport and other towns to the west sided with the Union. These divisions, plus the growth of the Catholic population, tended to show up in political registration as well. The northeast region which had leaned toward the confederacy became solidly

Democratic. Central and Western Breckinridge County and Hancock County developed a Republican flavor.

The Post Civil War Era (1865-1890's)

The end of the Civil War brought profound changes to the nation as a whole, and the Ohio River Valley region was no less affected.

The End of Slavery. One of the major agencies of change was the end of slavery, and this was no better illustrated than at Holt Bottoms, site of the proposed liquefaction plant. This high, fertile land had been under development as a plantation by Joseph Holt. A former Postmaster General, Holt had served as the Secretary of War, and then as Judge Advocate General for the Union Army during the Civil War. It was he who signed the death warrant for Mrs. Surrat, who had been falsely accused of conspiracy in the assassination of President Lincoln.

The rich bottom lands, such as Holt Bottoms, depended in many instances upon slave labor to make them prosper. When the slaves were freed after the civil war, the fortunes of the large land owners abruptly ended. That, coupled with the generally hard times brought on by the war's economic disruption, began to take its toll. Some small, isolated towns began to die. Building, for the most part, stopped. The plantation home overlooking Holt Bottoms, along with many other building projects, was abandoned.

The area's resort towns were especially hard hit. Not only was money for such leisure travel short, but the towns became more isolated as the developing railroads began to cut them off. Typical of such towns was Big Spring, located where Meade, Breckinridge and Hardin counties meet. Before the civil war, it was a flourishing tourist attraction, the town's spring being a central feature. It had developed 2 grand hotels, a bowling alley, a distillery and a race track. It even sported a saloon which straddled the county line -- in case one county voted dry, it could merely move its

bar to the other end of the room and keep on serving liquor.

Economic Decline. During the Civil War, confederate troops used Big Springs as an operational headquarters and turned its very substantial jail into a holding area for Union prisoners. After the war, however, the town's fortunes sank, and today it is a decaying relic, though currently some local efforts are being made to restore the town to at least some of its former glory. In a similar vein, the "Tar Springs" resort south of Cloverport began to slow down as the popularity of mineral springs began to decline.

Cloverport's coal refining business also began to die out after the civil war, but the war was not the only reason. More and more Kentucky areas were discovering great quantities of petroleum in the ground, and it was cheaper to get illuminating and other oils from petroleum than from coal. Moreover, demand for "coal oil" began to decrease and the supply of cannel coal necessary for its production was nearing exhaustion. By 1898, the coal oil refinery was closed.

The end of the Civil War left its mark in other, non-material ways as well, and the 1867-1877 Reconstruction Period seemed to only aggravate some of the social and political differences which the war had brought about. Loyalties to political parties were heightened, and their differences tended to give each county a unique political flavor. Natural boundaries, such as Sinking Creek and the Ohio River, began to separate once friendly neighbors in more than a physical way. Remnants of these divided loyalties remain even today. Irvington even suffered outright aggression; bands of raiders often came over from Indiana to loot property and seize farm produce, and then disappear across the Ohio as rapidly as they came.

In spite of the interrupted commerce, economic hard times, and social

and political friction, however, there were some positive developments which held the region together through the post civil war period. Hancock County continued its historic dependence upon agriculture, and the 1881 Agriculture and Commerce Report listed a growing population of 8,563, with major crops being harvested in Indian corn, oats, rye, tobacco and barley. The year 1875 also saw 2 new industries in the region. The Murray Tile Company built a brickyard in Cloverport, and the Rock Haven Cement Mill was built in Meade County between Muldraugh and Brandenburg, near the present site of Otter Creek Park. It had 4 or 5 large stone kilns where quarried limestone was burned, using wood for fuel. It only operated for 15 years, stopping in 1890 when it was bypassed by the railroad.

While the cannel coal business was declining, the increasing market for ordinary bituminous coal continued to fuel a population boom around Hawesville. It wasn't until 1890 that the boom ran out of steam and the population began to decline. Hawesville was never again to be prominent as a coal mining center.

Railroads. Clearly, the greatest factor in the region's post-civil war development was the coming of the railroad. It was called the "Louisville, St. Louis, and Texas" railroad, and was built during the late 1880's. It was established as a company on January 13, 1882 and had secured its rights-of-way by 1886. Construction began in Henderson, Kentucky on November 10, 1886 and progressed eastward during the next five years.

It passed through Cloverport, and the railroad shops were located there. Here, it also connected with the older "Short Line" railroad built 2 decades earlier to carry coal from Victoria to Cloverport's coal-oil refinery on 2 trains per day. The Short Line rolling stock contrasted sharply with that of the "Louisville, St. Louis and Texas". Short Line cars were essentially

gondolas with wide-flanged, spoked wheels rolling on flat iron rails. The first "Louisville, St. Louis and Texas" passenger service was opened at Hawesville in 1890.

The railroad did not pass through most established towns. For example, it passed 3 miles south of Brandenburg, forcing the city to build a road to it in order to avoid being cut off from the commercial trade the railroad would bring. The other cities were out of luck, and the coming commercial growth did pass them by; many cut-off towns began to slowly die. Hardinsburg was bypassed, but built a turnpike to Cloverport in 1886.

While the railroad contributed to the death of some towns, it also caused the birth of at least one other: Irvington. Robert Morris Holly and Edgar Bennett perceived the need for a new town along the railroad route and began to lay one out. In 1887, there were already some houses there, and 2 churches to boot. Water was taken from the underground Sinking Creek. By 1889, the town had been surveyed, with developmental help from the railroad, which needed a station at that location anyway. It was named Irvington after an official for the "Texas" railroad, as it came to be called.

The railroad began to exert a major influence on the town to which it had given birth. In 1896, the railroad reorganized as the "Louisville, Henderson and St. Louis" and built a round house and a coal tippie at Irvington. Through the influence of the railroad with the Circuit Court, the town was given an established government. For years thereafter, Irvington developed a reputation as a "railroad town", and the railroad continued a long and intimate relationship with the town.

Other towns in the region lacked such close ties to the railroad, but all began to be influenced by it. It had now ushered in a new age of commercial contact with the trade centers at Owensboro and Louisville. This development helped to create needed jobs in a section of the state

which was in need of recovery from the Civil War. Many developments of social importance, such as tax-supported school systems, took place after the Civil War.

Education. Education had been most important to the region throughout its history. Even before the Civil War, the area's children were educated by private tutors, by 3 "seminaries", and by an "academy" in each town. Notable schools included the Mount Alba Female Collegiate Institute (1847) in Breckinridge County, the area's first school district (1849) in Hawesville, the Hardinsburg School established by the Louisville conference of the Methodist Church (1850's), the "seminary" (1866) at Lewisport, and the Hawesville School (1875).

After the Civil War, the education of teachers became important, and so colleges of education (called "Normal Schools") were established at Hardinsburg (1888) and at Irvington (1898).

Entering the New Century (1890's to WWI)

As the 19th century came to a close, and the twentieth century began, the steamboat era drew to a close, and with it, the river-based economy it represented. The railroad began to usurp the steamboat's place as the provider of trade connections and set in motion a basic shift in the area's economy.

When the steamboat era was beginning to wane, Hawesville was just becoming the center of the area's steamboat building. From 1889 - 1906, four major Ohio River boats were built in Hawesville: the "Water Queen", the "Gazelle", the "Gertrude", and the "Theatorium", the latter having the reputation as the world's largest and most prominent showboat. Up to 12 steamboats were eventually being operated between Cloverport and Owensboro. America's most famous riverboat captain, John W. Cannon, was born in Hancock

County, building the well-known steamboat, the "Robert E. Lee".

While Hawesville was enjoying the last gush of the steamboat era, and its population was declining as the mines played out, Irvington was, by contrast, beginning to boom under the influence of the railroad, especially between 1900-1915. The town added several churches, a telephone service, both a "normal school" for teachers and a business college, a graded school district and a board of health.

In Cloverport, the Murray Tile Company merged with two other brickyards (1904) and changed its name to the Murray Roofing Tile Company. It was one of the few industrial developments not connected directly with the railroad boom.

Then, as if it was an omen of the times that were ahead, the major part of the town of Cloverport was destroyed by a disastrous fire. The town had developed its own municipal gas well system for heat and light, but the gas pressure was not regulated. A gas pipe burst in a Cloverport home, setting the home afire. High winds soon spread the fire throughout the town, and before it was over, it had consumed 10 city blocks, including 73 houses, the newspaper, 3 tobacco factories, a flour mill, a furniture store, drug store, bank and hotel.

One other ominous development characterized the area's transition into the new century: the erosion of downtown Lewisport. Sometime during the 1880's, it was noticed that the Ohio River was gradually eating away at the edge of town, crumbling the riverbank from beneath it. The erosion continued for 40 years. By the end of World War I, Front Street was gone. The hotel and several stores were destroyed, and several buildings had to be moved. By about 1920, the erosion stopped as mysteriously as it had started.

A Depression Between Two Wars (1916-1941)

The era between World War I and II was marked by a decline in influence of local activities and a dramatic increase in influence from the Federal Government.

Local activities were important during this era, especially agriculture, which held the economy together while an otherwise lax economy tried to get first one thing and then another going. The Irvington Herald newspaper started in 1917, and the Murray Tile Company at Cloverport incorporated in 1926. But nothing really stimulating was happening. The four coal mines at Hawesville shut down during the depression; and during the 1930's, a number of "cottage industries" and craft industries started in Meade County. In 1936, some strip mining for bituminous coal was started near Mount Eden in Hancock County.

All-in-all, this was an unremarkable era for the entire region, and it wasn't helped any by the decline of the railroad. It was acquired in 1929 by the Louisville and Nashville Railroad, but closed down in 1941. Moreover, the railroad shops were moved out of Cloverport in 1928 and relocated in Louisville, removing several jobs from Cloverport.

As the mines closed down and the railroad activity slowed, jobs decreased, and with them, the area's population. Hawesville, for example, dropped in population from 1,002 in 1919 to 824 in 1920, a decline of 18% in a single year.

In the face of an apparent inability of local activities to stem the tide of the depression, the Federal government began to exert an influence which would slowly but surely affect the region. One major factor was the construction of the U. S. Highway 60 through Muldraugh, Irvington, Hardinsburg, Cloverport, Hawesville and Lewisport. Gravelled in 1926 and paved in 1930,

the road provided a more personal and individual access between Louisville and Owensboro, and shifted the main commercial route further south away from the river. The towns along this highway thus became, and remain today, the major towns in the region, with the exception of Brandenburg and (across the river) Tell City.

A second major Federal influence was the development of Fort Knox. This military post consumed much of the land in eastern Meade County and became a major area employer. Meade County began to develop, by 1945, a little of its present-day character as a residential area to those who work at Fort Knox and, later, in Louisville.

The third factor was the designation, in 1935, of 63,000 acres of Perry County woodland by the U. S. Forest Service as the "Hoosier Natural Forest". This opened up possibilities for the gradual development of tourist-related businesses in the Perry County area.

One other local issue was influenced by Federal activity -- alcoholic beverages, and Hancock County reflected the issue well. For much of its history, all of Hancock County had been traditionally "dry", except for Hawesville which was wet. During Prohibition, people wanting a drink would often ferry across the river to the "Bucktown" section of Cannelton. Liquor could be supplied there by many "Moonshiners" who inhabited the caves, cliffs, forests, and hills of Perry County. Then, in 1939, Hawesville, too, voted to become "dry". The ordinance outlawing the sale of liquor was passed on June 29, 1939.

The Post World War II War Boom (1946-Present)

Thus, in the 170 years since the region's first settlement, the area's growth and development had been slow and cyclical, shifting with the prominence

of the riverboat and the railroad.

After World War II, however, the post-war industrial boom began to rapidly usher this region into the modern age. More has happened in the region's economy during the 34 years since World War II than in all the 170 previous years. And most of the changes have come about because of the factor which originally gave impetus to the region's growth: the Ohio River. The region has now come full circle, and today's modern industry exists primarily because of the river which first gave the area life.

Now, the area's economy is dominated by the huge plants on the river; Murray Tile, American Olean Tile, the Big River Power Plant, Olin Matheson, Wescor Paper, Martin Marietta, and National Southwire Aluminum. These, along with the Hawesville floodwall (1953-1954), the Ohio River bridges at Hawesville and Brandenburg, and the Cannelton Lock and Dam are harnessing the mighty Ohio river to provide a stable industrial base to an area that has been largely rural for many years. The Matthew E. Welsh toll bridge at Brandenburg was completed in 1966, linking it with Mauckport, Indiana. The same year saw completion of the Bob Cummings Lincoln Trail Memorial Bridge, linking Hawesville and Cannelton. Thus ended a historic era where ferrys provided the only means of linking Kentucky with its Indiana neighbors.

The rapid industrialization of the region since 1951 has caused an appreciable boom and a shift in population, and these have forced the area's towns to quickly adapt. A boom, for example, was experienced by Brandenburg; its 1950 population of 755 soared to 1,542 by 1960, due primarily to the construction of the Olin Matheson Chemical Plant there in 1952. And the population of Lewisport tripled during the late '50s and early 60s when American Olean Tile and the Martin Marietta Aluminum Mill went in. By contrast,

the mayor of Cloverport stated, in 1968, that it was a dying town, and he proposed to build a large river-based development to serve the area's tourist needs, as a means of overcoming the slump.

Partly to capitalize upon the area's industrial boom, a large private residential community started development in 1961 around the Doe Valley Lake southeast of Brandenburg. It had lots for 1,000 homes, and a year after changing hands in 1971, it sold 500 of these for a total of \$3.6 million. A golf club was completed there in 1972, and a swim and tennis club in 1974. Most of the residents are either military personnel associated with Fort Knox or working people from the Louisville area. Otter Creek Park, also in Meade County south of Brandenburg, was created after World War II to serve the recreational needs of the Louisville and Fort Knox area.

Hancock County has received by far the most new industry, and yet, it provides an illustration of the way in which a county can fail to capitalize on its industrial development. In spite of an industrial base including a tile plant, paper mill, and an aluminum mill, the county did not benefit for as long while as it should have. When, however, the county passed a payroll tax, an appreciable income began to accrue to the county, enabling it to build a new government building and otherwise modernize both its urban and county environment.

POPULATION

At this writing, the results of the 1980 census are still being released in stages; some summary-type information is presently available, but many of the desirable details are not. It is therefore possible, at this point, to assess major population trends in the 4-county area, and recent population characteristics based upon earlier census data. A detailed treatment of population statistics will have to await the availability of 1980 census analyses.

Historic Trends

The effects of the post-war boom on population may be determined by examining census data since 1940. Table 4 and Figure 9 summarize population trends for the counties, and Table 5 and Figure 10 summarize trends for the cities.

The four county area has a 1980 population of 66,639. Meade County is the largest and today contains 34% of the total population (22,856), followed by Perry County, Breckinridge County, and the smallest, Hancock County which contains less than 12% of the area's population (7,710).

As shown by Figure 9, the total population of the four-county area was declining during World War II, but has increased steadily since 1950. During this interval, Hancock and Breckinridge counties have experienced a declining, and then rising population with today's population not markedly different from that in 1940; during the interval, Hancock County experienced a relatively rapid increase; population jumped by 33% (from 5,330 to 7,080) between 1960 and 1970.

County	Year				
	1940	1950	1960	1970	1980
Breckinridge	17,744	15,528	14,734	14,789	16,862
Hancock	6,807	6,009	5,330	7,080	7,710
Meade	8,827	9,422	18,938	18,796	22,856
Perry	17,770	17,367	17,232	19,075	19,211
Total	51,148	48,326	56,234	59,740	66,639

Table 4. Trend in Area Population, by County

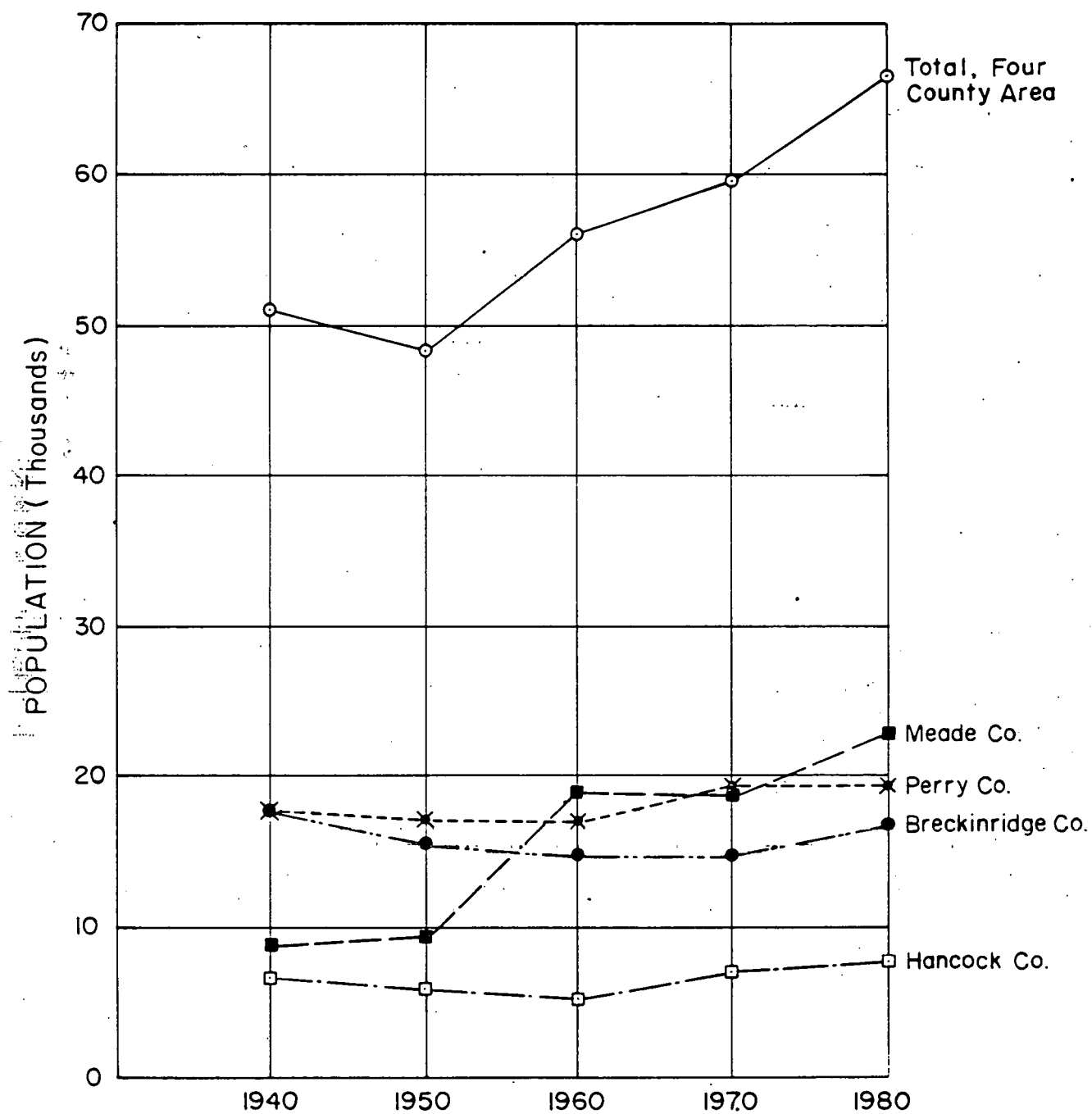


Figure 9. TREND IN AREA POPULATION, BY COUNTY

City	Year				
	1940	1950	1960	1970	1980
Muldraugh	--	--	1,743	1,773	1,755
Brandenburg	874	755	1,542	1,637	1,845
Hardinsburg	930	902	1,377	1,547	2,219
Irvington	790	831	1,190	1,300	1,405
Cloverport	1,402	1,357	1,334	1,388	1,457
Hawesville	896	925	882	1,262	1,029
Cannelton	2,240	2,027	1,829	2,280	2,238
Tell City	5,395	5,735	6,609	7,933	8,707
Total	13,118	13,188	17,116	20,715	22,479

Table 5. Trend in Urban Population, by City

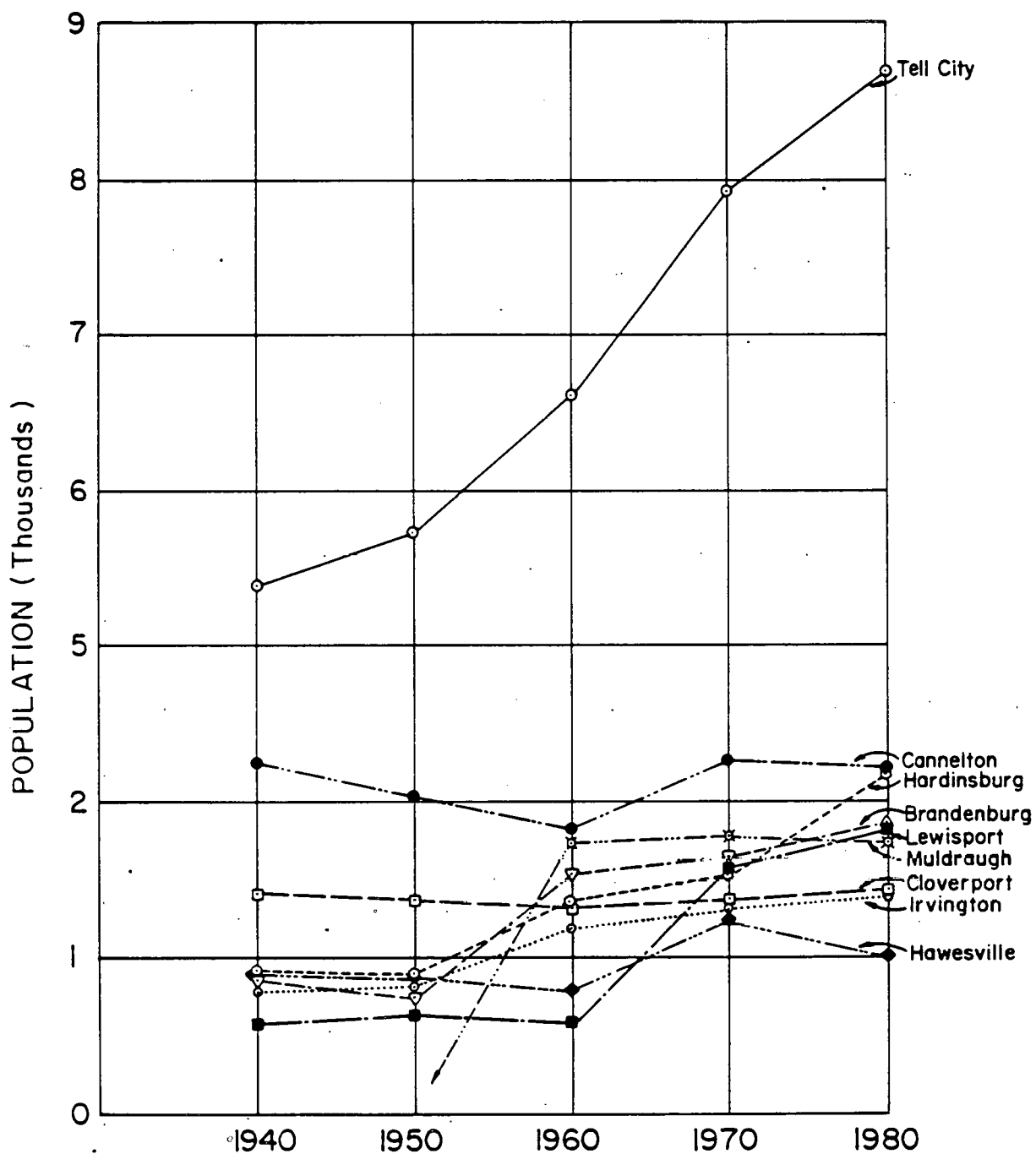


Figure 10. TREND IN AREA POPULATION, BY CITY

Perry County has experienced slow, but relatively steady growth. Meade County has been the biggest gainer; it ranked 3rd of the 4 counties in population in 1940 but, spurred by the development of Fort Knox, and its developing role as a residential community for the Louisville area, it jumped 101% in population between 1950 and 1960 (from 9,422 to 18,938).

Some of the cities within the 4-county area have evidenced the change brought by industry. Tell City, by far the largest city in the area (8,461 population) has experienced a steady growth since 1940, while the nearby county seat of Cannelton has fluctuated with no clear population trend. Cloverport has declined quite steadily in population.

Six of the nine major area cities have experienced periods of volatile growth. From 1950 to 1960, Irvington increased by 43% (from 831 to 1190), Hardinsburg by 53% (from 902 to 1372), Brandenburg by 104% (from 755 to 1542), and Muldraugh exploded from a town too small to report in the 1950 census to a population of 1,743 in 1960. The next decade brought additional spurts of growth; from 1960 to 1970, Hawesville increased by 43% (from 882 to 1,262) and Lewisport by 161% (from 610 to 1,595).

The spurts of growth described above were generally related to two factors: the development of Fort Knox and the coming of heavy, river-based industry to the area. Probably the greatest impact occurred in Hancock County; while it is the smallest in population of the four counties in the impact area, it captured most of the new river-based industry; 7 of the 9 new industrial plants in the area are located in Hancock County.

Population Characteristics

Table 6 and 7 summarize the age and race makeup of the population in the four-county area, as determined by the 1970 census; 1980 figures should

Race	County				TOTAL
	Breckinridge	Hancock	Meade	Perry	
White	14,103	6,936	15,891	18,967	55,897
Non-White	686	144	2,905	108	3,843
TOTAL	14,789	7,080	18,796	19,075	59,740

Table 6. Racial Composition of the
4-County Population - 1970

Age	County				TOTAL
	Breckinridge	Hancock	Meade	Perry	
0- 4	1,154	715	2,389	1,669	5,927
5-19	4,441	2,093	5,823	6,066	18,423
20-44	3,981	2,189	7,434	5,337	18,941
45-59	2,404	1,013	1,721	2,950	8,088
60-69	1,443	551	787	1,592	4,373
70+	1,366	519	642	1,461	3,988
TOTAL	14,789	7,080	18,796	19,075	59,740

Table 7. Composition, by age,
of the 4-County
Population - 1970

be available shortly from the federal government.

Racial minorities form a very small segment of the area's population; only 6.4% are non-white. Most of the non-white population resides in Meade County (15.5% of the county's population is non-white), probably in or near the Fort Knox area. The average portion of non-white population in the other three counties is only 2.3%. Regarding age distribution, approximately 1/3 of the area's population is of school age (5-19 years old), and 1/3 is between 20-44 years old.

More detailed data on population characteristics are in the appendix.

Area Economy

The four-county area derives its employment primarily from agriculture, river-based heavy industry, Fort Knox, small commercial businesses, wood-working, and tourism. This section reviews these sources of employment, as well as taxes, banking, welfare and other aspects of the area's economy.

Agriculture

Agriculture continues to be a primary employer in the four-county area, though farm jobs are being continually lost to industry. Tables 8 and 9 illustrate the trend between 1970 and 1978.

About $\frac{1}{4}$ of all jobs in the four-county area are with agriculture, most of those being farmers who own their own land and a small minority having full-time jobs as hired farm hands. But the proportion of jobs varies appreciably from county-to-county. Only 9.1% of the jobs in Perry County are agricultural, probably owing to the large number of employers in the Tell City area. And only 14.8% of Hancock County jobs are in farming. By contrast, 29.5% of the jobs in Meade County are on the farm, and 42.6% of those in Breckinridge. Thus the county economy in which the Breckinridge Project is located may be considered to be dominated by agriculture.

While agriculture is a major economic factor, it is losing ground to industry as an employer. In 1970, 25.1% of the area's jobs were in agriculture, but this fell to 22.1% in 1978, and the proportion of total

	Breckinridge	Hancock	Meade	Perry	Total
Farmer Owners	1,918	667	1,000	694	4,279
Farm Employees	404	89	155	34	682
Total Farm Jobs	2,322	756	1,155	728	4,961
Total Employment	5,445	5,125	3,912	8,008	22,490
Farm Jobs as % of Total Employment	42.6%	14.8%	29.5%	9.1%	22.1%

Table 8. Number of Agricultural Jobs in the Four-County Area during 1978, and the Percentage of Total Employment this Represents.

	Breckinridge	Hancock	Meade	Perry	Total
Farmer Owners	2,039	750	1,048	673	4,510
Farm Employees	331	78	106	29	544
Total Farm Jobs	2,370	828	1,154	702	5,054
Total Employment	4,875	4,297	3,499	7,492	20,163
Farm Jobs as % of Total Employment	48.6%	19.3%	33.0%	9.4%	25.1%

Table 9. Number of Agricultural Jobs in the Four-County Area during 1970, and the Percentage of Total Employment this Represents.

jobs represented by agriculture fell during this interval in every county.

The trend may be summarized by saying that new industry, mostly river-based, is attracting its employees away from farm jobs, a factor which area farmers have noticed with some dismay. It is becoming difficult for farmers to keep their children on the family farm when the much higher paying industrial jobs become available.

The major farm income results from the production of corn, soybeans, wheat, oats, hay, tobacco, milk, cattle, hogs and poultry. The most recent figures (1974) on agricultural production show the following value of products sold (Ky. & Indiana Census of Agriculture, U.S. Dept. of Commerce):

<u>County</u>	<u>Value of Agricultural Products Sold</u>
Breckinridge	\$19,076,000
Hancock	4,856,000
Meade	8,608,000
Perry	6,006,000

Industry

The four-county area has a strong but unevenly distributed base; Figure 11 shows the location of the major river-based heavy industry, and Table 10 lists the area's major manufacturers.

Most of the area's industry is concentrated along the river between Cloverport and Lewisport, particularly near Hawesville and Tell City. The principal products are aluminum, furniture and other wood products, clay tile and agricultural lime, paper, textiles and chemicals. Table 10 lists a total of 7,479 jobs in the major plants; small manufacturers employ a few additional workers.

A comparison of this table with the agricultural figures of Table 8 shows that industry employs substantially more people in the four-county

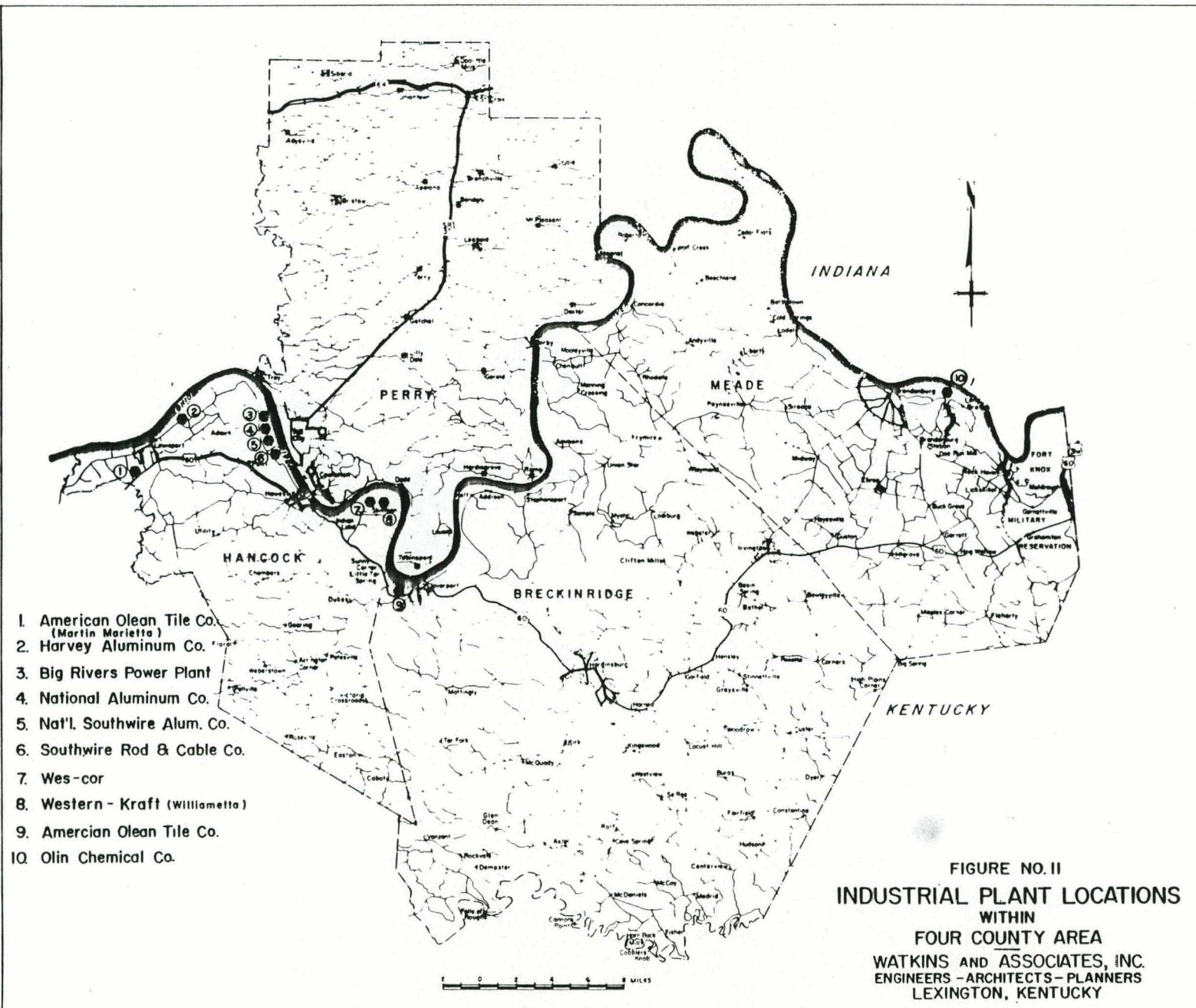


Table 10. Major Area Industries

County	City or Location	Name of Plant	Appx. No. of Employees	Products
Meade	Brandenburg	Olin Chemical	650	Glycol ethers, glycols, polyglycols
		Atlas Pallet	50	Wood skids, boxes, pallets
Breckinridge	Irvington	The Kentucky Stone Co.	15	Agricultural lime
	Hardinsburg	The Galanti Studio	100	Needlecraft, bedspreads, pillows, soft goods.
		Elanor Beard Studio	20	Bedspreads, ladies' robes
	Cloverport	American Olean-Murray Tile	90	Unglazed quarry tile
		Cloverport Mill	12	Lumber
Hancock	Between Hawesville & Cloverport	Wescor Corp. Paper Mill	163	Corrugating medium
		Western Kraft	162	Paper
	Between Hawesville & Lewisport	Southwire Rod and Cable	250	Aluminum rod, cable
		National Southwire Aluminum	1,000	Aluminum wire
		National Aluminum - Division of National Steel	290	
		Big Rivers Electric Power Plant	150	Electric power
		Harvey Aluminum-Martin Marietta	1,100	
	Lewisport	American Olean Tile	187	Clay tile, pipe

Table 10. Major Area Industries (con't)

County	City or Location	Name of Plant	Appx. No. of Employees	Products
Perry	Tell City - Cannelton	Tell City Chair Co.	1,000	Wooden chairs, furniture
		General Electric Co.	700	Motors
		Maxon Marine Industries	300	Barges, dredges, towboats
		Can-Tex Industries	250	Clay Pipe, tile
		Commercial Filters	200	Disposable filter media
		Mulzer Crushed Stone	200	Coal, agricultural lime
		Wm. Tell Woodcrafters	200	Case goods
		Swiss Plywood Corp.	150	Case goods
		Schwab Safe Co.	60	Office cabinets
		Scott Boat Co.	50	Small boats
		Fischer Chair Co.	50	Chairs, rockers
		Lloyd Jobe Sawmill	30	Lumber
		Blum's Lumber & Crating	30	Lumber, shipping crates
		Hydro-Tex Corporation	20	Plastic beauty supplies

area (7,479+) than does farming (4,961+).

It is significant to the Breckinridge Project that only about 237 of the 7,479 industrial jobs listed (3.2%) are in Breckinridge County.

Other Employment

Table 11 lists the number of employees in five other categories of interest. These data are 1978 estimates from the U.S. Bureau of Economic Analysis, and include both full-time and part-time employees.

Area Banks

There are 12 banks and savings and loan institutions in the four-county area. These are listed in Table 12.

Unemployment

Like many areas of the country, unemployment in the four-county area is higher than desirable; Table 13 lists the city and county rates.

The highest rate at this writing is in Tell City (16.4%), a reflection of the low sales of products manufactured during the recession. Brandenburg, at 10%, has the second highest unemployment rate. Hancock County has the lowest unemployment rates, perhaps indicative of the large amount of basic industry in this county.

Personal Income

Table 14 shows the per capita income (1977 figures) for residents of the area's cities and counties. It ranges from a low of \$3,649 in Muldraugh to a high of \$5603 in Lewisport.

Of special significance to the Breckinridge Project is the fact that, of the four counties in the impact area, Breckinridge County residents have the lowest per capita income.

Employer Category	Breckinridge	Hancock	Meade	Perry	Total
Manufacturing	274	2,758	688	3,054	6,774
Local and State Govt.	610	243	466	913	2,232
Services	494	0	214	671	1,379
Construction	138	408	108	380	1,034
Mining	43	52	0	99	194

Table 11. Employment in the Four-County
Area for Various Employers of Interest (1978).

County	City	Name of Institution	Total Assets
Breckinridge	Irvington	Farmers Bank (Branch)	\$
	Irvington	First State Bank	35,565,000
	Hardinsburg	First Federal Savings & Loan (Br)	
	Hardinsburg	The Farmers Bank	23,233,000
	Hardinsburg	First State Bank (Branch)	
	Cloverport	Breckinridge Bank	7,078,000
Hancock	Hawesville	Owensboro Fed. Savings & Loan (Br)	
Hancock	Hawesville	Hancock Bank and Trust	30,702,000
	Lewisport	Hancock Bank and Trust (Branch)	
Meade	Brandenburg	Farmers Deposit Bank	31,455,000
Perry	Cannelton	First Cannelton Nat'l Bank	16,500,000
	Tell City	Citizens National Bank	57,465,000
	Tell City	Tell City National Bank	52,280,000
	Tell City	Tell City Fed. Savings & Loan	15,000,000
	Tell City	Peoples Building & Loan Assoc.	12,500,000

Table 12. Banks and Savings and Loan Institutions
in the Four-County Area.

(Br = Branch Location)

County	City	Unemployment Rate for October, 1980
Breckinridge		7.2%
	Irvington	
	Hardinsburg	7.4%
	Cloverport	
Hancock		5.4%
	Hawesville	6.7%
	Lewisport	6.2%
Meade		7.7%
	Brandenburg	10.0%
Perry		
	Cannelton	
	Tell City	16.4%

Table 13. Area Unemployment Rates
(October, 1980)

County	City	Per Capita Income - 1977
Hancock		\$4,894
Meade		4,539
Perry		4,474
Breckinridge		3,677
	Lewisport	5,603
	Tell City	5,223
	Brandenburg	5,134
	Hawesville	5,080
	Hardinsburg	4,659
	Cannelton	4,638
	Irvington	4,177
	Cloverport	4,171
	Muldraugh	3,649

Table 14. Per Capita Income for Area Cities and Counties (1977). Listed in Descending Order.

Low Income Families

Table 15 summarizes some statistics which describe the status of low income families in the four-county area.

It is significant for planners of the Breckinridge Project that Breckinridge County, which has the second lower population of the four counties, has by far the highest numbers of families on low income, and receiving food stamps and AFDC and disability payments.

Skilled Labor and Labor Organizations

Table 16 lists some of the national labor unions representing employees of area industrial plants. And Table 17 summarizes the size of membership of various union locals in the Green River and Lincoln Trail Area Development Districts and the Louisville area; any local workers hired would likely belong to one of these locals.

While there appear to be many skilled laborers residing and working in the four-county area, and unemployment levels which are higher than desirable, the availability of skilled labor appears to be limited. The following quotations from a recent "Economic Adjustment Study" done for Tell City appear relevant:

"Despite the large surplus of labor in the Tell City area, there is a severe shortage of skilled tradesmen. Local manufacturers generally sought to keep their skilled work force intact during the recession. The great majority laid off during 1974 and 1975 were employed in unskilled or semi-skilled occupations.

Leading industrial employers interviewed by Fantus reported that it is virtually impossible to find qualified applicants for skilled maintenance, toolroom or welding jobs in the Tell City area. To fill openings of this type, it is frequently necessary to attract recruits from Evansville or Owensboro. Local vocational training programs have proven to be inadequate to develop the skills needed by industry.

	Breckinridge	Hancock	Meade	Perry	Total
Number of families on food stamps average month, 1979	690	172	314	*	
Number of families on AFDC, average month, 1979	328	75	194	*	
Number of recipients, permanently and totally disabled, 1979	260	62	93	*	
Percentage of families with low income, 1978	39.2%	26.4%	27.9%		

Table 15. Statistics describing the status of low income citizens in the four-county area.

*Not available at the present time.

Company	Location	Labor Unions
National Aluminum Div. Nat'l Steel	Hawesville	Aluminum Workers International (AFL-CIO)
American Olean Tile	Lewisport	Amalgamated Clothing and Textile Workers Union (AFL-CIO)
Wescor Corporation		United Paper Workers and Paper Makers (AFL-CIO)
Martin Marietta	Lewisport	United Steel Workers of America (AFL-CIO)
Olin Corporation	Brandenburg	International Brotherhood of Electrical Workers International Brotherhood of Fireman and Oilers United Plant Guard Workers United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry
Western Kraft Paper	Hawesville	United Paperworkers International (AFL-CIO)

Table 16. Representative Area Labor Unions

Labor Union Membership by Location of Local, 1980

	Green River ADD				Lincoln Trail ADD				KIPDA (Kentucky Portion)				
	Daviess	Henderson	McLean	Ohio Union	Grayson	Hardin	Larue	Marion	Jefferson	Shelby	Region	Total	Total Ky.
Asbestos Workers									150			150	1,020
Boiler Makers	247								730 ⁱ			977	2,649
Brick-Layers	122 ^a	17	71						450			660	1,945
Carpenters	620	261 ^b		51			300		4,002 ^j			5,234	9,009
Industrial													200
Millwright	(160)								(740)			(900)	(1,242)
Other	(460)	(261) ^b		(51)			(300)		(3,262) ^j			(4,334)	(7,657)
Cement Workers									193			193	193
Electrical Workers	500			150	1,100	216	966	366 ^h	168	17,454 ^k		19,670	28,346
Iron Workers	130	130								1,413 ^l		1,543	6,854
Laborers	240	1,800 ^c								3,175 ^m		6,758	9,172
Operating Engineer		5,000 ^d										5,000	9,577
Printers	275 ^e									533		808	2,686
Plumbers	354									2,678	217 ⁿ	3,249	5,156
Pipefitters & Steamfitters										(900)		(900)	(2,460)
Pipefitters (354)										(283)		(637)	(637)
Other Plumbers										(617)	(217) ⁿ	(1,712)	(934)
Sheet Metal Workers		20 ^f								800		820	1,714
Teamsters		7,000 ^g								21,500		28,500	51,785

Table 17. (Continued)

Labor Union Membership by Location of Local, 1980 (con't)

Notes:

- a) Includes Local 8 in Bowling Green of 72 members.
- b) Includes Local 2310 in Madisonville, KY with 94 members.
- c) Local 561 (Evansville, IN).
- d) Local 181 has branch offices in Central & Western Kentucky.
- e) Local 156, Evansville.
- f) Local 96, Evansville; Kentucky members only. The local has 325 total members.
- g) Local 215, Evansville.
- h) Local IBEW 463, Telephone workers of General Telephone Co., of Kentucky.
- i) Includes local 102 with 80 members. Headquarters in Salem, Indiana. Contract with L & N.
- j) Includes local 1650 in Lexington with 490 members.
- k) Includes local 761 of IUE with 14,203 workers at GE.
- l) Includes local 372 in Cincinnati (3 Kentucky contracts).
- m) Includes locals 661 (Hopkinsville) with 400 workers and 1214 (Paducah) with 775 workers.
- n) Local 669 - Road Sprinkler Fitters.

SOURCE: 1980 Directory of Labor Organizations, Kentucky Department of Labor.

No similar information was available from the Indiana Department of Labor.

This situation is likely to be a matter of serious concern to a manufacturer considering Tell City as a possible branch plant location. If any significant number of skilled workers are required, Tell City will probably be rejected in favor of a community offering a greater supply of applicants qualified for such employment through experience or training."

This same study raised the issue of labor-management relations in the Tell City area; these conclusions are not necessarily applicable to other portions of the four-county area:

"The recent history of labor relations in the Tell City area must be rated as highly unfavorable from an industrial location standpoint. There have been two major strikes in Tell City during the past six months. Since 1969, strikes have occurred at five of the seven largest plants in Tell City and Cannellton. One of these firms has been struck on three separate occasions since 1971. Another local manufacturer had a wildcat work stoppage in 1972 and a strike after contract expiration in 1974. A third company experienced a series of walkouts due to grievance problems extending over a three-year period.

The magnitude of the labor relations problem is evidenced by the duration as well as the frequency of strikes. Five of the work stoppages occurring in the same area since 1969 have lasted over one month. Two of these strikes continued for periods of approximately four months.

The labor-management conflicts in the Tell City area have, of course, resulted in substantial losses of production and payroll. In addition, they will undoubtedly have an adverse impact on efforts to attract new industry. Fantus experience indicates that communities with a history of frequent or lengthy strikes are usually avoided by manufacturers selecting sites for branch plants.

It should be noted that this discussion implies no judgment as to the justification for the labor-management disputes in Tell City. Manufacturers conducting location searches rarely seek to examine the "rights and wrongs" of the labor situation in communities where serious problems of this type have arisen. Such communities tend to be routinely rejected as "high risk" areas."

Area wage rates differ markedly between skilled and non-skilled labor.

Table 18 summarizes recent wages paid for non-skilled labor in the Lincoln

	<u>Total</u> <u>Openings</u> <u>Received</u>	<u>Average</u> <u>Wage</u>	<u>Total</u> <u>Openings</u> <u>Filled</u>	<u>Average</u> <u>Wage</u>	<u>Experienced</u> <u>Applicants</u> <u>Available</u> <u>at End</u> <u>of Month</u>
TOTAL	3,027	\$ 3.55	2,871	\$ 3.50	4,370
Professional, Technical and Managerial	78	4.95	53	3.70	148
Clerical	1,252	3.17	1,203	3.17	547
Sales	86	3.30	80	3.30	89
Domestic	27	2.62	28	2.63	184
Other Services	387	3.24	360	3.24	463
Farming, Fishery and Forestry	129	4.17	124	4.19	177
Processing	91	5.03	91	5.04	116
Machine Trades	159	4.24	149	4.13	321
Bench Work	186	3.27	184	3.27	227
Structural Work	285	3.64	270	3.51	697
Motor Freight and Transportation	125	4.75	119	4.80	217
Packaging and Material Handling	209	3.93	197	3.92	227
Other	13	3.46	13	3.46	23

*Includes: Breckinridge, Grayson, Hardin, Larue, Marion, Meade, Nelson and Washington Counties.

Table 18. Recent rates (October 1, 1979 - July 31, 1980) paid for unskilled labor in the Lincoln Trail Area Development District.

Trail Area Development District (which includes Breckinridge and Meade Counties), and Table 19 lists skilled labor rates for union workers in the Louisville area.

Tourism

The four-county area derives a small but significant income from tourism, especially around Rough River Dam State Park on the southern border of Breckinridge County, Otter Creek Park near Brandenburg, and portions of the Hoosier National Forest in Perry County. See the separate chapter on Recreational Facilities.

Economic Development

Several of the area's cities and counties have existing or past development programs which are meeting with some success in stimulating the area economy.

The agencies promoting development differ among the cities and counties. There are active chambers of commerce in Tell City, Hancock County, and Breckinridge County. Cloverport's agency is the Cloverport Industrial Foundation, Inc. Hardinsburg and Irvington are on a common industrial development board.

Some communities have undertaken development plans or studies. The Hardinsburg Rotary Club put together a development plan during the mid 60's. Tell City hired the Fantus Company of Chicago to conduct an Economic Adjustment Study in the mid 70's. Muldraugh engaged Bost and Associates to develop a comprehensive plan in September, 1970.

Some economic stimulus is being provided by recent plant expansion activity. Local officials report the following expansions: Consolidated Oil at Tell City which will hire 10 new workers. Wilammet Paper Co. now

Table 19. Skilled Labor Rates for Union Workers in the Louisville Area.

Minimum Wage Roster for Union Workers

Louisville, Ky

	July 3, 1978 <u>Rate per hour</u>	July 2, 1979 <u>Rate per hour</u>
Asbestos Workers	\$10.73	\$11.85
Boiler Makers	9.80	10.70
Brick- Layers	10.44	10.69
Carpenters	10.35	10.75
Millwrights	10.75	11.75
Cement Workers	9.48	9.78
Electrical Workers	11.90	12.80
Iron Workers	10.50	11.00
Operating Engineers	na	na
Printers	9.47	10.28
Plumbers	11.58	12.06
Pipefitters	11.24	11.77
Sheet Metal Workers	11.05	11.68
Teamsters	na	na
Construction Laborers:		
Group II - General Laborers, Cement Finishers' Tenders, Carpenters' Tenders	7.93	8.30
Group III - Pipelayers, Fibrator operators, concrete saw operators, asphalt operators	8.13	8.50
Group IV - Mason tenders, Air track drillers	8.28	8.65
Plumbers' Laborers	5.78	5.78

SOURCE: Union Wages and Benefits: Building Trades, July 2, 1979. U.S. Dept.
Of Labor, July, 1980.

has a \$71 million expansion under construction. Martin Marietta has a \$92 million expansion underway; some 3,000 applications have been received for the 280 new jobs to be created. Atlas Pallett at Irvington is expanding and will hire about 40 low-skilled workers. And the Olin Chemical plant at Brandenburg is reported to be expanding.

Other industrial projects are in various stages of planning but are not yet underway. These are reported to include a coal blending plant, between Lewisport and Hawesville, a farmer's cooperative methanol plant in Meade County, a firm called Liquid Transport in Brandenburg, and a new Kentucky Utilities electric power plant in Breckinridge County. Three other unknown companies are reported to be seeking sites, through consultants, in the Hawesville area.

Commercial Sales

Commercial sales of food, gasoline, furniture, clothing, etc. are a general measure of an area's economic health. Table 20 summarizes the dollar volume of commercial sales for 9 categories of products in the four-county area.

Total dollar volume varies widely, from a little over \$8 million per year in Hancock County to nearly \$50 million in Perry County, due mostly to the activity of Tell City.

Breckinridge County has the second highest volume of commercial sales (almost \$40 million per year). It has the highest volume of sales for food stores and for gasoline service stations.

	Lumber- Hardware	General Merchandise	Food	Auto	Gasoline	Apparel	Furniture	Eat, Drink	Drugs	Total
Breckinridge	2,709	2,465	13,528	8,663	3,626	1,202	1,732	1,784	2,245	39,707
Hancock	363	---	3,258	1,722	1,281	155	190	871	193	8,294
Meade	735	732	4,104	7,795	1,979	400	425	2,216	384	21,247
Perry	3,803	3,283	13,255	9,654	3,578	1,788	3,280	4,731	2,325	49,937

(a) Dollars

Breckinridge	6.8%	6.2	34.1	21.8	9.1	3.0	4.4	4.5	5.6
Hancock	4.4	---	39.3	20.8	15.4	1.9	2.3	10.5	2.3
Meade	3.5	3.4	19.3	36.7	9.3	1.9	2.0	10.4	1.8
Perry	7.6	6.6	26.5	19.3	7.2	3.6	6.6	3.5	4.7

(b) Percent

Table 20. Retail Sales in 1978, as Estimated by the Editor and Publisher Market Guide, 1978 Edition. Figures are in thousands of dollars (top table); lower table gives data in percents.

Land Use

The growth pattern of a region is influenced by the features and existing uses of its land. Therefore, one important aspect of this socio-economic study is a characterization of the area's geography, physiography, soils, geology, land use and zoning constraints on development. This section presents a review of such land use factors.

Area Overview

The four-county area encompasses three physiographic ("natural features") regions, and therefore, the region has non-uniform land features. See Figure 12.

The westernmost portion of the area lies in the "Western Coal Field" physiographic region, characterized by shale, sandstone and coal formations (Pennsylvanian geology). The central and eastern portion of the area are in the "Mississippian" physiographic region, characterized by shale and sand stone, limestone with underground caverns and moderate surface slopes. The area is penetrated from east to west by the "alluvial terrace" physiographic region, which contains the Ohio River. It is characterized by bottom lands of sand, gravel and limestone bedrock; it also contains abundant groundwater which may be tapped by wells near the river.

The topography near the river is hilly as is the land on the southern extremity of the region near Rough River Lake. The Kentucky land between

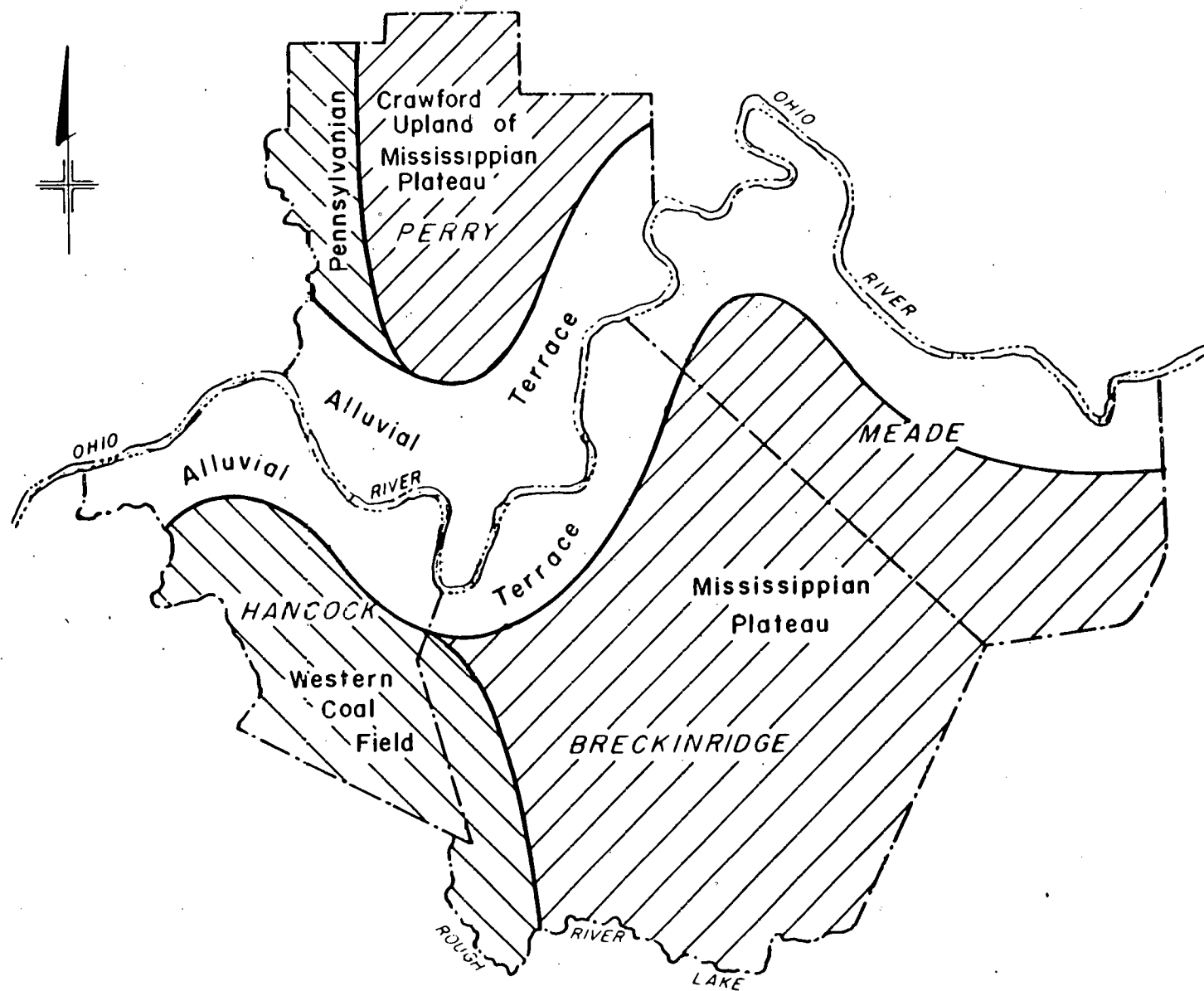


FIGURE NO.12 APPROXIMATE BOUNDARIES OF
PHYSIOGRAPHIC REGIONS IN THE FOUR COUNTY AREA

these two contains abundant farms of small-to-moderate size and large patches of woodland. North of the river, the land of Perry County is largely forested and most farms are of small-to-subsistence size.

Soils in Hancock County are largely of the Wellston-Frondorf-Zanesville association, which are gently sloping to steep, well drained or moderately well drained, deep to moderately deep, and of medium texture on the uplands. Soils in Breckinridge and Meade counties are largely of the Pembroke-Cumberland-Criden association which are sloping and gently sloping, well-drained, and of good agricultural potential. The soils in southern Perry County are largely of the Gilpin-Muskingum-Wellston association which are moderately deep to deep, well drained, medium textured, and gently sloping to very steep on the uplands; soils near the Ohio River are deep, medium textured and well drained except for portions of the subsoil which is slowly permeable fragipan.

Land Use Classification

The four-county area contains 921,600 acres (1,440 square miles) of which a substantial portion is classified as forest land (47.0%) and agricultural land (45.6%). Table 21 shows the distribution of land use, by use classification, in each county.

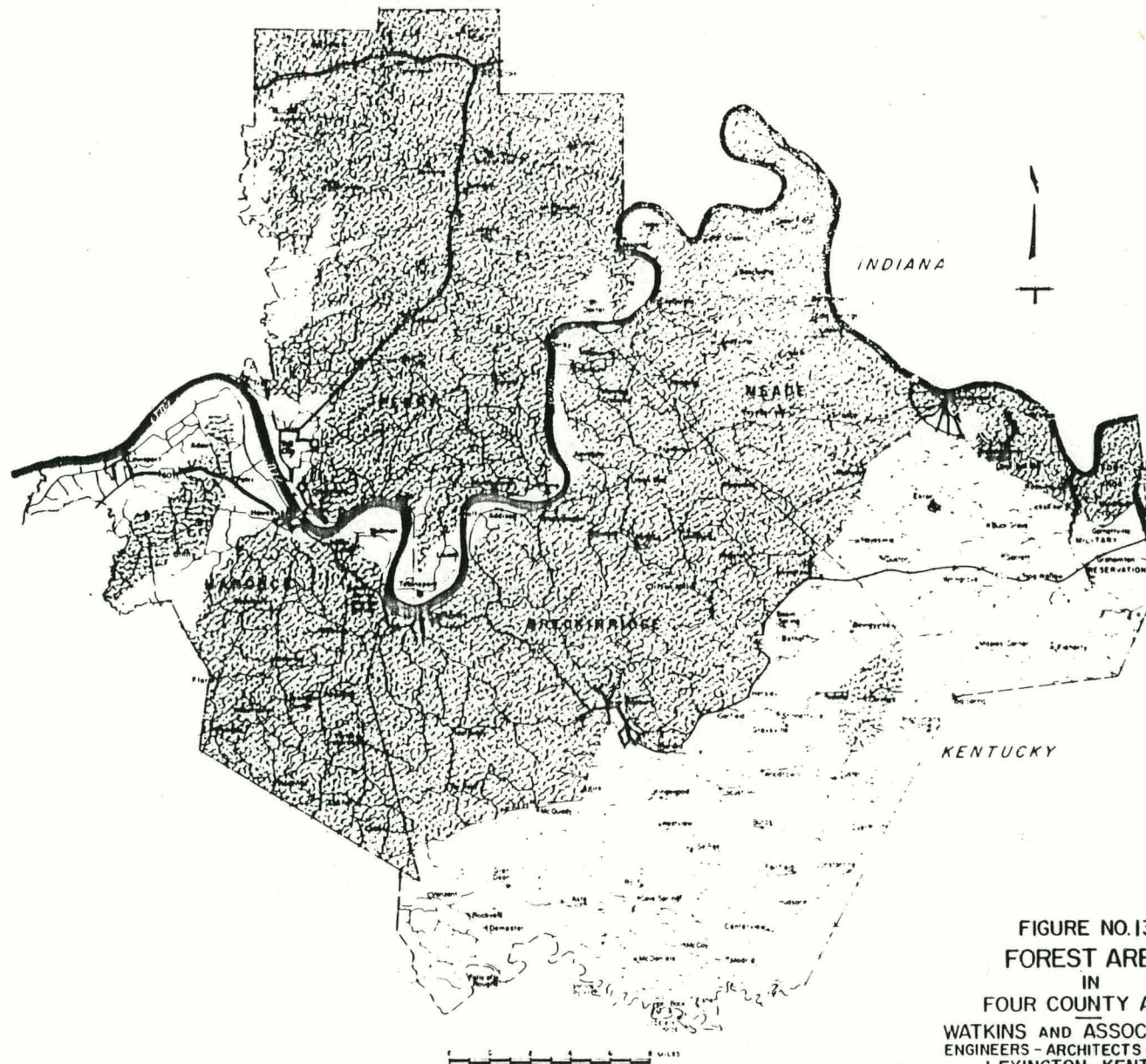
Forest Land. The large amount of uncleared forest land is indicative of the relatively remote, rural character of this region; Figure 13 shows the large portion of the area which is heavily forested. Perry County contains the largest proportion of forest land, much of which is now designated as the Hoosier National Forest. This national forest was designated in 1935 and given the power to purchase such lands as became available from time to time from willing sellers. The first land (29,244) was purchased in 1937, and the area has grown virtually every year

	* Breckinridge		* Hancock		* Meade		** Perry		Total	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Forest	160,000	44.2	56,800	47.4	75,800	38.8	140,711	57.3	433,311	47.0
Pasture	67,812	18.8	29,769	24.9	37,466	19.2	89,049	36.2	420,399	45.6
Cropland	113,708	31.5	26,425	22.1	56,170	28.8				
Water	2,066	0.6	294	0.2	1,800	0.9	7,059	2.9	11,219	1.2
Urban Built-up	8,160	2.3	2,613	2.2	4,791	2.5	6,495	2.6	22,059	2.4
Other	9,214	2.6	3,779	3.2	19,173	9.8	2,446	1.0	34,612	3.8
Total-acres	360,906	100	119,680	100	195,200	100	245,760	100	921,600	100
Total-mi ²	564		187		305		384		1,440	

Table 21. Distribution of Land Use, by
Use Classification, in the Four-County Area

*Taken from Kentucky Soil and Water Conservation Needs Inventory, 1970,
U.S. Soils Conservation Service (1967 data base)

**Taken from Planning Report, Perry County, Indiana, 1978, Perry County
Planning Commission (1978 data)



so that, today, it contains over half the land in the county.

Agriculture. As shown by Tables 22 and 23 , both the number of farms and total acreage of those farms dropped between 1969 and 1974. It is interesting, however, that Perry County ran counter to that trend. Both the number and total acreage of farms increased during the same period.

Urban Land Use. Table 24 shows the various land use features and use control mechanisms available to manage growth in the area's major cities. Paradoxically, Muldraugh is the only city having an actual land use plan, yet it is completely surrounded by Fort Knox and cannot, therefore, expand. All the major cities have a zoning ordinance except Hardinsburg; the community citizens have resisted such control over their use of land though the city is studying a possible ordinance now that the Breckinridge Project is being planned.

Hancock County is somewhat unique in having a combined city-county planning and zoning commission and is, therefore, able to regulate major developments such as new river-based industry.

The major land use constraint other than the zoning ordinance is the Ohio River; portions of Cloverport, Hawesville and Lewisport are subject to flooding. There is no county-wide zoning in Breckinridge or Meade County, so private developments associated with the Breckinridge Project may proceed unhindered at the present time.

	Breckinridge	Hancock	Meade	Perry	Total
1969	1828	715	971	583	4,097
1974	1601	569	838	625	3,633

Table 22. Number of Farms in the Four-County Area from 1969-1974. From the 1974 Census of Agriculture.

	Breckinridge	Hancock	Meade	Perry	Total
1969	310,404	84,407	132,255	99,282	626,348
1974	297,294	65,361	119,220	108,014	589,889

Table 23. Acreage in Farmland in the Four-County Area from 1969-1974. From the 1974 Census of Agriculture.

	Local Features and Constraints	Location of industry and Commerce	Zoning	Land Use Plan
Muldraugh	Surrounded by Ft. Knox; no expansion possible.	Fort Knox, downtown.	Ordinance; planning and zoning commission.	Comprehensive Plan, 1970.
Brandenburg	On River.	Along River, east side of town; downtown.	Ordinance; planning and zoning commission.	None.
Hardinsburg	None; surrounded by farmland.	Downtown; along U.S. 60 east of town.	None, but it is under study.	None.
Irvington	None; surrounded by farmland.	Downtown.	Ordinance; city zoning board.	None.
Cloverport	On River inside 100-year flood plain; hills to south.	Downtown, east side of town.	Near Ordinance; planning and zoning commission.	None.
Hawesville	On River inside 100-year flood plain.	Downtown; along River toward Lewisport.	Ordinance; county-wide planning commission.	County plan.
Tell City	On River.	Downtown; along River; along Hwy. 37 north of town.	Ordinance; planning and zoning commission.	County plan.
Lewisport	On River; west side of town subject to flooding	Downtown; along River both sides of town.	County-wide planning commission.	County plan.

Table 24. Urban Land Use Features and Control in the Four-County Area.
Based on information supplied by local officials.

Transportation

The four-county area is not generally characterized by good transportation, and the Breckinridge Project is, except for its access to the Ohio River, fairly remote from the transportation that is available. Transportation is thus of special importance to the Breckinridge Project.

This section reviews the current status of the area's transportation network, including highways, rail lines, barge system and airports.

Highways

The area's highway system consists of a federal highway (U.S. 60), two connectors with Interstate 64 (State routes 37 and 135), and several miles of secondary roads and bridges. See Figures 14 and 15. Table 25 summarizes some of the highway conditions and traffic counts on various segments of the area's highway system.

U. S. Highway 60 is the primary route through the area, and it connects between the major market regions at Owensboro and Louisville. Sections of it are relatively fast and well maintained, but for the most part, it may be characterized as an older, primary, federal route which carries far too much traffic for its design and condition. The problems are particularly bad from Hardinsburg to Hawesville (nearest the Breckinridge Project site); this portion is hilly, curvy, narrow and heavily patched. Local officials interviewed were unanimous in characterising U. S. Highway 60 as the worst transportation

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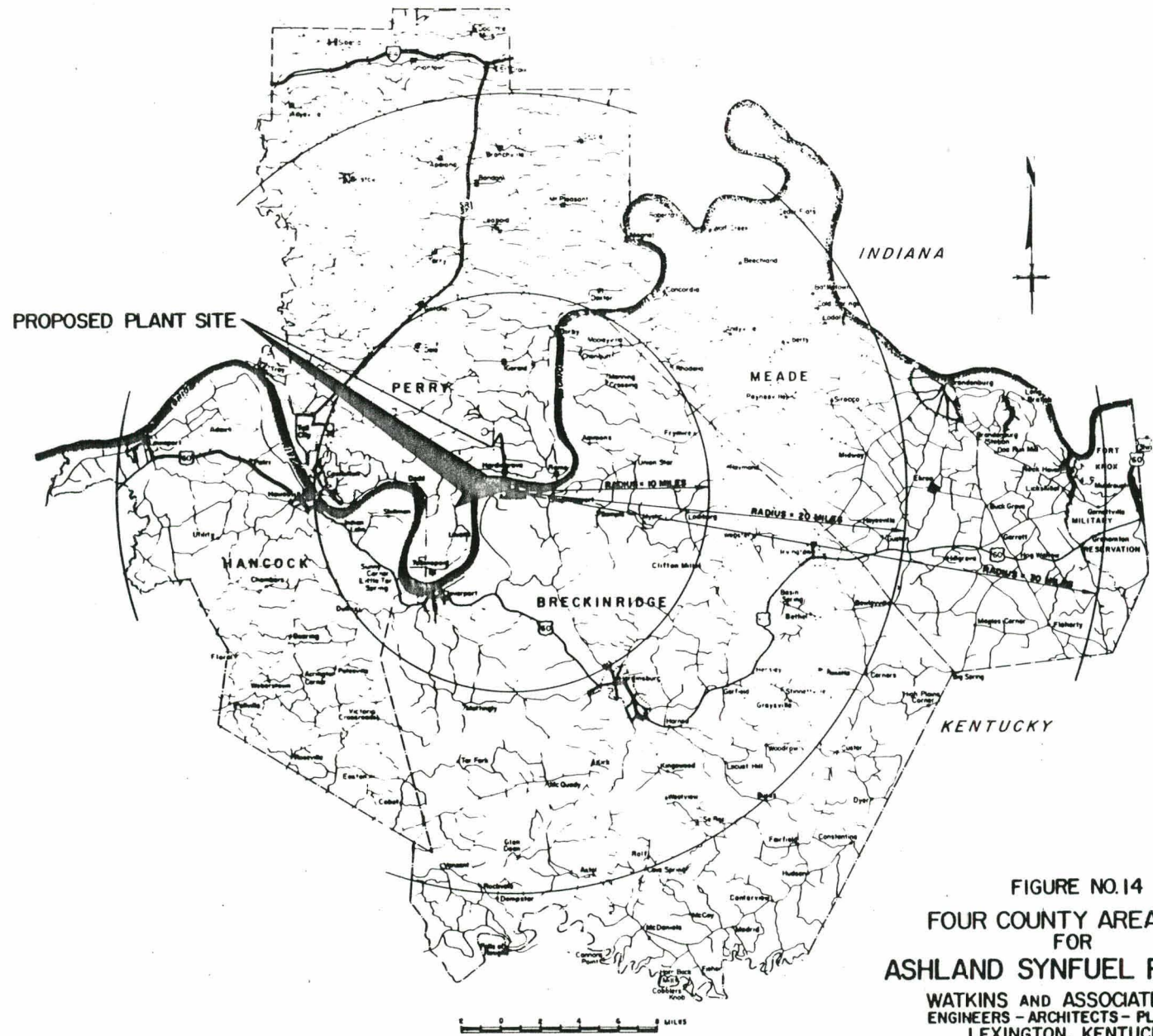


FIGURE NO. 14
FOUR COUNTY AREA MAP
FOR
ASHLAND SYN FUEL PROJECT
WATKINS AND ASSOCIATES, INC.
ENGINEERS - ARCHITECTS - PLANNERS
LEXINGTON, KENTUCKY

Table 25. Highway Conditions and Traffic Counts in the 4-County Area.

Classification	Route Number	Section	Condition	24 Hour Traffic Count
Major Access Roads	SR 37	Tell City to St. Croix	New; fast, straight, wide asphalt	
	SR 135	Brandenburg to Corydon	Relatively good asphalt; average condition	
	US 31W	Louisville to Muldraugh	4-lane; old, fair condition, very heavy traffic	13,660-34,620
	SR 79	Caneyville to Rough River		
	SR 259	Leitonfield to Madrid		
Major Thru Route	US 60	Muldraugh to Hog Wallow		2,050
		Hog Wallow to Irvington		2,760
		Irvington to Harned	Good, wide, fast, somewhat hilly, curvy	2,870-4,530
		Harned to Hardinsburg	Good, but slow; excessive traffic, access	5,410
		Hardinsburg to Cloverport	Rough, patched, hilly, curvy at north end	1,530-2,010
		Cloverport to Hawesville	Slow, patched, hilly, curvy	1,850-2,390
		Hawesville to Lewisport	4-lane; south lane good, fast; north bad, patched	3,460-5,540
	SR 66-70	Cannelton to Tell City	Nice, wide, asphalt, wide shoulders	
	SR 1638	Muldraugh to Brandenburg		3,090-3,410
	(Kentucky) SR 79	Irvington to Brandenburg		2,050-2,100
Major Secondary Routes	SR 144	Radcliff to Vine Grove		5,210-9,200
	SR 144	Vine Grove to Brandenburg		
	SR 238	Brandenburg to Wolf Creek	Narrow, hilly, curvy, being resurfaced	660
	SR 86	Dyer to Garfield	Narrow, good condition	750-1,030
	SR 79	Harned to McDaniel	Fair condition, heavily patched, hilly south end	2,000-2,980
	SR 108-261	Hardinsburg to Rough River	Narrow, fair to poor condition, heavily patched	510-710
	SR 105	Cloverport to Rough River	Good asphalt, but hilly and curvy	300-430
	SR 401	Madrid to Dyer	Narrow, straight, rolling, fair-to-good condition	
	SR 69	Hawesville to Paducah		670-1,210
	SR 62	St. Croix to Uniontown	Wide asphalt, rough, curvy	
Major Secondary Routes (Indiana)	SR 145	Uniontown to Bristow	Closed to traffic	
	SR 70	Leopold to Derby	Wide asphalt but rough, patched	
	SR 66	Derby to Rome	Narrow, winding, rough	
	SR 66	Rome to Cannelton	Slow, hilly, curvy, rough, patched	
Routes near Addison	SR 144	Addison to Cloverport		280-440
	SR 144	Addison to Brandenburg	Narrow, patched, average condition	440-1,250
Bridges	SR 144	?		
	US 60	Sinking Creek		
	SR 144	Town Creek		
	SR 135	Brandenburg to Mauckport	Toll bridge, toll delay	
	SR 69-37	Hawesville to Cannelton	Lincoln Trail Toll Bridge, toll delay	

problem they face. Furthermore, they report that, in spite of several requests for the highway to be widened and straightened, no such improvements have been scheduled for the near future.

The area's access to Interstate Highway I-64 is fairly good via SR 37 from St. Croix to Tell City and SR 135 from Corydon to Brandenburg. It is not possible, however, to drive directly to the Breckinridge Project Site from I-64 without crossing the toll bridge at either Hawesville or Brandenburg. These two access roads are adequate, especially SR 37 which is a fast, wide, new asphalt road paralleling old Route 37. It was dedicated on August 6, 1980. The two toll bridges represent a traffic delay during heavy use.

Secondary roads in the four-county area are mostly in fair to poor condition, especially those near the Breckinridge Project site. Some resurfacing is currently underway northeast of Brandenburg. Secondary access roads from the south are also in only fair condition.

Some bridges represent potential obstacles. The Highway 144 bridge over Town Creek, leading from U.S. Highway 60 to the Breckinridge Project site, has a ten-ton load limit. This bridge and one other bridge on Highway 144 are reported to be scheduled for upgrading in 1982. Lewisport officials report that the state is now planning to improve bridges on the 4-lane section of U.S. 60 at Lick Creek (west bound lane) and Little Yellow Creek (east bound lane). Some improvements are also being planned for the U.S. Highway 60 bridge over Sinking Creek near Garfield; core drilling is now taking place.

Other existing needs already identified by local officials include the following: An improved connector road from U.S. 60 to the site, direct routes to the site from Hardinsburg and Irvington, wintertime snow removed on state and county roads near the site, improvements for Highway 79 from Brandenburg to Irvington, and perhaps a bridge over the Ohio River at Addison, a bypass

around Hardinsburg, and a connector between the Western Kentucky Parkway and either Hardinsburg or the Lincoln Trail Toll Bridge at Hawesville.

A few potential, secondary problems have been identified. Area shipments of grain, from farm to market, as well as from small mills like Dobbs Seed and Grain in Hardinsburg, are presently restricted since the only major grain elevator is in Owensboro; trucks from the four-county area wanting to sell grain must often travel over the narrow, winding, hilly sections of U.S. 60 between Cloverport and Hawesville; this represents a potential overload condition when construction of the Breckinridge Project ensues. Cloverport did a feasibility study on locating a barge loading facility there for grains, but couldn't interest anyone in building it. Coal shipments do not presently appear to be a problem since little coal moves over the four-county area's highway network. Some coal is trucked from the Western Kentucky coal fields to Owensboro Municipal Utilities, the Big River Power Plant, Olin Chemical, Fort Knox and Louisville Gas and Electric. Most coal passes through this area on Ohio River barges or the railroad (discussed below). Some problems may be anticipated for school buses in areas near the plant when traffic congestion associated with plant construction begins, especially on secondary roads without snow removal. And recreation traffic is already heavy in some places, notably Hardinsburg which has a lot of boat and water-related traffic going to Rough River State Park during the summertime; a recent (August) survey by Kentucky DOT was reported to show that 8,500 - 10,000 vehicles per day pass the hospital there. Even more congestion could be expected when plant construction begins.

Commuting Patterns

Many employees in the four-county area do not work in their county of residency but rather commute to other counties. Tables 26, 27, and 28

County	Percent of Employees	
	Working Inside County of Residence	Working Outside County of Residence
Breckinridge	62.7%	27.6%
Hancock	75.3%	21.4%
Meade	34.0%	58.2%

Table 26. Percent of Employees Working Inside and Outside County of Residence. From Kentucky Dept. of Commerce, 1973, based upon the 1970 Census.

County	Number of Employees	
	Coming in from Other Counties	Leaving for Jobs Outside the County
Hancock	516	196
Breckinridge	83	445
Meade	180	55
Perry	211	294

Table 27. Number of Employees Working in County of Residence and Commuting from County of Residence to Work in Other Counties. From Kentucky Department of Commerce, 1973, Based upon the 1970 Census.

Commuting Out of Breckinridge

- to Hancock	222
- to Perry	43
- to Meade	<u>180</u>
Total	445

Commuting Out of Hancock

- to Perry	168
- to Breckinridge	28
- to Meade	<u>--</u>
Total	196

Commuting Out of Meade

- to Breckinridge	55
- to Hancock	<u>--</u>
- to Perry	<u>--</u>
Total	55

Commuting Out of Perry

- to Hancock	294
- to Breckinridge	0
- to Meade	<u>--</u>
Total	294

Table 28. Number of Employees Commuting Out of Each County to Work in Other Counties Within the Four-County Area. From Kentucky Department of Commerce, 1973, Based Upon the 1970 Census.

summarize numerical and percentage data describing these patterns (10 year old data).

Two major factors stand out in these data. First of all, most (66%) of Meade County residents commute to other counties to work. Few of them travel to other counties in the four-county area; most probably work in the Louisville area.

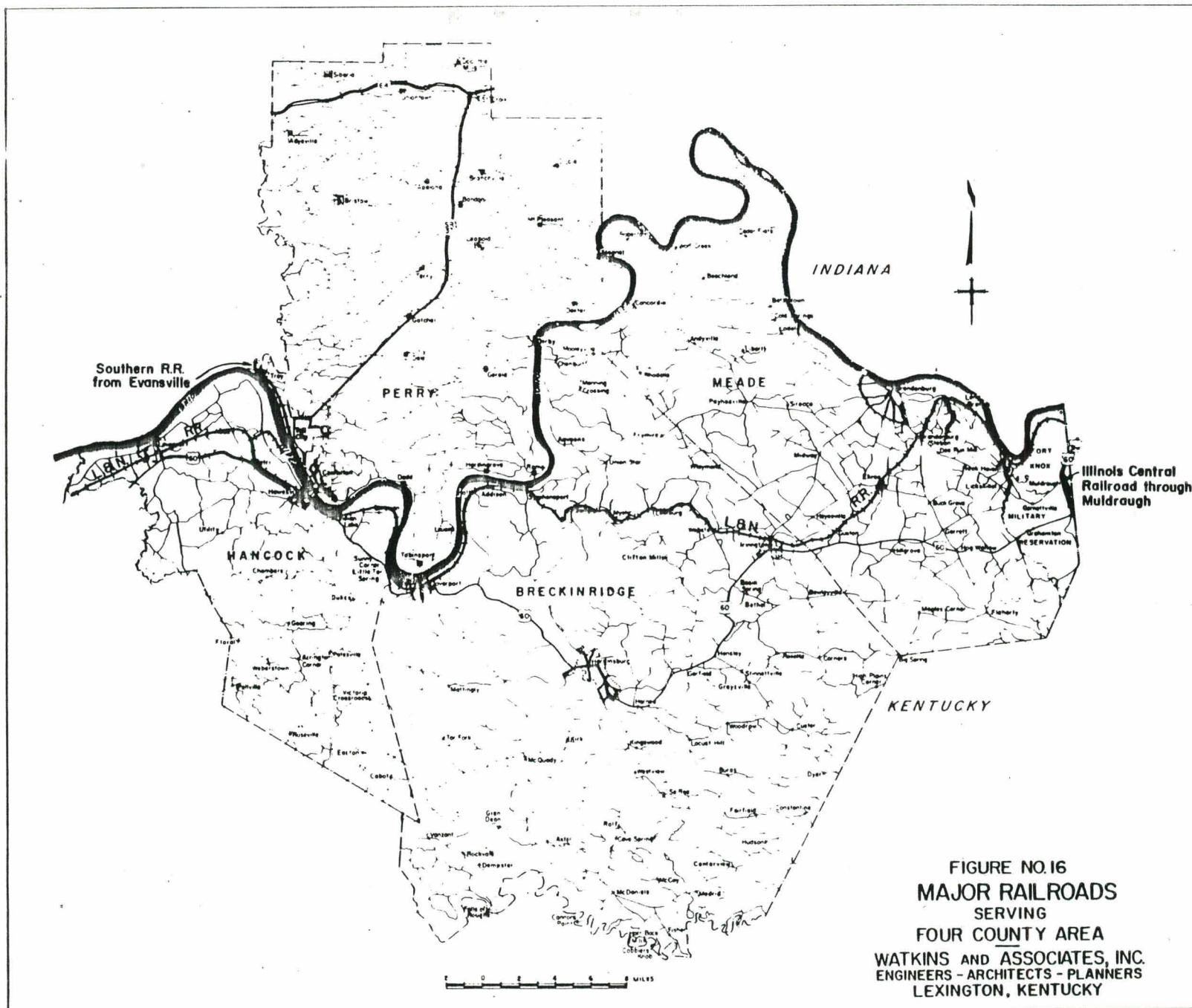
The second major factor is that Hancock and Breckinridge Counties have a large, relative imbalance in worker commuter patterns. Only 28 Hancock County residents commuted to Breckinridge County to work, whereas 222 Breckinridge residents commuted to Hancock County to work. Overall, Hancock County attracts more employees than it loses, and Breckinridge County loses more than it attracts.

The Breckinridge Project may be expected to help Breckinridge County correct this imbalance in worker commuter patterns.

Rail System

The area's only major rail line is the L and N, which penetrates the area's center from east to west, passing near Brandenburg, Irvington, Addison, Cloverport, Hawesville and Lewisport. Hardinsburg is not served by a rail connection. Part of the area is also served by the Southern Railroad, which enters the area from Evansville, Indiana and terminates at Cannelton; Tell City officials report, however, that service on this line is poor, being limited to three runs per week. The Illinois Central Railroad passes through the edge of the four-county area at Muldraugh.

Since the rail line passes through the site for the Breckinridge Project, it will service the site's needs for coal, construction equipment, and out-bound shipments of petroleum products (along with the planned barge facilities). Local officials report that about four unit trainloads of coal already pass



through each day on the L and N.

Some need for improvements have already been identified by local officials. Cloverport officials have been holding discussions with the L and N about putting in welded rail through the city limits; this would raise the train's speed, getting them through town more quickly, thereby reducing the present obstacles to police and fire vehicles. Irvington officials also express the need for downtown crossing improvements.

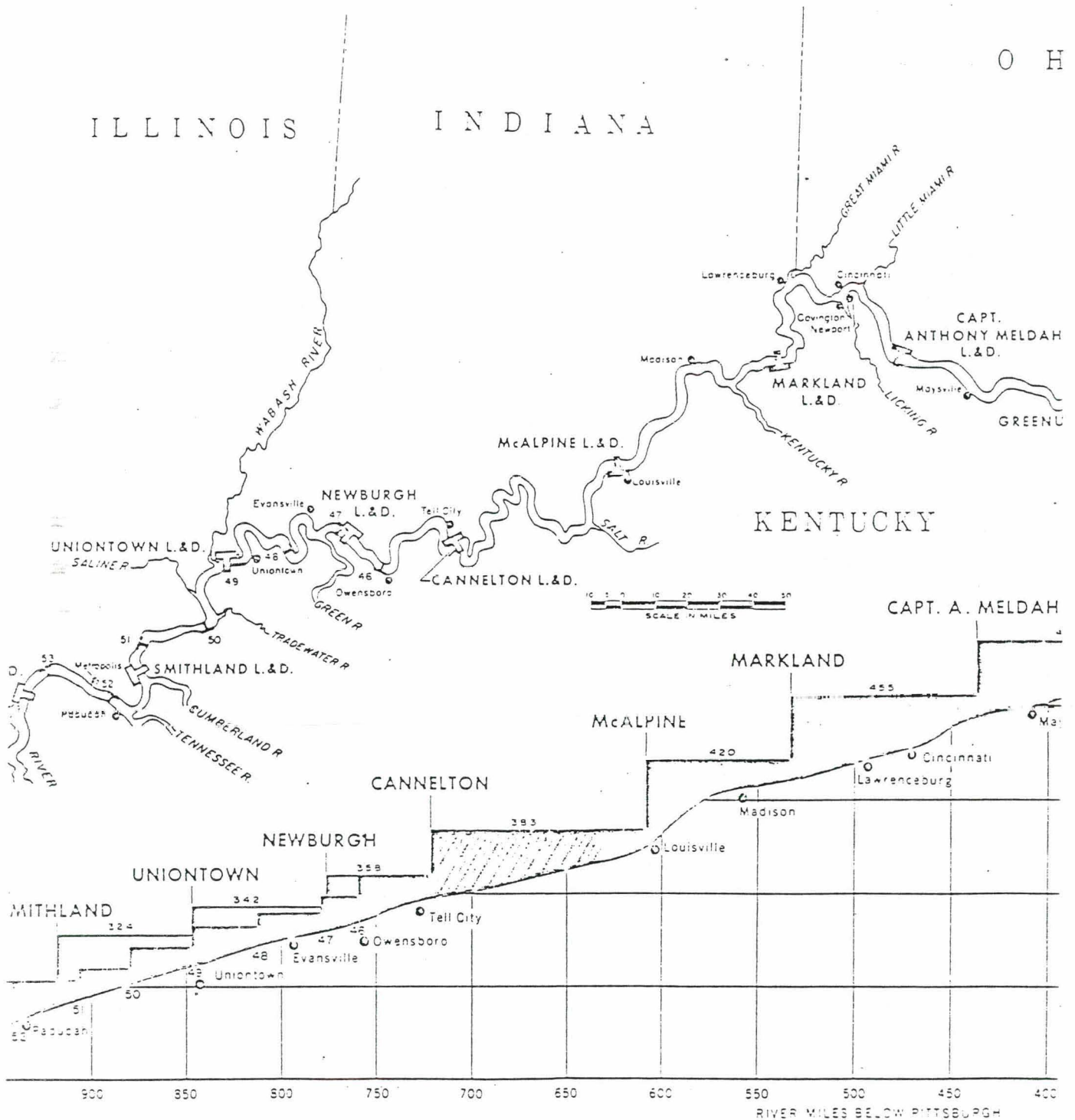
Other rail-related developments in the area may combine with the Breckinridge Project to produce future impacts. Preliminary plans have been reported by officials for a coal blending plant on the Ohio River, which would blend high and low sulfur coal and load it onto barges for shipment to utility plants; this plant may add 5 unit trains of coal per day to L and N traffic. An even larger potential for increased coal volume on the L and N is posed by other synfuel plants being developed in the Owensboro-Henderson area and the proposed Kentucky Utilities coal-burning power plant in Hancock County. Since the L and N extends westward to Owensboro and Henderson, where these plants are being developed, the potential for increased coal shipments on the L and N is significant.

Barge System

During 1979, over 177 million short tons of commodities were shipped by barge over the Ohio River system (including the Tennessee, Cumberland, Ohio and Monongahela Rivers and tributaries). Nearly 53% of that was coal and lignite, 14% was sand, gravel, and crushed rock, and another 13.5% was chemicals, gasoline and fuel oil.

The Ohio River portion of this system passes through the four-county area, providing it with an excellent rivercourse for barge shipment of goods. See Figure 17. Just east of Cannelton is the Cannelton Lock and Dam, which

Figure 17. Area Locks and Dams.



lowers the pool depth from 383 feet elevation to 358 feet. Barges can usually pass through the locks in 30-35 minutes, but the obstacle necessarily limits the volume of barge traffic the river can accomodate; during the 5-year interval from 1973-1978, the tonnage of goods shipped increased only 5.2%. More recent data from the Louisville District Corps of Engineers reveals that during the first 3 quarters of 1980, 30,584,765 tons of goods passed through the McAlpine Locks at Louisville in the direction of Cannelton.

Like the railroads, barge transportation may be expected to be substantially increased with the development of the Breckinridge Project and related coal and synfuel developments downstream.

The town of Cloverport has a port authority and is, therefore, capable of developing new barge loading facilities to serve the four-county area.

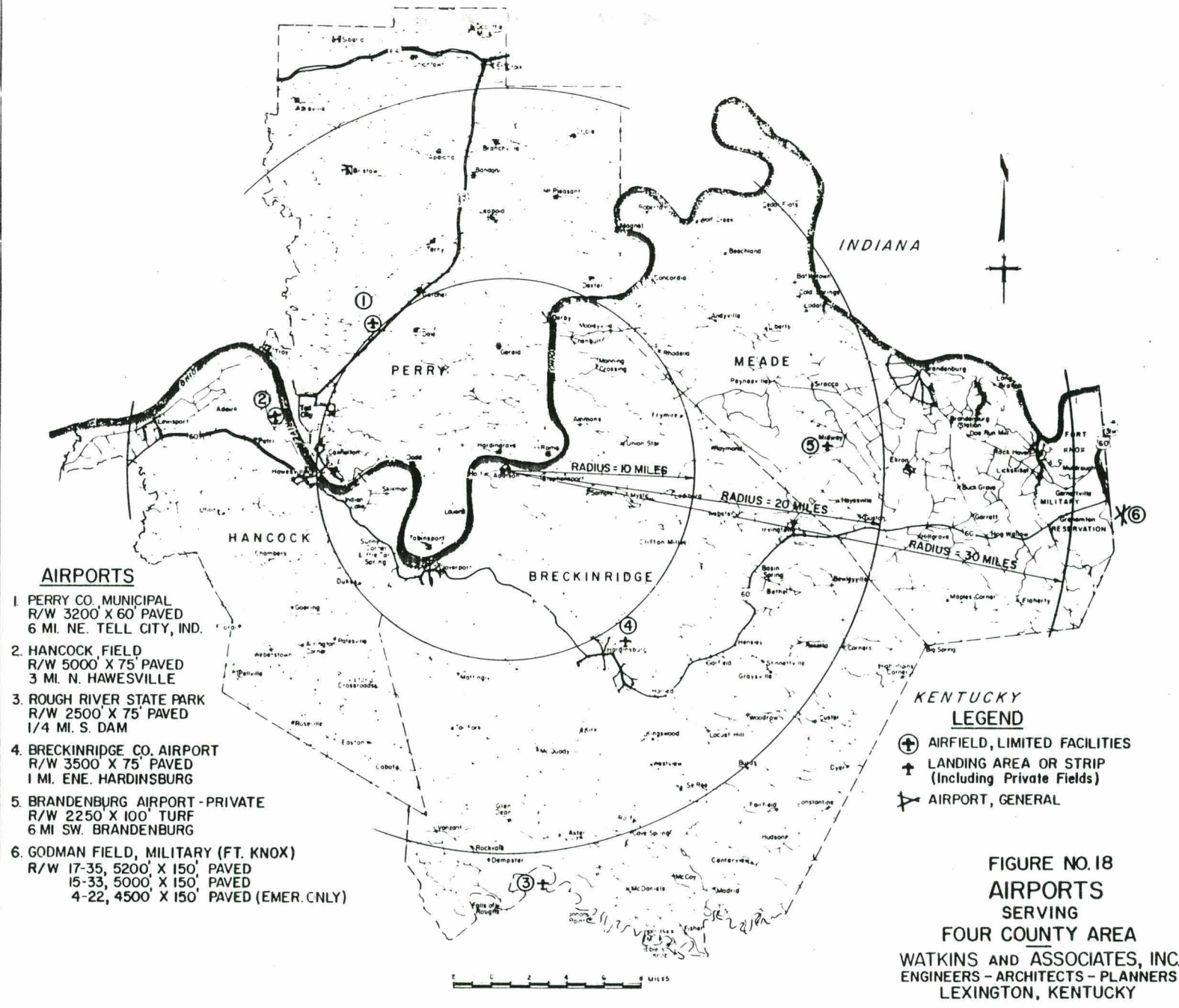
Airports

There is no general (commercial) airport in the four-county area; the nearest commercial service is at Owensboro and Louisville. The military airfield at Fort Knox (Godman Field) is just outside the Meade County boundary.

There are, however, five landing strips and limited service airfields in the area. See Figure 18.

The two airfields nearest to the Breckinridge Project site are near Hawesville (5,000 foot paved runway), and at Hardinsburg (3,500 foot paved runway). The Breckinridge County Airport at Hardinsburg has received approval from the Kentucky Airport Authority to lengthen its runway to 5,000 feet.

There are no known plans to locate additional airfields or to expand any existing airfield other than the one at Hardinsburg in the four-county area.



Schools and Education

As the Breckinridge Project develops, the population in the 4-county area may be expected to increase; construction workers, permanent employees and induced secondary job workers will, therefore, move into the area bringing with them an undetermined number of school-age and pre-school age children. These will require education or care in the area's public or private schools and day care centers. Adults may wish to enroll in classes at area colleges and vocational schools.

This section reviews the characteristics of the area's public and private schools, day care centers, colleges and vocational schools.

Public and Private Schools

Table 29 summarizes the basic status of the area's public and private schools. It lists 37 schools in 18 towns. Figure 19 shows their locations.

The schools nearest the site (10 mile radius) for the Breckinridge Project are at Milner (1-8), Cloverport (HS-12), Hardinsburg (HS-12), Hawesville (K-12), Cannelton (3-12) and Tell City (K-12). Because of their proximity to the site, these might be expected to be among the first to be impacted.

The Milner elementary school has a declining enrollment and a large surplus capacity; perhaps 130 additional students can be accommodated. The Cloverport elementary school is already saturated and cannot accommodate new

Table 29. Area Public and Private Schools

County	City	Name	Type	Grades	Year Built	Total Capacity	1980 Enrollment	Surplus Capacity	Enrollment Trend
Breckinridge	Hardinsburg	Ben Johnson Elementary	Public	1-8	1955, exp. 59, 74	240	200	40	Declining
		Breckinridge County High	Public	9-12	1965, exp. 69, 71	1,080	990	90	Declining
	Hardinsburg	Hardinsburg Elementary	Public	HS-8	1972	900	630	270	Declining
	Hardinsburg	St. Romuald Elementary	Catholic	1-8		240	220	20	Declining
		St. Romuald High School	Catholic	9-12		120	110	10	Declining
	Custer	Custer Elementary	Public	1-8	1959, exp. 1974	270	190	80	Declining
	Irvington	Irvington Elementary	Public	HS-8	1938, new one due 1981	540 now 750 1981	450	90 now 300 1981	Declining
	McQuady	McQuady Elementary	Public	1-8	1950, exp. 58, 74	240	180	60	Declining
	Milner	Milner Elementary	Public	1-8	1954, exp. 1958	240	110	130	Declining
		Frederick Fraize High	Independent	7-12			167	150	Steady
Perry	Cloverport	Wm. Natcher Elementary	Independent	HS-6			267	0	Steady
	Tell City	Tell City High	Public	9-12			844	160	Declining
	Tell City	Tell City Junior High	Public	6-8			532	160	Declining
	Tell City	Newman Elementary	Public	1-2			488	30	Declining
		St. Paul Elementary	Public	K-8			573	35	Declining
	Tell City	Franklin Grade School	Public	1-2					
	Tell City								

Table 29. Area Public and Private Schools
(Continued)

County	City	Name	Type	Grades	Year Built	Total Capacity	1980 Enrollment	Surplus Capacity	Enrollment Trend
Perry	Cannelton	Cannelton High School	Public			}	524		
	Cannelton	Meyers Grade School	Public	3-6					
	Cannelton	St. Michael's Special Hoosier							
	Tell City	Elementary	Public	K-8					
Meade	Battletown	Battletown Elementary	Public	K-6	1953 exp. 1960	210	95	115	Stable
	Brandenburg	Brandenburg Elementary	Public	1-3	1930	290	290		Slight decline
	Brandenburg	Meade County Middle School	Public	7-8	1959 exp. 1962	750	550	200	Slight decline
	Brandenburg	St. John the Apostle Elementary	Catholic	1-6			150		Slight decline
	Brandenburg	Meade County High School	Public	9-12	1959, exp. 1962	1,350	1,250	100	Slight decline
	Crossroads	Cross Road Elementary	Public	1-8	1950	120	108	12	Stable
	Ekron	Ekron Elementary	Public	K-6	1960	300	300	0	Stable
	Flaherty	Flaherty Elementary	Public	K-8	1958	420	370	50	Stable
		James R. Allen Elementary	Public	K-6	1969	420	410	10	
	Muldraugh	Muldraugh Elementary	Public	K-6	1962	360	86	274	Stable
	Payneville	Payneville Elementary	Public	K-6	1956	240	180	60	Stable

Table 29. Area Public and Private Schools
(Continued)

County	City	Name	Type	Grades	Year Built	Total Capacity	1980 Enrollment	Surplus Capacity	Enrollment Trend
Hancock	Hawesville	Hancock County High	Public	9-12	1973	600	580	20	Stable
	Hawesville	Hancock Co. Middle	Public	6-8	1960, exp. 1972	540	410	130	Stable
	Hawesville	Hawesville Elementary	Public	K-5	1927, exp. 1937	360	330	30	Declining
	Hawesville	Inmaculate Conception Elementary	Catholic	1-8			105		
	Lewisport	Lewisport Elementary	Public	K-5	1938, exp. 1975	330	260	70	Stable
	Pellville	S. Hancock Elementary	Public	K-5	1978		130		

PUBLIC SCHOOLS IN TELL CITY & CANNELTON

- ① Cannelton High School
- ② Franklin Grade School
- ③ Hoosier Heights Grade Sch. (Pvt.)
- ④ Meyers Grade School (Pvt.)
- ⑤ Newman Grade School
- ⑥ St. Michaels Grade School (Pvt.)
- ⑦ St. Pauls Grade School (Pvt.)
- ⑧ Tell City High School
- ⑨ Tell City / Troy Township Sch. Corp.

KEY TO SCHOOLS

SYM.	GRADES
▲	KG - 06
△	KG - 08
□	01 - 08
■	06 - 08
○	08 - 12
●	09 - 12
◆	HS - 06
◇	HS - 08
☆	07 - 12
★	SPEC. ED.
○	PRIVATE
●	VOC.

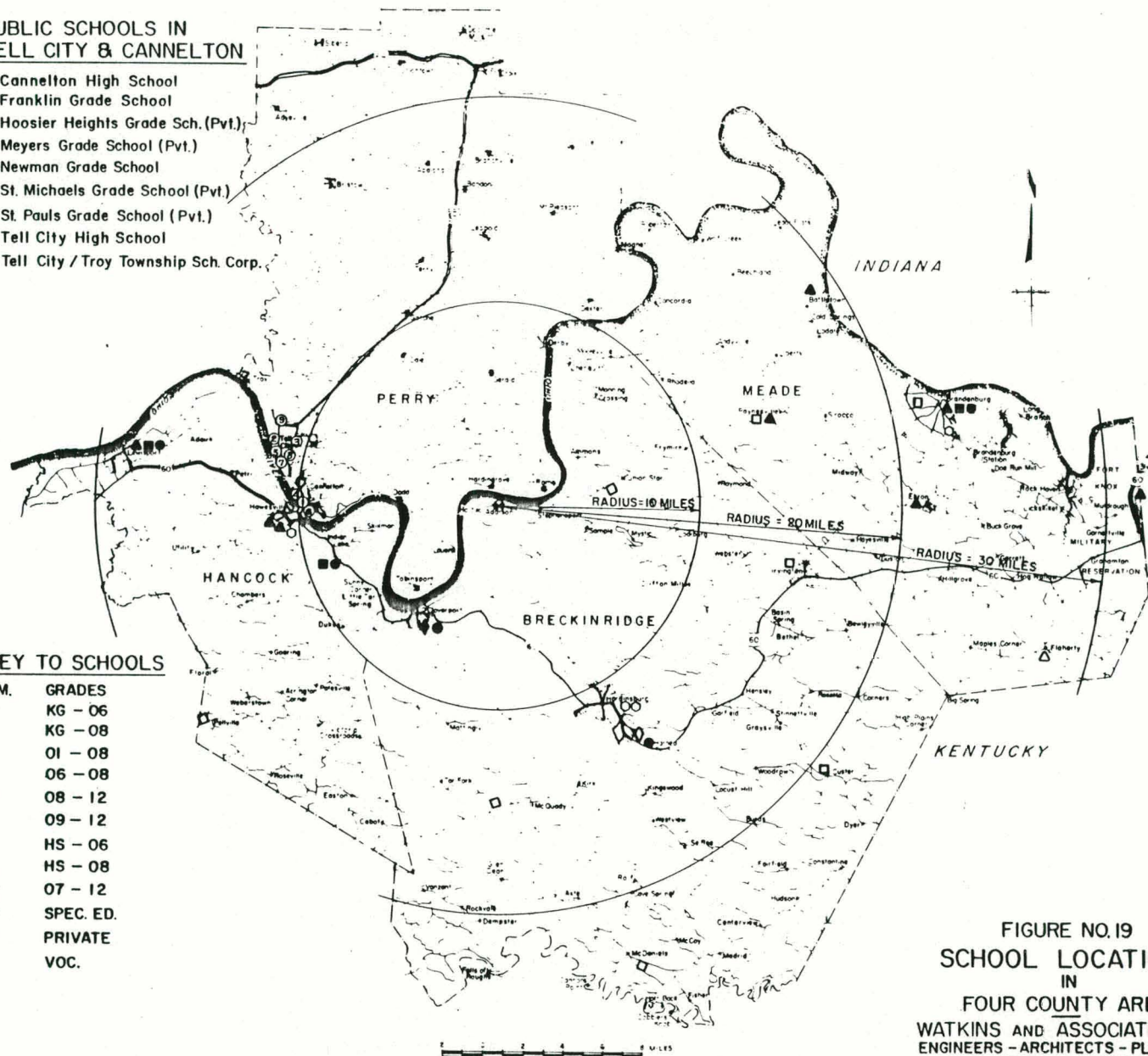


FIGURE NO.19
SCHOOL LOCATIONS
IN
FOUR COUNTY AREA
WATKINS AND ASSOCIATES, INC.
ENGINEERS - ARCHITECTS - PLANNERS
LEXINGTON, KENTUCKY

students, though the high school can accomodate perhaps 150. Hardinsburg elementary schools can take perhaps 310 more students, but the high school can incorporate only about 90; Hardinsburg's Catholic schools could perhaps take a few students. Hawesville elementary and high schools can only accomodate 30 and 20 new students, respectively, but the middle school can take 130; the Catholic school there (1-8) could perhaps take a few new students. Tell City can accomodate perhaps 160 new high school students, 160 junior high students and 65 elementary students. Cannelton can perhaps absorb a few high school students.

In summary, the nearest schools to the Breckinridge Project (10 mile radius) could accomodate 825 elementary and middle school age students (K-8) and 420 high school students (9-12). Any additional student load would have to be met either by increased local capacity or by the schools now existing at more remote locations.

Two of the area's three vocational schools are within a 10-12 mile radius: Tell City and Harned (near Hardinsburg). They could accomodate an increased student load if planned for, and have expressed an interest in providing training for personnel associated with the Breckinridge Project. The Harned School teaches carpentry, welding, automotive, machine shop, health and office courses; it could only expand if courses were taught at night and additional equipment were acquired from the state. Unfortunately, the school is now relatively crowded and yet there are few nearby jobs for the school's graduates to accept. Therefore, the Breckinridge Project could provide a much needed source of jobs for the people already being trained by the area's vocational schools. See Table 30.

No college currently exists in the 4-county area; those wanting to attend college classes must go to Owensboro, Evansville, Louisville, Elizabethtown,

Table 30. Summary of Area Vocational Schools, Colleges and Day Care Centers.

Area Vocational Schools

Name	Location	Capacity	Enrollment
Breckinridge County Area Vocational Center	Harned	207	377 (3 shifts)
Meade County Area Vocational Center	Brandenburg	179	327 (3 shifts)
Perry County Area Vocational Education Program	Tell City - Troy Township School Corporation		

Area Colleges

IV Tech - New technical college under construction in Tell City. Scheduled to be completed in March, 1981. Any class will be taught provided 10 students enroll.

Area Day Care Centers

City	Name	Capacity	Enrollment
Muldraugh Brandenburg	(none)		20 20 20
Irvington Hardinsburg	(none) Kiddie Corner	40 - exp. to 103 12	
Cloverport Hawesville	Cloverport School (none)		12
Tell City		35	20 40

Madisonville or other more remote locations. A new technical college is being constructed in Tell City, however, and is due to be completed in March, 1981. Virtually any college level technical course would be taught provided only that 10 students would enroll.

There appears to be few nearby day care centers. Those at Hardinsburg, Cloverport and Tell City are within a 10-12 mile radius, but they could accomodate only a few additional children. One center in Hardinsburg reports that it can easily expand to accomodate an additional 63 children if the demand warrants it.

Water, Sewer and Solid Waste

The growth induced by the Breckinridge Project will impact the area's water, sewer and solid waste systems in two ways. First, the location and capacity of existing systems will limit growth to specific areas since housing to accomodate the increased population will tend to gravitate toward areas having the necessary water, sewer and solid waste capacities needed. Second, the focusing of growth in those areas will tend to quickly use up the remaining capacity and accelerate the demand for new or enlarged facilities.

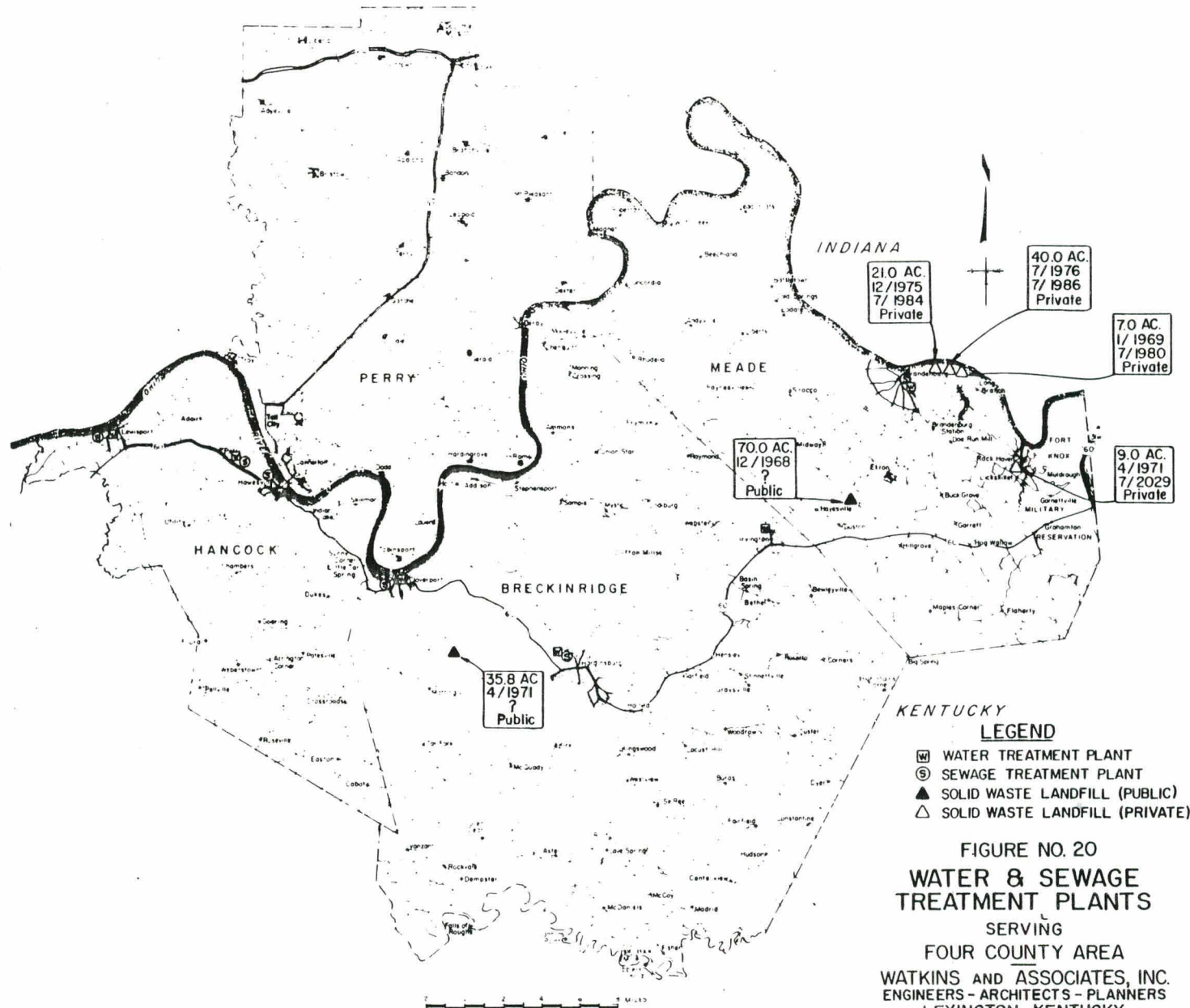
This section reviews the area's existing water, sewer and solid waste systems from the standpoint of existing capabilities and present plans for expansion. Figure 20 shows the location of the various systems, and Table 31 at the end of this section, summarizes system adequacy.

Muldraugh (Meade County)

The city of Muldraugh, being largely surrounded by Fort Knox, depends upon the army for many of its services.

Water. Muldraugh owns its own water lines, but has no natural water source, water treatment facilities or storage facilities of its own. Rather, it purchases water from Fort Knox and serves only customers who are inside the city limits.

The city considers the system adequate and reports that it has caused no problems. It would only expand the system if additional land were



purchased from the Army.

Sewer. Muldraugh also owns its own sewage collection lines, but no treatment facilities. Rather, it transmits its sewage, through two pumping stations, to the Fort Knox wastewater treatment plant. The city reports no problems with the system. No expansion would occur unless additional land were purchased from the Army.

The city charges a \$200 tap-on fee for both water and sewer service.

Solid Waste. The city used to haul its solid waste to the Fort Knox landfill, but the demand upon the landfill kept increasing as other cities in the area requested the same privilege. The Army then closed its landfill to other users, and Muldraugh then engaged the services of a private waste hauler which charges \$2.50 per month for a single family and hauls the waste to Jefferson County.

Flaherty (Meade County)

The city of Flaherty has no wastewater treatment plant but does operate a private water system. Water is pumped from two wells, chlorinated, and distributed to a limited number of customers. There is a single 300 gallon storage tank.

Ekron (Meade County)

The city of Ekron has no wastewater treatment plant but does operate a municipal water system without water meters. Water is pumped from two wells, chlorinated, and distributed to a limited number of customers. The city has 800 gallons of storage capacity.

Doe Valley (Meade County)

Doe Valley is a private resort and residential development surrounding Doe Valley Lake southeast of Brandenburg.

Water. Doe Valley has its own private water system, water being supplied from Doe Valley Lake. It also has a 180,000 gpd treatment plant.

Sewer. The development also has its own sewer system with 8-inch collector lines and a 100,000 gpd primary treatment plant.

Brandenburg (Meade County)

The city of Brandenburg has adequate water and sewer systems but is facing potential solid waste problems. These systems are described below.

Water. Brandenburg takes its water supply from three wells along the Ohio River, having a pumping capacity of 800 gpm. The water treatment plant was originally built in 1936 and the new one in 1963. Two new pressure fitters were added in 1976, having a capacity of 200 gpm each. The plant has a capacity of 580,000 gpd but is currently operating at only 300,000 gpd (52% of capacity). Elevated storage tanks provide 300,000 gallons of temporary storage.

The present water system has been reported to have problems with leakage from the old (1936) underground water lines. This has also been reported to contribute to low line pressure and, therefore, a potential problem for fire protection.

There are no immediate plans to expand the system. The system presently serves 878 water customers. The present water tap-on fee is \$40 plus costs.

Sewer. Brandenburg's sewage treatment plant has recently been upgraded to provide secondary treatment, using the rotating biological contactor process with aerobic digesters and sludge drying beds. The plant is designed to handle a year 2,000 population of 1,925 people (about 600,000 gpd); it is presently operating at 300,000 gpd, or 50% of capacity and serves 540 sewer customers.

The sewer collection system utilizes 6", 8", 10", 12", and 15" lines and one pumping station. The present sewer tap-on fee is \$150 plus costs, but may soon be increased. The combined water and sewer bill averages about \$11.75 per household each month.

Solid Waste. The county landfill is only 5 miles from Brandenburg (between Ekron and Hawesville) and began operation on a 70 acre site in December of 1968. City pick-up for disposal is presently \$2.50 per household each month.

The county's geology presents some basic problems for landfill operation. There are many sinkholes and abundant underground water. Landfills may, therefore, easily contaminate area water supplies. There is, therefore, danger that this landfill may be forced to close sometime during 1981.

The city has observed plans underway whereby Fort Knox may develop a large incinerator, but believes it questionable whether the city would be permitted to use it. Because of the critical landfill problem and the low probability of using Fort Knox disposal facilities, the city is presently considering development of a resource recovery plant. Alternately, private pick-up can presently be arranged in the county for \$4.00 per month.

Irvington (Breckinridge County)

The city of Irvington has adequate water and private solid waste service but no sewer system. Details of the systems are as follows.

Water. The Irvington water system has recently been expanded. The water treatment plant has a design capacity of 288,000 gpd, and present use is only about 100,000 gpd (35% of capacity). The system is judged by the city to be in good condition. Water is supplied from wells having an

estimated pumping capacity of 480,000 gpd, and the city has 200,000 gallons of elevated storage capacity.

The water tap-on fee is \$150, and regular use costs \$4.80 for a minimum of 2,000 gallons per month. No service is offered outside the city limits.

Sewer. Irvington does not have a sewer system. The city has applied to EPA for a system, and anticipated construction may begin in about two years.

Solid Waste. The city presently contracts with a private hauler (Fuqua Sanitation) which disposes of solid waste in Jefferson County. The service charge is \$3.50 per month per household in the city and \$5.00 in the county.

Hardinsburg (Breckinridge County)

The city of Hardinsburg has a new water system, but the sewer system and county landfill are inadequate and in the process of upgrading. Details on these systems are as follows.

Water. Hardinsburg completed construction of a new, one-million gpd water treatment plant in April of 1980. It is presently operating at about 300,000 gpd (30% of capacity) and is anticipated to be adequate for the next 20 years. The system includes 350,000 gallons of storage from two elevated tanks and one standpipe. The water tap-on fee is \$300, and the monthly charge per household is \$8.00 for a minimum of 2,000 gallons.

The water district has plans to expand the distribution system into the surrounding county (east to Garfield and south to Rough River). Plans now call for adding 21 miles of 4", 6" and 8" lines, two pumping stations and 350,000 gallons of storage capacity in two elevated tanks.

Sewer. Hardinsburg's present sewage system consists of 47,650 feet of collector lines, one pumping system with 1,250 feet of force main, and a secondary treatment (200,000 gpd trickling filter) plant, serving 700 customers.

The present system has been plagued by excessive inflow and infiltration problems. The Lincoln Trail Area Development District advises that planners closely follow the status of Hardinsburg's provisional moratorium on new sewer hookups. The Health Department, in 1974, placed a moratorium on new hookups because of encroachment on effluent BOD standards. The moratorium was eased in during mid-1979 to permit a limited number (about 30) of new hookups. A few additions continue to be allowed (from single family units), but housing development is clearly hindered at the present time. EPA has, therefore, recently approved expanding the plant to a capacity of 730,000 gpd. They are receiving an 83% grant in excess of \$2 million for the project. The new plant will feature rotating biological contactor treatment with anerobic digesters and sludge drying beds. Two pumping stations, 8000 linear feet of 18" and 24" interceptor sewers and 5,200 linear feet of 8" force main are also to be added.

The project is secheduled to be bid in the Fall of 1981, with construction completed in 1982.

Solid Waste. The county landfill is located west of Hardinsburg near Mattingly. The 36 acre site was established in 1971 and now has only a year's capacity remaining. Work is now underway to locate a new, centrally-located county landfill. City pickup presently costs \$3.00 per month and county pickup is \$3.50 per month.

Kingswood; Westview (Breckinridge County)

The towns of Kingswood and Westview, southeast of Hardinsburg, are now served by the Hardinsburg water system.

Cloverport (Breckinridge County)

The City of Cloverport has a water system that is adequate to substandard, an adequate sewage system, and use of the county landfill. The water and sewer systems are described below.

Water. Cloverport has an adequate water treatment plant but an inadequate distribution system. Water comes from three wells near the Ohio River. A virtually unlimited water supply is, therefore, available but only one of the wells is pumped and the other two pump systems are reported to be in need of repair or replacement.

The treatment plant operates at 500 gpm which is only about 50% of capacity. It utilizes activated charcoal and chlorination treatment processes and is adequate at present.

The distribution system consists of 57,000 linear feet of 3/4" galvanized iron and 6" unlined cast iron distribution mains, which are inadequate. This system serves 600 water meters.

The city plans, and has applied to FMHA, to upgrade the system, replacing the entire distribution system with 4" to 10" PVC pipe and adding a demineralization process to the treatment plant.

The current storage capacity is 75,000 gallons (elevated tanks), plus a nominal amount at the plant's clearwell. The water system expansion is planned to include an additional 150,000 gallon elevated tank.

The present water tap-on fee is \$150, and the monthly water fee is \$4.05 per family for the first 2,000 gallons.

Sewer. The Cloverport wastewater treatment plant was constructed in 1963-1964 and upgraded in 1974. It has a capacity of 200,000 gpd but is operating at only 50-60% of capacity. The plant features the activated sludge treatment process and sludge drying beds. The collection system

consists of 35,000 linear feet of 8" vitrified clay sewer lines, and three pumping stations with 4" - 6" force mains.

No plant expansion has been planned, but the city has applied to FMHA for a \$1.6 million combined water/sewer loan to construct the above described water system collection lines (\$750,000) plus 10,000 linear feet of sewer collection lines. The city reports that this project is high on FMHA's priority list, but has no projected date for project initiation.

The current sewer tap-on fee is \$150, and the monthly charge is \$1.65 per 1000 gallons of sewage plus a 3% utility tax (also supports the schools). The minimum charge for both water and sewer is \$7.47 per month.

Solid Waste. The city collects solid waste for \$3.00 per month (the county charge is \$4.00 per month) and takes it to the county landfill west of Hardinsburg (see "Hardinsburg" section for discussion of landfill problems).

Hawesville (Hancock County)

The City of Hawesville has adequate water, sewer and solid waste facilities. These are described below.

Water. Hawesville's water treatment plant was built in the 1960's. It has a capacity of 288,000 gpd and currently operates at about 105,000 gpd (37% of capacity). It uses treatment with lime and alum, followed by filtration and chlorination.

Water is supplied from wells fed by an underground river, pumped at the rate of 200 gpm. The system has a storage capacity of 223,000 gallons. Distribution is mostly within the city limits except for one line extending out of town.

No problems have been reported with the water system, though city

officials note that an increase in population would be helpful in spreading costs over a larger number of customers.

The current water tap-on fee is \$250, and the monthly charge is \$5 for the first 1,500 gallons per day, and is graduated at higher use rates.

Sewer. The Hawesville sewage treatment plant was built in 1971 and has a capacity of 250,000 gpd. It is presently operating at about 120,000 gpd (48% of capacity). The plant utilizes the contact stabilization treatment process.

The plant apparently provides adequate treatment. The current sewer tap-on fee is \$250; the monthly charge for sewer service is 140% of the water report.

Solid Waste. The American Olean Tile Co. at Lewisport operates a large landfill for the county, which Hawesville uses for disposal of solid waste. The city charge for pick-up is \$4.00 per month.

Lewisport (Hancock County)

The City of Lewisport is somewhat unique in that it owns its own telephone system and natural gas system. Its water, sewer and solid waste systems are adequate and are described below.

Water. The Lewisport water treatment plant has a capacity of 288,000 gpd and is currently operating at 120,000 gpd (42% of capacity). The process utilizes lime and alum treatment, followed by filtration and chlorination. Water is taken from wells fed by an underground river, and pumped out at the rate of 200 gpm.

The city has 110,000 gallons of storage capacity. Water service is presently offered only to customers within the city limits. Present plans, however, call for constructing 17 miles of new water line into the surrounding

county, and doubling the capacity of the treatment plant.

The present water tap-on fee is \$100, and the monthly charge is \$4.50 for the first 2,000 gallons.

Sewer. The Lewisport wastewater treatment plant was constructed in 1970. It has a capacity of 250,000 gpd and presently operates at 90,000 gpd (36% of capacity). It utilizes a contact stabilization-type treatment process.

There are presently some tentative plans to add some additional sewer lines. The present sewer tap-on fee is \$100 and the monthly sewer charge is 80% of the water bill.

Solid Waste. The American Olean Tile Co. operates a county landfill on their own property and Lewisport uses this. There is reported to be a large reserve capacity. The current monthly rate for twice-weekly pick-up is \$5.00 per household.

Tell City (Perry County)

Tell City has adequate water and solid waste systems, but an overloaded sewer system. These are described below.

Water. The source of Tell City water is a system of deep wells near the Ohio River, reputed by local officials to be drawing from the largest underground water supply in the United States. It is reported to be of adequate quality.

The water tap-on fee is \$150, and the monthly use charge is \$2.00 for the first 3,300 gallons. There are no plans for expansion of the water system.

Sewer. Local officials report that the sewer system and treatment plant is saturated. They have applied for an 85% loan to add a secondary treatment plant which would provide 50% more capacity than presently needed.

The sewer tap-on fee is now \$168.

Solid Waste. Local officials report that a new county landfill is operating, having a 5-year capacity. Tell City has a municipal solid waste system offering free trash pick-up.

Cannelton (Perry County)

No information is yet available.

Other Perry County Cities

No information is yet available.

Summary Assessment

The greatest deficiency in the area seems to be in capacity to handle solid waste. Hancock and Perry Counties appear to have a capacity to accomodate growth, but Breckinridge County and Meade County have a pressing need for new landfill and for resource recovery facilities.

Most area water systems are adequate for the present, except for Kingswood, Westview and a weak distribution system at Cloverport. If future population growth occurs, Flaherty and Ekron will likely have inadequate water systems, and Brandenburg's distribution system may be too weak to accomodate the increased load.

Several communities have no sewer system, including Flaherty, Ekron Irvington, Kingswood and Westview; this will reduce their growth potential. The cities which have sewer systems appear adequate, both for the present and to accomodate future growth.

Table 31 summarizes the estimated adequacy of area water, sewer and solid waste systems.

City	County	Water		Sewer		Solid Waste	
		Present	Future	Present	Future	Present	Future
Muldraugh	Meade	A	A	A	A	A	Q
Flaherty	Meade	A	I	None	--	Q	I
Ekron	Meade	A	I	None	--	Q	I
Doe Valley	Meade	A	A	A	A	Q	I
Brandenburg	Meade	A	Q	A	A	Q	I
Irvington	Breckinridge	A	A	None	--	Q	I
Hardinsburg	Breckinridge	A	A	Q*	A	Q	Q
Kingswood	Breckinridge	A	A	None	--	Q	Q
Westview	Breckinridge	A	A	None	--	Q	Q
Cloverport	Breckinridge	Q	A	A	A	Q	Q
Hawesville	Hancock	A	A	A	A	A	A
Lewisport	Hancock	A	A	A	A	A	A
Tell City	Perry	A	A	A	A	A	A
Cannelton	Perry						

*Note: The Lincoln Trail Area Development District advises that planners closely follow the status of Hardinsburg's provisional moratorium on new sewer hookups. The Health Department, in 1974, placed a moratorium on new hookups because of encroachment on effluent BOD standards. The moratorium was eased in during mid-1979 to permit a limited number (about 30) of new hookups. A few additions continue to be allowed (from single family units), but housing development is clearly hindered at the present time.

Table 31. Estimated Adequacy of Area Water, Sewer and Solid Waste Systems at the Present, and for Handling Future Growth. A = Adequate, Q = Questionable, I = Inadequate.

Public Protection (Police, Fire Departments)

Whenever an area's population increases quickly and/or a large contingency of temporary or transient people move in, the potential increases for social disturbances of all kinds. Therefore, the capacities of the area's public protection sector become more important. This section reviews the area's experience with crime, accidents, and suicide, and the capacity of area police and fire departments.

Social Disturbances

For purposes of this review, the term "social disturbances" will include crime (murder, rape, assault), suicides and accidents. Table 32 summarizes some recent data on the occurrence of these events in the four-county area.

Discussion with local leaders in the 8 largest towns revealed the general impression that crime and other social disturbances were quite low and not considered a problem.

Police Departments

Tables 33 and 34 summarize the personnel, equipment and condition of police protection in the 4 counties and 8 major cities in the area, as assessed by local officials. In general, most of the area officials feel their present police departments are adequate for the present, based upon a standard of one officer per 1,000 population, and could be easily expanded

	Breckinridge	Hancock	Meade	Perry
Number of highway accidents, 1977-78	454	161	621	*
% of these which are fatal or injurious	22%	29%	29%	*
Suicide rate, 1978, per 100,000 population	12.4	13.5	15.1	*
Accidental death rate, 1978 per 100,000 population	43.5	54.1	30.2	*
Number of murders, 1978	1	0	0	*
Number of forcible rapes, 1978	3	0	6	*
Number of assaults, 1978	22	15	15	*

Table 32. Recent Statistics on Various Social Disturbances in the Four County Area. Compiled by the University of Louisville's Urban Studies Center.

*Data not available at the present time.

	Breckinridge	Hancock	Meade	Perry
State Troopers Assigned to County	3	2 troopers 1 detective	3 troopers 1 detective	3 troopers 1 detective
Sheriff	1	1	1	*
Number of Deputy Sheriffs	1 full time 2 part time	1 full time 4 part time	1	*
Number of Sheriff Department Vehicles	2	5	*	*
County Rescue Squad	2	*	*	3 vehicles

Table 33. Current Staff and Equipment in the County Sheriff Departments in the Four-County Area. Based on Interviews with Local Officials, October, 1980.

* Data could not be confirmed at time study was completed.

	Muldraugh	Brandenburg	Irvington	Hardinsburg	Cloverport	Hawesville	Lewisport	Tell City
Chief of Police	1	1	1	1	1	1	1	1
Deputies or Patrolmen	1	1 full time 3 part time	1	2	1 full time 2 part time	2	1	9
Assistants or Voluntary Auxilliary					5			16
Vehicles	1		1	3	1	1	1	3
Present problems; needs	Adequate	Shorthanded	Good Condition	Funds low; shorthanded	Good Condition	Good Condition	Good; need extra vehicle	Good Condition
Capacity to handle increased pop.	Adequate; Expand if Necessary	Would need to expand	Adequate; Expand if Necessary	Would defi- nitely be strained	Could use more money	need training expect drug problem	Adequate; Expand if Necessary	Adequate; Expand if Necessary

Table 34. Current Staff and Equipment in the City Police Departments. Based upon Interviews with Local Officials, October, 1980.

if necessary to cope with an increased population, though all concede funding is tight. Brandenburg reports that the county Sheriff's Department is understaffed, and Hardinsburg reports that city-county police protection is already strained and would definitely need expansion if the population increases.

Fire Departments

Table 35 summarizes the personnel, equipment and condition of area fire departments. In general, local officials consider their present status good, but expandable if necessary. Potential needs include more county hydrants in Hancock County, newer fire vehicles and improved water system pressure in Brandenburg, and both vehicles and personnel for Hardinsburg.

	Muldraugh	Brandenburg	Irvington	Hardinsburg	Cloverport	Hawesville	Lewisport	Tell City
Equipment:								
Pumpers	500 gpm	500,750 gpm	500,750 gpm	500,750 gpm	500,750 gpm	500,700 gpm	250,500, 750 gpm	3
Rural Tank Trucks		1	1	2	1			2
Rescue					1			
Personnel								
Full Time	18	22	20	17	26	18	20	2
Volunteer					15		15	20
Reserves								
Water lines, hydrants		Pressure low				Need more county hydrants		
Problems - needs	Adequate	Need newer equipment	Adequate now	Capacity now Strained	Good Condition	Good Condition	Good Condition	Good Condition
Capacity to Handle Increased Population	Adequate; city can't expand	Adequate; expand if necessary	Some Expan- sion would be necessary	Would need to expand & new vehicles	Adequate; even if town grows	Adequate; expand if necessary	Adequate; expand if necessary	Adequate; expand if necessary

Table 35. Current Staff, Equipment, and Condition of Area Fire Departments. Based Upon Interviews with Local Officials and Letter from Kentucky Division of Fire Prevention.

Note: In addition to the above fire departments, there are departments in rural areas as follows:

Ekron	Old 500 gpm pumper	15 volunteers
Meade County	750 gpm, 1200 gal. tanker	18 volunteers
Flaherty	Two - 500 gpm pumpers	16 volunteers
Wolf Creek	6X6 Army tanker, 1000 gal.	22 volunteers
Harned	750 gpm pumper; 1947 Mack truck	26 volunteers
McQuady	750 gpm pumper, 1946 Mack truck	20 volunteers
Webster	250 gpm pumper, 1200 gal. tanker	?

Housing

Housing is one of the most important of the socio-economic factors related to Breckinridge Project development because of the great number of both permanent and temporary construction workers anticipated. This section reviews the current status of housing in the four-county impact area, particularly its demand, availability, cost and programs for housing assistance.

A parallel study of housing, restricted to Breckinridge County, is being conducted by the Lincoln Trail Area Development District, headquartered in Elizabethtown. The reader should also see this study when available.

Overview of Housing Trends in Kentucky

The latest definitive study of housing in the State of Kentucky is the 1979 Housing Report for Kentucky, published by the University of Louisville's Urban Studies Center. It reveals the following housing trends in the state:

- 1) The demand for housing throughout Kentucky continues to grow strongly, partly because a large group of young households is now entering the housing market and partly because housing expense is forcing use of small homes so that a larger number of homes is necessary to house the same number of people.
- 2) At the same time, however, the production of fixed housing units has dropped, due primarily to rapidly increasing construction costs and interest rates. The result is a substantial housing shortage.

- 3) Because of the rapidly accelerating need for affordable housing, mobile homes are becoming increasingly important in meeting the demand. Averaged across the state, 15% of the new production in housing is for mobile homes, and in some areas of the state, about half of new housing units are mobile homes.
- 4) While the personal income of Kentuckians is increasing, the price of housing is increasing twice as much, driving more and more couples out of the market. From 1970-1978, the average price of a house in Kentucky jumped 126% (from \$25,000 to \$56,600), an increase of 18% coming in 1978 alone. The average price of an existing house sold jumped 133% (from \$14,600 to \$31,700).
- 5) Three major forms of housing assistance are available to Kentuckians.
 - a) Public housing. This continues to be the major form of assistance to Kentucky citizens.
 - b) HUD "Section 8" low-income rental subsidy payments to tenants of privately owned housing, introduced in 1976. This form of assistance is now growing. .
 - c) Mortgages of below market rate interest for low-income families to purchase a single family residence, provided by the Kentucky Housing Corporation (KHC).

Area Housing Production

Production of housing in the four-county impact area has been very low because of excessive economic constraints and has been far below demand.

Thus, it follows the trend set all over the state.

One indication of building activities is the number of plumbing permits issued. Permit data in the four-county area for the 1975-1979 period are shown in Table 36. Almost 4 times as many single family residences were permitted as multi-family ones, but the total is still very small for a 5-year period.

When plumbing permits, building permits and historical building trends are considered, along with economic information from the National Association of Home Builders, a model can be developed to estimate the number of recent housing starts in a county. Table 37 gives the estimates from such a model developed by the University of Louisville's Urban Studies Center. Table 43A provides another view of Breckinridge County growth.

Considering these data together, it is clear that construction of single family housing is increasing, but the total numbers are low compared to the population, that the construction of multi-family housing in the area is volatile and very low.

Local officials were questioned about new subdivisions being planned which are not yet underway. Several have existing subdivisions with available lots (discussed in a later section), but only three cities reported plans for future development: Irvington (25 lots), Lewisport (115 lots), and Tell City (350 lots).

Housing Availability

The previous section reported data which were indicative of the rate of production of new housing. The present section reports data on the number of existing units, those which are vacant but available. The overall picture one gains is that the limited production of new housing has not kept pace with the large and growing demand for housing, the result being

Type	Years	Number of Plumbing Permits Issued			
		Breckinridge	Hancock	Meade	Perry
Single Family	1975-78	270	114	373	475
	1979	78	30	88	65
	Total, 75-79	348	144	461	540
Multi-Family	1975-78	23	6	138	117
	1979	2	68	16	50
	Total, 75-79	25	74	154	167
Total	1975-1979	373	218	615	707

Table 36. Number of Plumbing Permits Issued in the Four-County Area from 1975-1979. Data compiled by the Urban Studies Center.

Type	Years	Estimated Number of Housing Starts			
		Breckinridge	Hancock	Meade	Perry
Single Family	1970-74	452	188	618	*
	1975	57	20	91	*
	1976	72	33	93	*
	1977	91	44	128	*
	1978	122	48	153	*
	Total, 70-78	794	513	1083	*
	1979	98	37	109	65
Multi-Family	1970-74	41	8	243	*
	1975	4	0	27	*
	1976	4	4	6	*
	1977	4	0	78	*
	1978	8	0	7	*
	Total, 70-78	61	12	361	*
	1979	0	54	13	*
Total	1970-1978	855	525	1444	

Table 37. Estimate, According to a Model Developed by the Urban Studies Center, of the Number of Housing Starts in the Four-County Area from 1970-1978.

*Data unavailable at the present time.

an appreciable housing shortage in the four county area.

Inventory of Present Homes. Tables 38 and 39 show the number of housing units now existing in the four county area, and how that compares with population. Recent years have seen a steady decline in the number of persons living in each household.

Table 40 shows the recent number (1978) of mobile homes in the four county area and how that has changed since 1970. Like much of the rest of Kentucky, mobile homes have clearly provided a substantial portion of new housing units, primarily because prices and interest rates are higher for home construction. As shown by Table 41, on the order of 1/3 of new housing units developed from 1970-1978 were mobile homes.

The trend in mobile homes use varies sharply between the counties of the impact area. The number of mobile homes in Hancock County actually decreased between 1970 and 1978, probably a reflection of its high per capita income and the availability of jobs in the county's heavy industry. By contrast, the number of mobile homes in Breckinridge County, during the same interval, nearly doubled, and the number of trailers in Meade County nearly tripled.

Table 40 reveals one additional factor of interest; there are many more mobile homes than there are lots in mobile home parks. This, perhaps, indicates that most mobile homes are individual units placed on widely spaced locations, likely as second homes on farms.

Table 42 shows how 1,761 mobile homes are distributed throughout one county (Breckinridge). Most (46.1%) are individual units scattered throughout the county. A large portion (33.6%) are oriented toward recreation, around Rough River Lake. Only 357 units (20.3%) are located in the towns of Hardinsburg, Cloverport and Irvington.

	Breckinridge	Hancock	Meade	Perry
Population	16,862	7,710	22,856	19,211
Total Housing Units	7,155	2,800	7,652	7,329
Persons per Unit	2.36	2.75	2.99	2.62

Table 38. 1980 Total Population and Number of Housing Units, 1980 Preliminary Results, U. S. Bureau of the Census. The "Persons Per Unit" Average Includes Vacant Units, Seasonal, and Migratory Population.

	Breckinridge	Hancock	Meade	Perry
Single Family Units	5,574	2,173	4,819	5,931
Multi-Family Units	930*	627	2,818	1,391
Seasonal, Migratory	651	0	15	7
Total Housing Units	7,155	2,800	7,652	7,329

Table 39. 1980 Inventory of Housing Units, Preliminary Results, U. S. Bureau of the Census. Estimate of the Urban Studies Center.

* The Lincoln Trail Area Development District has underway, as of this writing, a housing study, preliminary results of which suggest there may be significantly fewer multi-family units in Breckinridge County. These data, therefore, are subject to verification.

Housing Factor	Years	Number			
		Breckinridge	Hancock	Meade	Perry
Mobile Homes	1970	569	369	476	*
	1978	909	355	1205	*
Mobile Home Park Spaces	1978	283	266	418	*

Table 40. Estimate of the Number of Mobile Homes and Mobile Home Park Spaces in the Four-County Area, from 1970-1978.

*Data Unavailable at the present time.

	Breckinridge	Hancock	Meade	Perry
Percent	28%	0%	33%	*

Table 41. The percentage of Housing Unit Additions, from 1970-1978, which were Mobile Homes.

*Data unavailable at the present time.

Setting	Location	Number of Trailers
Individual Trailers	Throughout rural area of county	813
37 Lake Lots and Camp Sites	Rough River Lake	554
3 Trailer Courts	Rough River Lake	37
3 Trailer Courts	Hardinsburg	161
2 Trailer Courts	Cloverport	104
3 Trailer Courts	Irvington	92
	Total	1,761

Table 42. Distribution of Mobile Homes Located in Breckinridge County, Provided by the County Property Valuation Office on October 10, 1980.

Home Sales. Table 43 shows the number of existing homes and plotted lots sold in the four-county area from 1970-1978 (these data may be incomplete). While the estimates are probably low, they nevertheless show that few properties have been changing hands, probably due to the high purchase and interest costs for homes and lots.

The current availability of homes and apartments was recently estimated by local officials in the 8 major area cities. Table 44 shows the results. The general impression given was that a limited amount of housing is available but that it remains on the market for perhaps 6 months before being sold because of high prices and interest. Based upon these estimates, Tell City could accomodate about 400, and Lewisport, Hawesville and Cloverport could together accomodate about 52 home buyers and 100 renters. The other towns apparently have very little housing available. Cloverport has additionally been approved for 48 units of "Section 8" HUD housing for the elderly (43 for elderly, 5 for handicapped); this should "free up" other homes for sale.

Vacancy Rates. Local officials estimate, as also shown in Table 44 that the housing market is very tight with few units becoming available or affordable compared to the desire for housing. Possible exceptions are at Lewisport, where past overbuilding in anticipation of growth has provided several available units, and Tell City where high unemployment and high prices and interest have made housing available but unaffordable.

Subdivisions. As shown in Table 45, local officials have also estimated that appreciable capacity is underway to accomodate new building because of subdivisions now having vacant lots, opening or planned. An estimated 1,267 new homes could be built on these present or future lots.

Trailer Spaces Available. Table 46 lists the trailer court spaces

	Breckinridge	Hancock	Meade	Perry
Average Annual Sales 1970-1978	126	40	97	*
Number of Properties Sold in 1978	156	53	151	*

Table 43. Housing Sales in the Four-County Area from 1970-1978, as Reported by the Kentucky Department of Revenue. Includes Existing Homes and Lots, but not New Construction or Mobile Homes. Figures are Probably Low.

*Data unavailable at the present time.

Date of Estimate	Number of RECC Customers	Increase Over Previous Year
June 30, 1970	4,952	--
June 30, 1971	5,128	176
June 30, 1972	5,950	822
June 30, 1973	6,521	571
Dec. 31, 1974	6,636	115
Dec. 31, 1975	6,848	212
Dec. 31, 1976	7,094	246
Dec. 31, 1977	7,395	301
Dec. 31, 1978	7,496	101
Dec. 31, 1979	7,922	426

Table 43A. Growth in Estimated Number of Residential RECC Customers in Breckinridge County, 1970-1979.
Source: Meade County RECC, Data Provided by Lincoln Trail Area Development District.

City	Estimated Vacancy Rate	Estimated Number of Housing Units Available - October, 1980
Muldraugh	"Seasonal; some winter vacancy"	"a few" apartment units
Brandenburg	"Very low vacancy"	"none" available
Irvington	"low"	"a few" homes available
Hardinsburg	"everything full"	more homes available than buyers; no apartments available.
Cloverport	"very low"	10 homes for sale; 15-20 rental units
Hawesville	"very tight"	7 new homes for sale; 35 others in county
Lewisport	"high vacancy rate"	35 homes for sale; 45 apartments for rent
Tell City	"Housing is available"	350 homes for sale; 50 apartment units available

Table 44. Approximate Availability of Housing for Rent or Sale during October, 1980 as estimated by Local Officials during Interviews.

Note: More Complete Estimates for Breckinridge County were developed by the Lincoln Trail Area Development District during a "Bankers and Realtors Meeting" on December 3, 1980. Participants' Estimates of Vacancy Rates were as follows: Cloverport, 10-15%; Hardinsburg, 2-3%; County-Wide, 5%. Complete Results Submitted Separately.

Town	Subdivision Lots Available
Muldraugh	None
Brandenburg	One existing has 40 acres, only 10 homes on it; one new one, 160 acres now being plotted
Irvington	One planned, to have 25 lots
Hardinsburg	A new one already full; three others now under construction, having total of 500 lots available
Cloverport	One new one has 7 lots available
Hawesville	One existing one has 25 lots available; two existing ones have 10 lots available in each
Lewisport	One planned, to have 150 lots
Tell City	One planned, to have 350 lots

Table 45 Approximate Present and Planned Availability of Subdivision Lots in the 8 Major Cities, as Reported by Local Officials during Interviews, October, 1980

City	Estimated Number of Trailer Spaces Available
Muldraugh	Three licensed courts, 50 lots available.
Brandenburg	None in town; one court at Ekron(4 miles away).
Irvington	Two courts, on water and septic systems, are full.
Hardinsburg	One court downtown is full. Second one nearly filled, but could expand by 150 units (on water and sewer). See note below.
Cloverport	One owned by city. On water and sewer. Capacity for 54 trailers, but only 3 spaces available; could expand by 15-20 spaces.
Hawesville	Snyder's Court is full.
Lewisport	Two courts, total of 25 spaces available. Both on water; one on sewer, one on package plant.
Tell City	All are full; no new ones permitted until city sewer problems are corrected.

Table 46. Approximate Availability of Spaces in Trailer Courts in the 8 Major Cities, as Estimated by Local Officials during Interviews, October, 1980.

Note: One developer has announced plans to locate a residential area having both single family homes and trailers for 700 families at the intersection of Highways 144 and 259, about 6 miles northeast of the Breckinridge Project site. The developer needs, however, a water line which is not yet approved.

See also the note following Table 31 (Chapter on "Water, Sewer and Solid Waste") regarding the provisional moratorium on sewer hookups in Hardinsburg.

estimated by local officials to be available. A total of only 78 lots are apparently available, though 170 additional lots could be provided by expansion at present locations. The large, proposed development near the Breckinridge Project site is apparently still somewhat speculative and contingent upon securing necessary water and approvals.

Area Economic Factors

While the previous section indicated that some existing housing is available and a limited amount of new housing is being constructed, economic factors are hampering its availability and the acceleration of its development. This section reviews recent prices and the rate of price increases, and the extent of government programs to assist lower income groups in securing housing.

Cost. It is the common experience of today's American that prices for homes, and indeed for everything, are high and rapidly becoming higher; and the same goes for interest rates.

One difficulty for residents of the four-county area is that housing prices have increased faster than personal income. Table 47 shows the statistics for the four-county area. Per capita income has increased faster than housing prices in Hancock County, nearly kept pace in Breckinridge County, and has been far below housing cost increases in Meade County. The distribution of 1979 housing prices in the four-county area is shown in Table 48.

Housing Assistance. There has not been a great deal of activity with federal or state assisted housing for low-income families in the four-county area. Table 49 summarizes some of the recent activity.

Economic Factor	Hancock	Breckinridge	Meade	Perry
Increase in Per-Capita Income, 1969-1977	152.2%	90.1%	81.2%	*
Increase in Average Price of an Existing SF Home, 1970-1978	124.4%	94.4%	149.2%	*
Average Price of an existing SF Home:				
1970	\$10,627	\$ 8,609	\$ 9,596	*
1978	\$23,800	16,700	23,900	*
1979	\$30,700	21,200	30,300	*

Table 47. Relative Changes in Housing Prices and Personal Income in the Four-County Area During Recent Years. Data Compiled by the University of Louisville's Urban Studies Center.

*Data not available at the present time.

Note: The 1981 Edition of "Kentucky Economic Statistics" (Department of Commerce) has just been Published. It Contains Per-Capita Income and other Economic Data for 1978 (Lincoln Trail ADD).

Price Range	Percent of Residential Sales			
	Hancock	Breckinridge	Meade	Perry
Under \$10,000	26%	30%	29%	*
\$10,000-15,000	11%	19%	7%	*
\$15,000-20,000	4%	15%	7%	*
\$20,000-25,000	14%	8%	6%	*
\$25,000-35,000	14%	12%	22%	*
\$35,000-50,000	14%	11%	21%	*
Over \$50,000	16%	6%	8%	*

Table 48. Distribution of 1979 Housing Prices in the Four-County Area. Compiled by the University of Louisville's Urban Studies Center.

*Data not available at the present time

	Hancock	Breckinridge	Meade	Perry
Number of FHA 221 assisted housing loans, 1979 (d2)	0	0	2	0
Amount of FHA 221 loans, 1979 (d2)	0	0	\$65,150	0
Number of Public Housing Units Available, 1979	0	36	0	318
KHC SF Housing Mortgages, 1978	7	1	17	n/a

Table 49. Recent Housing Assistance by State and Federal Programs in the Four-County Area. Compiled by the University of Louisville's Urban Studies Center.

*KHC is a Kentucky agency, and therefore, does not finance housing in Perry County

Health Care

An area's health care system may easily be overwhelmed by a substantial and rapid increase in population. Therefore, planning for the Breckinridge Project should include an assessment of the area's present capacity to deliver health care services.

This section of the report presents a review of the numbers of various health professionals in the area, the health care facilities and the programs to recruit and train additional personnel.

Health Care Personnel

Tables 50, 51, and 52 summarize the number of various health care professionals available in the four-county area during recent surveys. Based upon normal physician-to-population ratios, Breckinridge and Perry County presently have a sufficient number of physicians but Hancock and Meade Counties do not. The Office of Health Data for Kentucky's Department of Human Resources classifies Hancock County as having a "high need for physicians" and a "shortage of vision care specialists". They classify Meade County as having a "Very high need for physicians". None of the counties reported having a psychiatrist - a possible problem during times of increased social stress.

Health Care Facilities

Table 53 summarizes the number of hospitals, clinics and nursing homes in the area, and Table 54 shows the number of ambulances and emergency

	Hancock		Breckinridge		Meade		Perry	
	1977	1980	1977	1980*	1977	1980	1977	1980
Number of Physicians	2	2	7	7	2	1.75	9	
Number of Dentists	1	2	4	4	2	2.3	8	
Number of Psychiatrists		0		0		0		
Number of Optometrists		0		1.4		1		
Number of Pharmacists		2		8				
Number of Registered Nurses	10	6	44	48	25		68	
Number of Licensed Practical Nurses	5	4	13	13	7		26	

Table 50. Number of Full time Health Care Professionals in the Four County Area. Compiled by the Office of Health Data, Kentucky Department for Human Resources (1980), and the University of Louisville's Urban Studies Center (1977).

*Data supplied by Breckinridge Memorial Hospital (Jan. 31, 1981) and City of Cloverport (Jan. 27, 1981).

	Hancock	Breckinridge	Meade	Perry
Number of Physicians per 1,000 Population	0.27	0.43	0.10	0.51
1978 Birth Rate per 1,000 Population	20.7	15.7	16.2	
1978 Death Rate (all causes) per 1,000 Population	9.1	10.9	5.3	12.0

Table 51. Per Capita Birth, Death and Physician Density Statistics for the Four County Area. A County May Be Said to Have an Insufficient Number of Physicians if the Physician-to-Population Ratio is Less than 0.29.

	Number of Physicians	Number of Dentists	Number of Nurses
Muldraugh	0	0	0
Brandenburg	3	2	10
Irvington	2	2	3
Hardinsburg	4	2	"adequate"
Cloverport	1	0	3
Hawesville	1	1	"adequate"
Lewisport	1	1	2
Tell City	8	6	52
Total	26	16	70+

Table 52. Number of Health Care Personnel in Each of the 8 Major Area Cities, as Reported by Local Officials During Interviews (October, 1980).

		Hospitals	Clinics	Nursing Homes
Meade	Muldraugh	0	0	0
	Brandenburg	0	2	1 - 53 bed intermediate care - 13 bed personal care
Breckinridge	Irvington	0	1	0
	Hardinsburg	1-45 bed*	0	1 - 63 bed intermediate care
	Cloverport	0	0	1 - 40 bed personal care
Hancock	Hawesville	0	1	0
	Lewisport	0	1	1 - 78 bed intermediate care
Perry	Tell City	1-90 bed	1	1 - 147 bed skilled care

Table 53. Health Care Facilities in the Four-County Area
This Represents a Total of 134 Hospital Beds, 6 Clinics
and 5 Nursing Homes (147 beds skilled care, 194 beds inter-
mediate care, 53 beds personal care). Other hospitals
outside the area are at Owensboro, Corydon, Louisville
and Elizabethtown. Each county seat also has a County
Health Department.

*Note: The Breckinridge Memorial Hospital at Hardinsburg presently has pending a certificate of need to renovate and expand the facility by 16,000 square feet. Hospital Administrator, George E. Walz, can provide necessary status information.

City	Ambulance **	Emergency Room
Muldraugh	No	No
Brandenburg	Yes	No
Irvington	Funeral Home	No
Hardinsburg	Funeral Home	Breck Memorial Hospital*
Cloverport	Volunteer	No
Hawesville	No	No
Lewisport	County	No
Tell City	Perry Co. Hosp.-24 hr.	Perry Co. Hosp.-not 24 hr.
Outside Area	Fort Knox	Owensboro (24 hours) Corydon (24 hours)

Table 54. Emergency Medical Services in the Four County Area, as Reported by Local Officials During Interviews (October, 1980).

*Mr. George Walz, Administrator of the Breckinridge Memorial Hospital, is also a member of the Lincoln Trail Cardio-Pulmonary Resuscitation (CPR) Foundation. They provide CPR training in all 8 Lincoln Trail counties. Also, planned hospital renovation will include improvements in emergency services (see note following Table 53).

**The Kentucky Department for Human Resources (Bureau of Health Services) maintains license ratings (conforming or non-conforming for all ambulance services in the state.

room services. See also Figure 21.

There are only two hospitals in the area: The Breckinridge Memorial Hospital at Hardinsburg (45 beds) and the Perry County Memorial Hospital at Tell City (90 beds). These are both relatively near to the Breckinridge Project Site. Both hospitals have an emergency room, but local officials report that neither operates 24 hours per day; emergency patients, during off-hours, have to go to Owensboro or Corydon. All of the major towns, except Hawesville, have a local ambulance service. If the two local hospitals cannot accept a patient, he must go to Owensboro, Corydon, Louisville or Elizabethtown. See also the note following Table 53.

The area also has five nursing homes and six clinics, as further tabulated in Table 53. The nursing homes are as follows:

1. Medco Center of Brandenburg
814 Old Ekron Road
2. Medco Center of Hardinsburg
Rt. #1
3. Tindles Personal Care Home
Highway 60, Cloverport
4. Hancock Co. Rest Homes
Lewisport
5. (unnamed)
Tell City

Training and Recruitment

Only Hardinsburg and Tell City have physician recruitment programs, according to interviews with local officials. Nursing training is available, within the area, at the vocational schools in Hardinsburg and Brandenburg or outside the area at Owensboro, Evansville, Elizabethtown and Louisville.

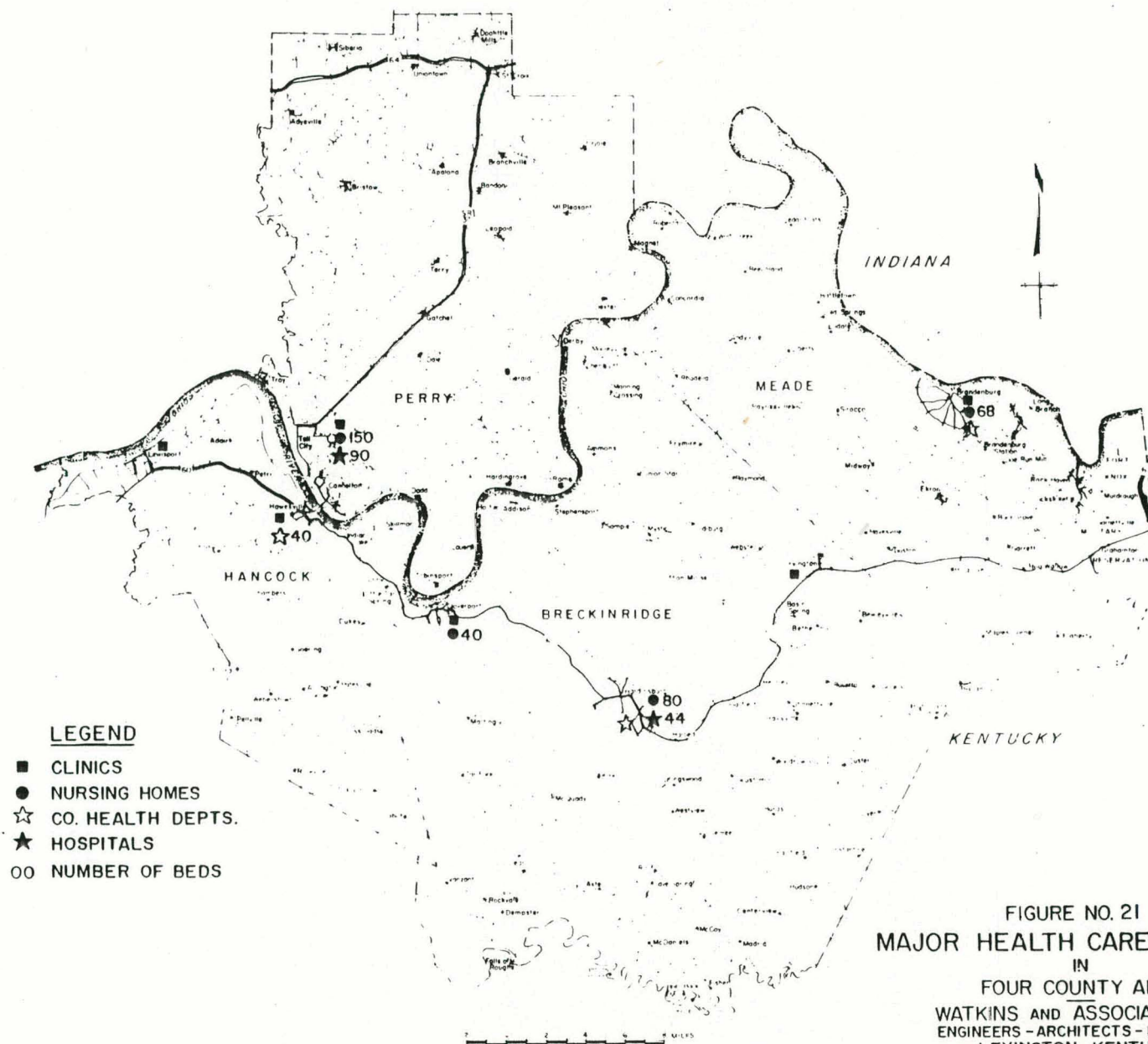


FIGURE NO. 21
MAJOR HEALTH CARE FACILITIES
IN
FOUR COUNTY AREA
WATKINS AND ASSOCIATES, INC.
ENGINEERS - ARCHITECTS - PLANNERS
LEXINGTON, KENTUCKY

Training for CPR-EMT is available at Ivy Tech in Evansville. See also the notes following Table 54.

Health Conditions and Needs

Detailed information on area health conditions and needs is available for analysis from the Meade County (Jerry Dryden) and Breckinridge County (Tom Phelps) Rural Development Committees.

Emergency Preparedness Plans

The Lincoln Trail Area Development District reports that Meade County has an existing "Emergency Preparedness Plan", while Breckinridge County does not.

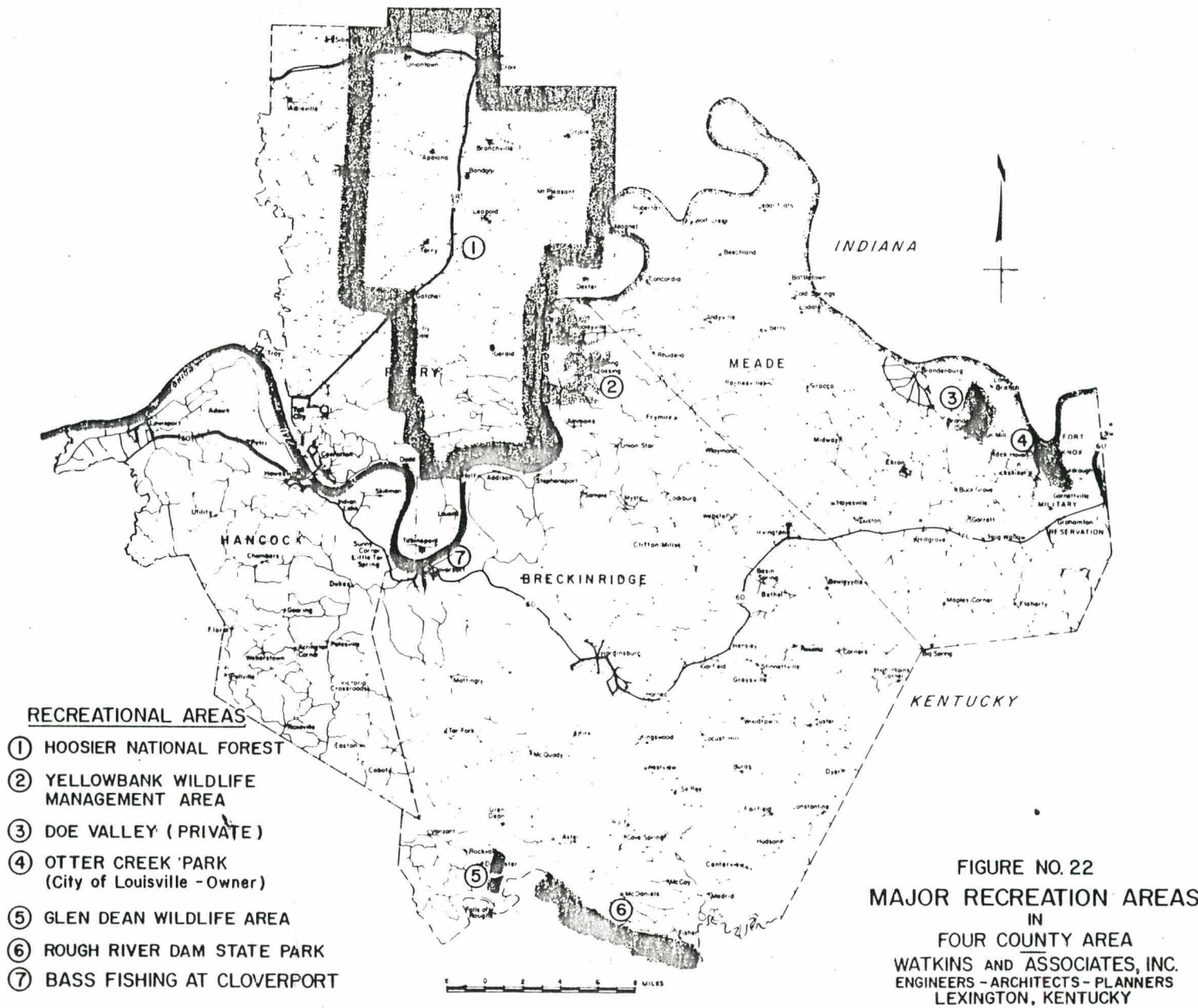
Cultural and Recreational Facilities

Since large increases in population can pose increased demands upon an area's cultural and recreational facilities, it is important to assess the facilities which presently exist. This section presents a town-by-town inventory of such facilities, as well as churches, service clubs, and unique area features. Additional factors discussed include area cultural values and attitudes about new industry entering the area. Historical resources are discussed separately, in the chapter on regional history.

Major Recreation Areas

Figure 22 shows the location of the major recreation areas in the four-county area. Perhaps the major attraction is the Rough River Dam State Park, along the southern border of Breckinridge County; it features a lake with a total storage area of 10,260 acres, 220 miles of shoreline and a maximum pool length of 45 miles. It was built between 1955 and 1961 by the U.S. Army Corps of Engineers. The park features a lodge, golf course, park air strip, marina, facilities for swimming and boating, a beach and playground, cabins and camp areas, hiking trails and horse-back riding. In 1979, the park had over 1.6 million visitors.

Another major recreation area, though more sparsely equipped and widely spread, is the Hoosier National Forest, covering most of Perry County and appreciable lands beyond it. It contains a number of smaller recreation areas developed around a small lake, wildlife area, camping,



hiking, fishing and picnicking. Those in Perry County are listed in Table 55.

In addition to those areas within the Hoosier National Forest, Perry County recreation areas include the Tell City Marina (on the Ohio River).

Hancock County has no defined public recreation areas; one private lake, Indian Lake, is located southeast of Hawesville.

Other major recreation areas in Breckinridge County include the Glen Dean Wildlife Area near Falls of Rough, the Yellowbank Wildlife Management Area northeast of the Breckinridge Project Site, and summer bass fishing tournaments at Cloverport.

There are two major recreation areas in Meade County; Otter Creek Park near Muldraugh (owned by the City of Louisville), and Doe Valley, a private recreational development east of Brandenburg, a 2,300 acre area built around Doe Valley Lake, which has 12 miles of shoreline. This latter development includes private homes, one 18-hole golf course, country club, beaches, hiking trails, picnic areas, and a swim and tennis club.

Inventory of City Cultural and Recreation Facilities

Table 56 summarizes the number of cultural and recreational facilities in the 8 major area cities. The number of churches, civic clubs, fairgrounds, libraries, tennis courts, golf courses, and community parks appear reasonable for present needs, but the number of movie theaters, swimming pools, museums and youth clubs appears to be somewhat sparse.

Church Assistance

The Kentucky Council of Churches, located at 1500 W. Main Street in Lexington, represents many of the denominations active in the area, and has programs which could be helpful in integrating new citizens

Name	Nearest Town	Features
Middle Fork Lakes Saddle Lake Tipsaw Lake Indian Lake Lake Celina	Gatchel Bandon Uniontown St. Croix	Swimming, fishing, boating, hiking, picnicking, camping Swimming, fishing, boating Fishing, boating Fishing, boating, camping
German Ridge Recreation Area	Rome	Swimming, fishing, hiking, picnicking, camping
Buzzard Roost Overlook	Alton	Fishing, hiking, picnicking, camping
Morgan Ridge Turkey Management Area	Leopold	Turkey refuge, hiking

Table 55. Recreation Areas in Perry County, Within
the Hoover National Forest.

	Muldraugh	Brandenburg	Irvington	Hardinsburg	Cloverport	Hawesville	Lewisport	Tell City	Total
Movie Theaters or Drive-Ins	0	0	0	2	0	0	0	4	6
Community Parks	1	8	2	1	1	2	2	many	17+
Community Pools	0	5	0	1	0	1	0	3	10
Golf Courses	0	2	1	1	0	1	0	1	6
Tennis Courts	1	12	2	7	2	4	3	8	39
Museums	0	1	0	0	1	0	0	0	2
Libraries	1	1	1	1	1	1	1	1	8
Fairgrounds	0	1	0	1	0	1	0	1	4
Youth Centers	0	1	0	0	0	0	1	0	2
Civic Clubs	2	4	2	2	5	6	2	10	33
Churches	3	7	10	6	6	6	8	20	66

Table 56. Inventory of Cultural and Recreational Facilities in the Eight Major Cities, as Reported by Local Officials during Interviews (October, 1980)

into the area. For example, they conduct regular assessments of the social, economic and spiritual needs of many Kentucky areas, including evaluation of health care, education, etc.

A similar organization, the Alaska Council of Churches, was recently quite active in working with local churches, ministerial associations, etc. to assist in integrating new people into the communities experiencing booming growth during construction of the Alaska Pipeline (Alaska Christian Conference, 813 W. 3rd Avenue, Anchorage, Alaska 99501).

Archaeological Features

Local officials report that there are numerous Indian burial sites and related archaeological sites along the Ohio River; particularly noted were areas near Webster, Lodiburg and Helpers Cliff.

Attitudes and Cultural Values

Interviews with local officials reveal the following features which they believe characterize the attitudes and cultural values of area citizens:

1. The area considers itself to be primarily a rural-agricultural area having strong ties to small town values and to the land, particularly to farming as a way of life.
2. Recent industrialization has been well received, in general, for area citizens want at-home jobs for themselves and to assist in keeping young people near their home towns.
3. New industry is generally well received because of the jobs it represents, but residents are somewhat selective in the kinds of industry they welcome; they express strong feeling, however, against those industries such as coal burning power

plants which might saturate the area's air pollution capacity* and/or interfere with the quality of product from the area's paper mill.

4. The response to Ashland Oils' Breckinridge Project has generally been favorable, with only a few opponents being vocal.
5. One possible disadvantage cited against further industrialization relates to the disruptive effect it may have on existing area farmers who are presently having some difficulty keeping the young members of the family interested in retaining their low-paying but healthy farming way of life when faced with much higher paying opportunities with local industry.
6. Area residents tend to be simple and direct and independent in their response to new area residents, but are friendly toward them and welcome new neighbors
7. Little problem has developed in the past in relation with special groups. The minority population is very low and so racial problems have been rare. There has been little destructive union activity in the smaller towns, which prefer non-union working situations. Around the major industrial plants, unions do represent workers, but relationships with management have generally been good, with the exception of a few strikes in the Tell City area.

One area, around Muldraugh, has become something of a "melting pot" because of the ever-changing military population at Fort Knox. In such an area, residents are quite accustomed to a large population of transient citizens.

*Cloverport's official position is that they welcome any industry, and rely on state pollution control agencies to prohibit any polluting activities.

Government and Institutional - Financial Resources

The capacity of an area to assimilate a rapid development and population increase is strongly influenced by its government structure and by the institutional and financial resources available to it. This section, therefore, reviews the present status of these factors in the four county area.

Government Form and Structure

The major cities in the three Kentucky counties have the mayor-city council form of government. Each has 6 councilmen elected every 4 years, except in Hawesville, Cloverport, Hardinsburg and Lewisport which elect councilmen every 2 years. Some of the towns have expressed the concern that both the mayor and council are elected at the same time (in 1981), making for the possibility of poor continuity from year to year; overlapping terms would permit greater continuity. The Cloverport City Council plans to submit a resolution for the November ballot, seeking voter approval of staggered terms for councilmen. Tell City is governed by a mayor and 5 councilmen, each serving 4 year terms.

County government differs between Indiana and Kentucky. The Kentucky counties are governed by a County Judge Executive and board of magistrates. Perry County, Indiana is governed by three county commissioners, who perform the administrative functions, and by seven county councilmen who exercise control of appropriation and financial affairs.

Zoning and land use are controlled by planning and zoning commissions, as detailed in the previous chapter on land use.

Government Financing

It is difficult to compile consistent financial data on Kentucky cities and counties. According to the Kentucky Municipal League, Kentucky has never had a good data base on municipal finance because, until July 15, 1980, cities and counties were not required to have a budget or an audit. With passage of the 1980 law, however, consistent data will soon become available, probably from the Kentucky Department of Revenue or the Department for Local Government.

Some information has been compiled, however, from interviews with local officials, Department of Commerce Industrial Resources brochures, the Kentucky Department for Local Government, Kentucky Department of Revenue, Federal Census of Government and other sources. These data follow.

General Overview of Revenue. Table 57 shows three-year old data on total county income, and its distribution into three categories. The difference in total income is unusually large, ranging from less than a million dollars for Meade County to over 13 million dollars for Hancock County.

Property Tax. Tables 58 and 59 show the property tax rates levied by area counties and cities during 1980. Property value assessments for the counties are shown in Table 60. And Table 61 shows the property tax income estimated for 1980, based upon the rates and assessed value.

School Taxes. Area school districts also levy property taxes, at rates shown in Table 62, for support of local schools. Today, however, a great deal of school income is collected by the state government and redistributed to the school districts in shares prorated to more-or-less equalize the quality of educational facilities across the state.

	Breckinridge	Hancock	Meade	Perry
Tax Revenue (from property, sales, & income tax or occupational	\$425,000	\$738,000	\$363,000	\$530,000
Intergovernmental Revenue (revenue sharing, refund of gasoline tax, coal severance tax, other state or federal income)	452,000	364,000	428,000	(b) 1,425,000
Charges and Miscellaneous (building permits, auto license tags, fees, rents, etc.)	34,000	(a) 11,899,000	32,000	(c) 1,382,000
Total General Revenue: Fiscal Year 1976-1977	911,000	(a) 13,001,000	823,000	(d) 3,337,000

Table 57. Total Revenue, and its Distribution for the Four Counties during the 1976-77 Fiscal Year. Compiled by the University of Louisville's Urban Studies Center (from the 1977 Census of Governments).

- (a) Includes Hancock County Industrial Building Revenue Bonds for aluminum mill.
- (b) Includes Federal and State payments in lieu of taxes for forest land.
- (c) Includes hospital fees.
- (d) Includes (b) and (c) above.

	Meade	Hancock	Breckinridge	Perry
General	11.1¢	7.0¢	10.0¢	*
Library	2.1¢	3.1¢	3.1¢	*
Health	2.4¢	2.1¢	-0-	*
Hospital	-0-	-0-	3.8¢	*
Extension Service	-0-	-0-	0.6¢	*
Total	15.6¢	12.2¢	17.5¢	*

Table 58. Property Tax Rates Per \$100 Assessed Valuation Levied by Area Counties Through the County Property Valuation Administrator, 1980. Provided by the Research Division, Kentucky Department of Revenue.

*Data not available at the present time

	Muldraugh	Brandenburg	Irvington	Hardinsburg	Cloverport	Hawesville	Lewisport	Tell City
Total City Rate	15.3¢	33.3¢	50.0¢**	33.0¢	33.0¢	41.28¢	24.2¢ (1979)	*

Table 59. Property Tax Rates (Per \$100 Assessed Valuation) Levied by Area Cities, 1980. Provided by the Research Division, Kentucky Department of Revenue.

*Data not available at the present time.

**Irvington rate includes 18¢ for a waterworks bond

	Meade	Breckinridge	Hancock	Perry
Total Value, Real Estate & Tangible Property, both PVA and State	\$217,354,219	\$229,469,808	\$147,223,759	
Total Tax Rate Per \$100 Valuation	0.156	0.175	0.122	
Revenue = $\frac{\text{Val.} \times \text{Rate}}{100}$	339,073	401,572	179,613	
Number of Bank Shares	1,836,220	4,066,655	2,138,890	
Tax Rate Per \$100 Valuation	0.180	0.190	0.180	
Revenue = $\frac{\text{Val.} \times \text{Rate}}{100}$	3,305	7,727	3,850	
Total Estimates Revenue from Property Tax	342,378	409,299	183,463	

Table 60. Calculation of Estimated County Income, for 1980, from Property Taxes (Prior to Appeals, Delinquency, etc.). From 3 to 5% of Total Revenue Due is Often Lost as Uncollectable or Delayed, Each Year. Based Upon Data Provided by the Research Division, Kentucky Department of Revenue.

Assessor	Item Taxed	Meade	Hancock	Breckinridge	Perry
PVA	Private Real Estate Tangible Personalty	\$154,378,907 40,621,312	\$83,468,498 33,904,261	\$166,985,017 33,548,791	
State	Public Service Real Estate Public Service Tangible Property Bank Shares	\$ 8,210,000 \$ 14,144,000 \$ 1,836,220	\$16,769,000 \$13,082,000 2,138,890	\$13,335,000 \$15,601,000 4,066,655	

Table 61. Property Value Assessments, 1980, prior to Appeals, Delinquency, etc. Provided by the Research Division, Kentucky Department of Revenue.

	Meade	Hancock	Breckinridge	Cloverport Independent	Perry
General District Rate	13.1¢	12.0¢	4.1¢	15.5¢	
Voted Building Levy	11.1¢	11.6¢	10.5¢	13.6¢	
Total	24.2¢	23.6¢	14.6¢	29.1¢	

Table 62. Property Tax Rate (Per \$100 of Assessed Valuation in the School District) Levied by Area School Districts, 1980. Provided by the Research Division, Kentucky Department of Revenue.

The properties assessed for school purposes are by school districts, not just by county, and may overlap in some cities.

Other Tax Revenues. The area cities and counties tax revenues are generated by several other categories of sources (tax on insurance, utilities, rents, etc.). Detailed breakdowns may be found in the Form F65 or F66 used by each city to submit revenue sharing information to the Census Bureau.

Comments on Revenue. Perry County officials note that revenue increases have been limited by state law to 3½% per year for several years; this has severely strapped local finances for Tell City and Cannelton. Smaller cities like Irvington note that they are heavily dependent upon federal revenue sharing. All agree that finances are relatively tight and that tax increases, to keep pace with inflation, are difficult to pass.

Local Assessment of Capabilities

Local officials were asked to assess their present situation with regard to three factors relevant to energy-related growth: local financial status, growth management ability, bonding capacity and existing problems with local government. Results are summarized in Table 63. Officials generally believed they were in a position to deal with such growth problems, and looked forward to the coming of the Breckinridge Project, though several conceded that present government services were being tightly controlled because of strained financial resources.

Planning and growth management assistance is available (in Kentucky) through the respective Area Development Districts (Lincoln Trail, Green River). Since the project involves 4 counties, several cities, and 2 ADD districts, the advantages of some centralized management agency, centered around the Breckinridge Project, should perhaps be evaluated.

	Muldraugh	Brandenburg	Irvington	Hardinsburg	Cloverport	Hawesville	Tell City	Lewisport
Financial status of local government	Sound	Stable to Good	Tight	Good	Tight, but in the black	Bad	Very tight	Good
Local ability to manage rapid growth & change	Yes	O.K., but will need more money	Some	Want help from Breck Co. Devel. Commission	Yes, believe so	Some capability	Good	Good
Local bonding capacity	O.K.	Near capacity	O.K.	O.K.	No problem	No problem, good audits	No problem	No problem
Problems with local government	None	None	None	None	None	None	None	None

Table 63. Assessment of Local Finances, Planning, Bonding, and Government Problems by Local Officials during Interviews, October, 1980.

General Financing Problem

Many cities in the area expressed the same reservation about problems experienced by other communities in the past during boom town growth; that is, the fact that roads, hospitals, schools and other community facilities must be expanded or improved in advance of the population increase, yet the tax revenues available to local governments don't materialize until the new taxpayers become residents. Some form of advance funding was desired, in anticipation of the large expected population increase.

State officials contacted (Kentucky Municipal League, Department of Local Government, Department of Revenue) were not aware of any existing, approved government program to provide such advance funding, though most were aware of recent discussion to correct the problem.

Two recent initiatives have been taken to assist local areas facing energy-related growth, one being a bill drafted by U.S. Senator Wendell Ford, and the second being a memorandum* from Mr. Gilmore Dutton (see copy following), head of the Appropriation and Revenue Committee of Kentucky's State Legislative Research Commission (December 18, 1980). Such initiatives should be evaluated as part of any socio-economic impact assessment.

*Note that this memo contains some errors; for example, the number of operational personnel listed in the memo's Table 2 is considerably below current estimates for the Breckinridge Project.

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M E M O R A N D U M

TO: Interim Joint Committee on
Appropriations and ~~Revenue~~
CJH

FROM: C. Gilmore Dutton, Staff Administrator
Appropriations and Revenue Committee

DATE: December 18, 1980

SUBJECT: Synfuel Plants and Local Government Fiscal Issues

Within the next three years, four major synfuel plants will be under construction in three Kentucky counties, if all factors remain as currently planned. These plants will have a significant impact on both state and regional social and economic conditions.

One set of impacts that appears to have escaped discussion is the effect that the synfuel plants will have on local government expenses and revenues. During the plants' construction phase, which will last an average of five years, large numbers of workers, many of whom will be accompanied by their families, will swell the local populations, creating a tremendous surge in the demand for municipal and educational services. During this phase, additional property tax revenues will be at a minimum, though increasing annually.

In the post construction, or operation phase, the demand for local government services will be sharply reduced from construction phase levels, but the tax base and resultant revenues will be at their maximum.

Construction Phase

The impact on local populations from the number of workers required during construction can be seen in Table 1 below. The "number of workers" represents maximum employment during the construction phase, but does not include family members.

TABLE 1

ESTIMATED MAXIMUM POPULATION INCREASE IN COUNTY OF
LOCATION DURING SYNFUEL PLANT CONSTRUCTION PHASE,
EXPRESSED AS A PERCENT

<u>Synfuel Plant</u>	<u>County of Location</u>	<u>1980 County Population</u>	<u>Maximum No. of Construction Workers</u>	<u>Percent Increase</u>
H-Coal	Breckinridge	16,862	5,000	30%
SRC-1	Daviess	85,702	2,800	3
W. R. Grace	Henderson	40,979	6,200	15
Texas Eastern	Henderson	40,979	15,000	37
W. R. Grace } Texas Eastern }	Henderson	40,979	21,200	52

Operation Phase

The number of employees required to operate the synfuel plants will be far less than the number required to construct the plants. Table 2 below lists the required number of operation employees, and the resultant percentage increase in the affected county populations. Like Table 1, the number of employees is the estimated maximum number that will be required, but does not include family members.

TABLE 2

ESTIMATED MAXIMUM POPULATION INCREASE
IN COUNTY OF LOCATION DURING SYNFUEL
OPERATION PHASE, EXPRESSED AS A PERCENT

<u>Synfuel Plant</u>	<u>County of Location</u>	<u>1980 County Population</u>	<u>Maximum No. of Operation Employees</u>	<u>Percent Increase</u>
H-Coal	Breckinridge	16,862	600	4%
SRC-1	Daviess	85,702	350	.4
W. R. Grace	Henderson	40,979	1,350	3
Texas Eastern	Henderson	40,979	4,800	12
W. R. Grace } Texas Eastern }	Henderson	40,979	6,150	15

The change (reduction) in the county populations that will take place between the construction and operation phases can be measured by subtracting the percentage increase in population shown in Table 2 from the percentage increase in Table 3.

Table 3 below shows the estimated value of the synfuel plants and the expected increase in assessed value of property subject to full local rates effected by their installation.

TABLE 3

ESTIMATED MAXIMUM INCREASE IN ASSESSED VALUE OF
PROPERTY FOR AD VALOREM TAX PURPOSES IN COUNTY OF LOCATION
RESULTING FROM CONSTRUCTION OF SYN FUEL PLANT,
EXPRESSED AS A PERCENT

<u>Synfuel Plant</u>	<u>County of Location</u>	<u>1980 Assessed Value of Property Subject to Full Local Rates (In Millions)</u>	<u>Value of Synfuel Plant (In Millions)</u>	<u>Percent Increase</u>
H-Coal	Breckinridge	222.5	3,000.0	1,348%
SRC-1	Daviess	1,456.8	1,500.0	103
W. R. Grace	Henderson	765.3	3,000.0	392
Texas Eastern	Henderson	765.3	4,000.0	523
W. R. Grace } Texas } Eastern }	Henderson	765.3	7,000.0	915

The relationship between the additional long-term municipal and educational services which will be required after completion of the synfuel plants, and the local revenues available to support those services, may be seen by comparing the percentage increases in population shown in Table 2 with the percentage increase in property values shown in Table 3.

ISSUES AND ANSWERS

Listed below are some of the major fiscal issues, with suggested solutions, raised by construction of the synfuel plants.

1. Financing the additional municipal and educational services. Local governments will be required to provide substantial additional services before additional revenues are available to finance those services.

A state financed and administered fund from which local governments could borrow monies in anticipation of additional local revenues would bridge the income and expense gap. Repayment schedules could be tailored to the construction cycle of the synfuel plants.

Short term borrowing will be more desirable than long-term loans. This would seem to rule out the use of the traditional, municipal bonds as a source of revenue, and argue for a flexible debt system.

2. Identification of the local governments impacted by the demand for additional services, and the disbursement of tax revenues generated from the synfuel plants.

The local governments which will be required to provide additional services to the personnel associated with the synfuel plants will not necessarily be the local governments in whose jurisdictions the plants will be located. Several cities and two independent school districts are located in the counties in which the synfuel plants will be built.

At least two of the four plants will be built near county lines (see attached maps), and depending upon transportation facilities, plant personnel could settle in adjacent counties in as large numbers as in the counties of location.

A program to identify the local governments required to provide services to the employees associated with the synfuel plants is feasible. Loans, and later, revenues, could be allocated to those governments based upon some sort of formula relating service costs to per capita count.

3. Disbursement of tax revenues generated from the synfuel plants. The revenues from the synfuel plants, when completed, will represent a major windfall to the local governments with the authority to tax the property. The issue of allocating revenues generated by the synfuel plants addresses not only the question of reimbursing all the local governments adversely affected by the synfuel plants, but also addresses the question of sharing the largesse statewide with other local governments. Revenue sharing mechanisms financed by "windfall" synfuel plant revenues could include a power equalization fund for counties, coupled with an expansion of the education equalization program, or a continuing, state administered local government loan program.

4. Permitting the state to take advantage of "new property" tax revenues. House Bill 44 limits state property tax revenue increases to 4% per year, unlike the provision which allows local governments to realize additional revenue from new real property in addition to a four percent increase on "old year" real property.

House Bill 44 could be amended to allow additional revenues from new real property to accrue to the state. This, of course, would slow down the rate of decrease in the state's property tax rate (based upon 1979 values, the state tax rate will drop 35% as a result of the construction of the synfuel plants), but the additional revenue could well forestall increases in other taxes.

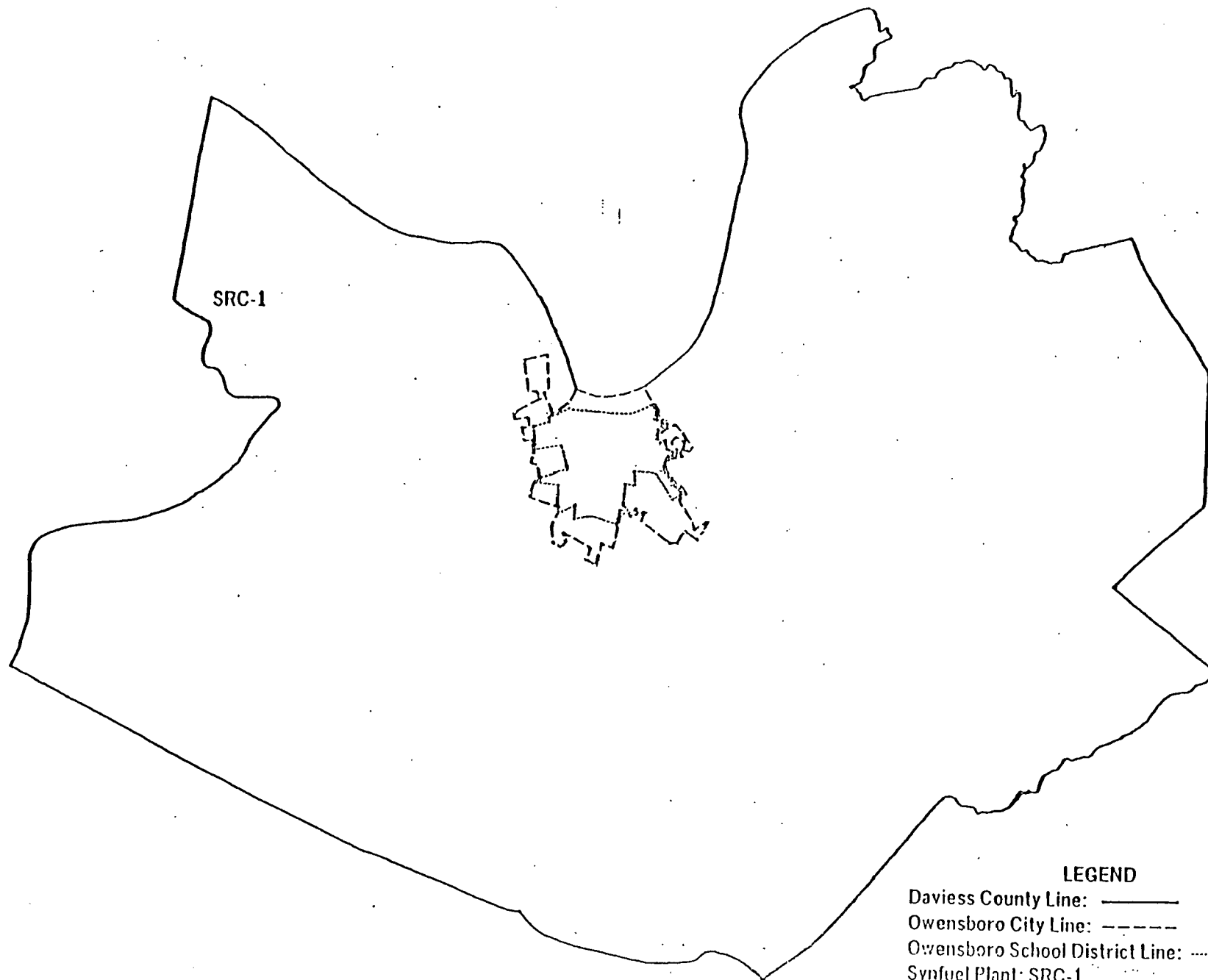
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Attachments



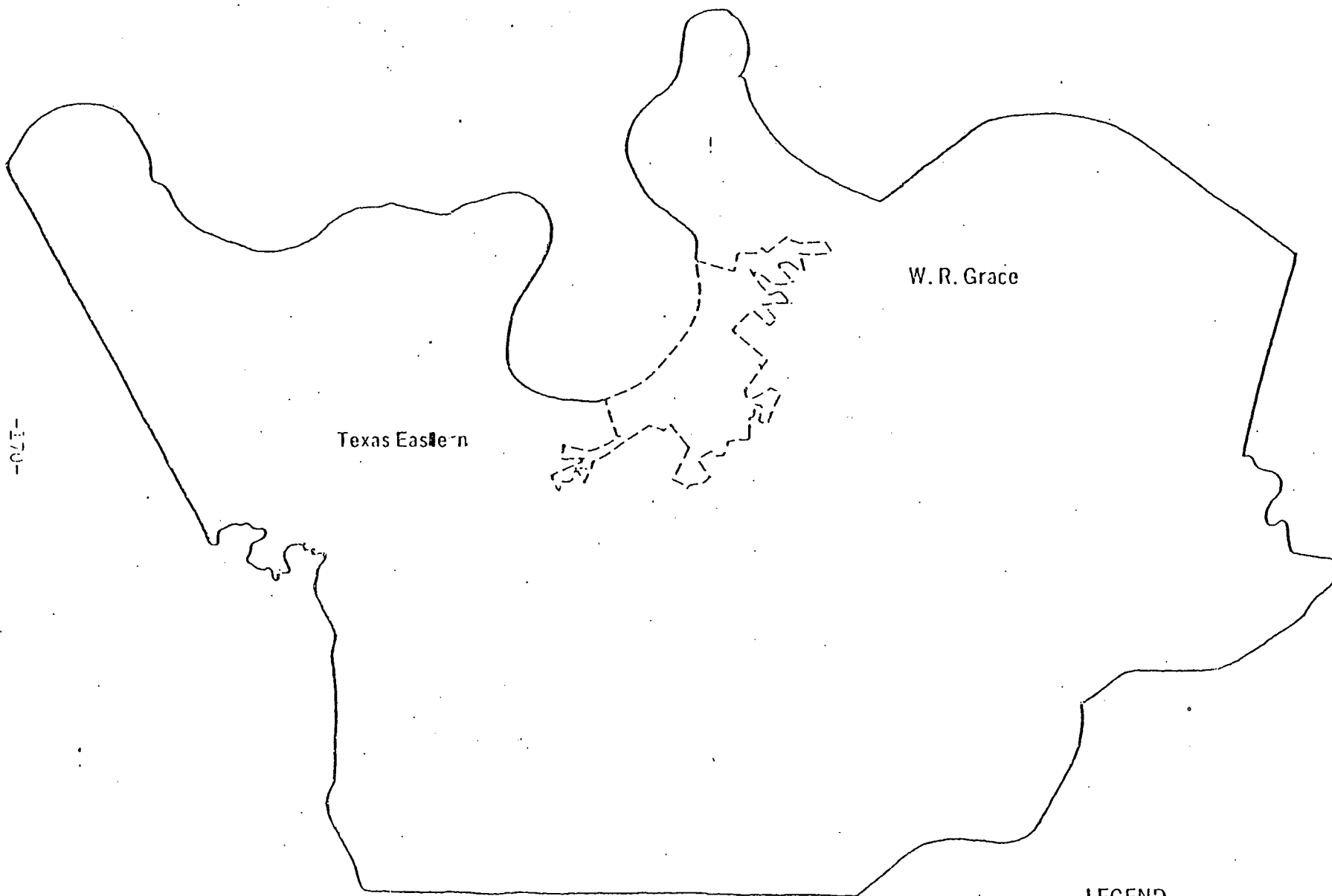
LEGEND

- Breckinridge County Line: —————
Cloverport & Hardinsburg City Lines: - - - - -
Cloverport School District Line: —————
Synfuel Plant: H-Coal



LEGEND

- Daviess County Line: —————
- Owensboro City Line: - - - - -
- Owensboro School District Line:
- Synfuel Plant: SRC-1



-170-

Texas Eastern

W. R. Grace

LEGEND

Henderson County Line: —————

Henderson City Line: - - - - -

Synfuel Plants: Texas Eastern & W. R. Grace

Impacts Associated with Industrial

Growth During the Last 30 Years

Since the 1950's, the four-county area has changed from an almost totally rural-agricultural area to one which has those of a balance between agriculture and heavy industry. But the change has come quickly and has caused the area to experience a few "growing pains". This section of the report reviews a few of the growth-related problems that the area has recently experienced.

1. Lewisport

Lewisport's experience is summarized by the headlines of an article in the April 5, 1966 issue of the Courier Journal newspaper: "An Aluminum Rolling Mill Came and Lewisport Began to Boom". The article is reproduced below:

"This little city, nestled on the Ohio River in Hancock County, is booming.

But unlike the temporary Western Shantytown of the gold rush days, Lewisport is becoming a city of modern subdivisions, shopping centers and service stations.

The boom began with a gamble 2½ years ago when the city floated a \$50 million bond issue to finance an aluminum rolling mill for the Harvey Aluminum Co.

Today, the plant, which will turn out about 120 million pounds of aluminum products annually and will eventually employ 1,000 persons, is nearly finished. Company officials expect to begin hiring in mid-May, and start production in June.

The aluminum plant has acted as a magnet to other construction projects. Five home builders are now filling six subdivisions with substantial brick-and-stone homes. Another builder has acquired 72 acres of land which is scheduled to be the site of 191 houses, a shopping center, and community recreation facilities. The Hancock Bank and Trust Co. has purchased a site for

a Lewisport branch.

There are Other Signs

Other signs of life in Lewisport include:

A new U. S. Post Office is nearly ready to open.

A major grocery chain has purchased land for a shopping center.

A new service station is open, and another is now providing around-the-clock service.

Skeptics in Lewisport said the boom would end when the construction workers building the rolling mill finished their job.

But as they leave Lewisport, they leave no vacancies behind. Mrs. Paul Roberts, who operates the Lewisport Information Center for the new Lewisport Industrial and Community Improvement Corp., says the housing construction isn't keeping pace with the pressing need for shelter.

'We have found living space for more than 100 families,' Mrs. Roberts said. 'But with no motel and the home building about two years behind, we have a real problem.'

One harried house-hunter told her, 'Get some garages or chicken coops ready. We need a place to live.'

Lewisport had a population of about 600 two years ago. Mayor J. Sam Pell estimates the present population at more than 1,000 and envisions a city of 2,500 soon. The General Assembly recently boosted Lewisport to the rank of fifth-class city.

Mayor Pell points to several civic improvements, including a new \$250,000 water supply system, a \$17,000 fire truck and plans for sewers and a sewage treatment plant.

'Why we have even blacktopped seven streets in town on the little tax money we get,' he said.

Taxation a Problem

Taxes are a problem in Lewisport. The city gave the Harvey plant a 25-year tax free period as an inducement to build the plant here. And this worries Hancock County School Supt. Charles F. Schafer.

He reports that the Lewisport Consolidated Elementary School is old and needs renovation. Already its enrollment has grown by 60 students as a result of the Harvey boom.

Schafer points out that the school district's bonding power depends on the taxes it takes in. 'And with Harvey paying no taxes, the additional homes being built won't take care of the additional children.' he said.

He estimates that a new school building will be needed in five years. Under present conditions, the \$500,000 cost is too steep, he said.

Solution Not Known

His solution? 'I don't know,' he said. Would the schools be better off if Harvey employees lived in an adjacent county? Schafer avoids this solution. He said the school system would try to gradually add classrooms, buy land for a new building, and hope for the best.

Mayor Pell hopes the Harvey plant will attract more industry to the area and there are signs he will see it soon.

The Big Rivers RECC has received a federal loan to build a generating and transmission facility in Hancock County, and Harvey is considering adding a \$70 million smelter plant to the Lewisport operation.

Hawesville Getting Mill

Hawesville, 10 miles to the east, appears to be in line for a \$12 million paper mill. Highway improvements on U.S. 60 and construction of a bridge over the Ohio River at Hawesville are also expected to improve the industrial climate.

Because Owensboro is only 17 miles away, only 20 percent of the Harvey employees are expected to live in Lewisport at first. But city officials hope to draw more later, as the city grows and gains needed facilities.

Some people in Lewisport are still skeptical of Harvey's worth. One man, who stands to benefit from the Harvey-stimulated boom but asked not to be identified, said:

'The way they are coming here, with us paying their bills and setting them up tax free - now that is what I call creeping socialism. No wonder Owensboroans helped us get Harvey here - they didn't want them in Owensboro but they wanted the benefits being close by.'

Most Are Optimistic

But most residents are optimistic. The grocers, druggists, restaurant owners all report business is better, and they

are planning to expand.

Most people view the school problem as serious, but also as just another growing pain that comes with growing up in the 20th century.

In fact, they say, 'We aren't really making a boom, but more a slow, sure-growing rumble.'

A boom is temporary. Lewisport appears to be building something permanent."

Eight years later, Lewisport was assembling a promotional package of its accomplishments as a community for entering the Kentucky Chamber of Commerce's competition to be named an "all Kentucky city". This, too, was described in a Courier Journal article (July 20, 1974).

Recent interviews with local officials (October, 1980) provided a few additional comments. They recalled that temporary housing was provided during plant construction by a trailer park and by construction of several new homes, but noted that both homes and trailer lots now have a high vacancy rate. The big housing demand was temporary, and now the "extra" housing provided is empty.

Officials also noted that the aluminum plant development was perceived as being hard on local farmers. Land values rose so rapidly that land "at a farming price" became unavailable in the Lewisport area. Moreover, the new industrial jobs available caused job competition for the farmers; children of farm families left the farm to take the higher paying jobs, and the general competition caused wages to rise significantly for hired farm labor.

2. Hawesville

The initial industrial development at Hawesville (WesCór Paper Plant) was documented in the Hawesville newspaper on May 25, 1967 under the headline "WesCor - A Gratifying Result of Planning, Effort":

"Kentucky now has its first pulp and paper mill and Hawesville has its first major industry. WesCor Corporation Paper Mill at Hawesville, construction of which was begun about one year ago, is now in operation and producing corrugating medium for its parent firms, Corrugated Containers Company, Columbus, Ohio, and Western Kraft Corporation, Albany, Oregon.

Only a little more than a year ago talk was just beginning of such an industry locating at Hawesville with nothing definite established.

S. S. Davis, Chairman of the Board of Corrugated Containers Company and Ira Keller, Western Kraft Corporation's Board Chairman, had conferred and determined the benefits of building a paper mill in this general area. After the heads of the two organizations decided to build a mill they established a corporation which they named WesCor.

Ira Keller was named Chairman of the Board; S. S. Davis was made president; C. R. Duffie became the firm's executive vice president; Robert E. Feltner, vice president of Corrugated Container Company, was appointed WesCor's vice president to be sent to this area to serve as resident manager, and Gene A. Wilers was elected secretary and treasurer of WesCor Corp.

Duffie, a member of the Board of Western Kraft, was appointed to the work of overseeing the construction of the mill. Mr. Duffie first came to the Hawesville area in the fall of 1965 to look around after having looked at possible mill sites in Ohio and Indiana and studying other paper mill designs.

Mr. Feltner came to Hawesville the second week in January, 1966, after the WesCor organization heads had decided to concentrate its investigation of this area - though no definite commitment had been reached at that time.

An office was established in Hawesville and Feltner began negotiations with L & N Railroad, the State Highway Department, the Sanitation Department and utility companies.

He said all talks were encouraging and it seemed time then to proceed with option of the desired land.

Part of the land WesCor Corporation officials were considering had already been optioned in anticipation of the location of another industry. Leroy Lamar, a local insurance man, had negotiated the option and had released it to Big Rivers, which was working to entice the other industry here. When it was learned WesCor

wanted this land and other adjoining property, Big Rivers turned it back to Lamar for option by WesCor. The extra land WesCor needed was also optioned by Lamar to hold until a definite decision was made by the paper making company.

By early April, 1966, all details had been worked out - with the railroad, Highway Department and the utilities, and on April 19, 1966, official announcement was made by the Kentucky Department of Commerce that the mill would be built here.

One year and one month has gone by since that date and with WesCor Corporation's paper mill in operation, a special dedication ceremony was held to celebrate Hawesville's first major industry and Kentucky's first paper mill. That observance was held at the Hancock County High School on Friday, May 19.

Top officials of WesCor Corporation, its parent organizations, the Governor of Kentucky and Kentucky's Commissioner of Commerce joined Hancock County people in expressing satisfaction with the establishment of this industry and of the most gratifying relationship that has existed with all concerned during the time of negotiations and while the mill was in the process of construction.

Letters of WesCor officials telling of their impressions of this area and of the new mill are from the following: Sam Davis, who had been acquainted with the Hawesville and Perry County, Indiana area in the days of his early career in the paper box business; Ira Keller, who has been Mr. Davis' friend since those early days when they worked at Containers Company; and C. R. Duffie, who has been in the Hawesville area frequently since the mill construction was started.

From Mr. Davis comes this message to Hawesville people:

'This, the first paper mill in the State of Kentucky, was built here because it was the best place we could find to build it:

'It is the best place for our mill because the supply of wood to make the pulp is the finest we could locate...it is here because the supply of water is plentiful and the means of disposal of the purified waste water is available with our great Ohio River.

'I do miss the ferry, though, that I rode for the first time forty years ago when I got off the "Henderson Route" train as a fledgling box salesman to call on furniture plants across the river, trying to convince them they

should ship in Corrugated Boxes.

'During these forty years, a greater and greater amount of land reverted to forest cover, growing the very material which now can be used as pulp for the kind of paper that makes such containers. This land that had become uneconomic for farming has now become a valuable natural resource for this area.

'My memory of Hancock County forty years ago, as a community of friendly, cooperative, and delightful people, is the same as that we have experienced in the past eighteen months. This has been true with the farmers from whom we bought the land, with our local officials, and with your business leaders. The pie at the Cardinal Restaurant has been a plus, too.

'The electric, gas and railroad companies have been most helpful, as have the wonderfully intelligent officials at your State Capital in Frankfort.

'I started this note by stating we are here because it is the best place we could find. In fact, it was quite easy to find in Kentucky, once we told your Department of Commerce what we needed. Their knowledge of natural resources, the information in detail on potential sites, their great urgency to be helpful, made it very easy to settle right here.

'To all of you who have helped make the completion of our project so successful, our most sincere thanks.'

S.S. DAVIS

Mr. Ira Keller has this to say:

'We in Western Kraft are very proud indeed of our new mill on the Ohio River near Hawesville, Kentucky, and are sure it will become a real contributor to the development of Hawesville and Hancock County. We expect the mill to grow in the years to come and that more and more of our fine people will become a part of the community.

'Unlike many new industrial plants in Kentucky, our plant was not financed by industrial revenue bonds and, therefore, pays its fair share of local taxes. We are proud to do this and hope that our taxes will help both the community and its schools finance public improvements to keep up with the needs of our employees and their families and other residents of the area.

'We want to express our appreciation to both state and local officials for their help and encouragement and as our thanks we will do everything in our power to make the

Hawesville area a good place in which to work and live.'

IRA C. KELLER

Mr. Duffie's greetings and comments are:

'I would like to start this letter by telling of my first visit to Hawesville. This was in the fall of 1965 when my wife and I were returning from a business convention in New York City. We threaded our way through Columbus, Indianapolis, French Lick and Tell City, looking at various potential mill sites, mill designs and discussing the formation of WesCor with Sam Davies. We had been given the name of Mr. Davies here in Hawesville and upon our arrival we looked him up. It was a Sunday afternoon and he graciously left his waiting dinner at his son's home to take us out and show us a proposed mill site. Incidentally, it was essentially where the mill is today.

'We were most impressed by the physical advantages of the area and also by the hospitality shown us. Since then my wife has come back with me several times and I, of course, have been here quite often. We have always received the same cordial, friendly welcome.

'I might say just a word about one advantage that we believe the area will derive from our paper company. To start our operation we are bringing in a substantial number of employees already skilled in the art of paper making. Quite a few of our new employees, however, have never been in a paper mill before. They are learning a new trade that will stand them in good stead for many years here and elsewhere. As time goes by most all additional employees will come from the area and also be able to learn as they earn. I might comment here that we have been very pleased with the willingness, intelligence, and moral character of the people from the area that we have hired. This is a plus factor for us as important as are the other elements of our location.'

C. R. DUFFIE

Recent interviews with public officials in Hawesville revealed additional information about its recent industrial development. According to these leaders, many of their experiences paralleled those of Shiloh County, as described in the book, "Local Success and Federal Failure".

The rapid industrial build-up had a number of adverse secondary impacts upon Hawesville because they had not planned and prepared. No money was available to finance

the needed improvements in area schools, roads, water system, sewer system, etc.

One especially important impact was caused by the lack of available housing. New plant-related citizens went to the areas where housing was immediately available and Hawesville had made now available. The new people then settled in areas other than Hawesville and began to commute there to work. This, local officials feel, is why so many people commute into Hancock County today.

Since there was a sizeable population needing services, but no tax revenue from them, Hawesville was hard-pressed financially. The situation was not remedied until recently when they implemented a utility tax and an occupational tax, the latter affecting mostly people who live elsewhere but commute into the Hawesville area to work. Now, with this added revenue, Hancock County and Hawesville boast of one of the region's highest income-per-capita.

3. Tell City

Tell City's experience with industry has differed from those of its Kentucky neighbors. The Kentucky cities were essentially small, rural towns which went through something of a boom when new, heavy industry arrived. Tell City, on the other hand, was laid out by its founders to be an industrial town, and it enjoyed the high employment of local industry long before its Kentucky neighbors; on the other hand, the industry that was already in Tell City began to decline as a result of recession and technological innovation.

One of the major factors in the declining industrial stimulus was the closing, in 1974, of the General Electric Vacuum Tube Plant, which had

until then provided jobs for 2,400 people. The vacuum tube was relegated to a "lower shelf" with the coming of the transistor and integrated circuit, lowering demand for tubes and leading to the plants decline; in 1974, the payroll was reported to drop from 2,400 to 700.

In short, Tell City has had no real industrial boom; if anything, this city has experienced more of a "bust". When the new, heavy industry arrived, it settled in Kentucky, mostly in Hancock County, effectively bypassing Tell City with its stimulus.

4. Cloverport

With most of the boom-related industry locating in the Hawesville-Lewisport area, Cloverport found itself on the edge of boom-related growth. Apparently, relatively few new people settled permanently in Cloverport as the boom progressed, but a number of construction-related people took advantage of the possibility of parking their trailer there; local officials reported during a recent interview (October, 1980) that Cloverport was, at that time, on the verge of "becoming a trailer camp". They also noted, however, that the boom did not cause them any problem with schools, traffic or crime.

In relation to other booming towns, therefore, Cloverport appeared to be benefitting little, if any; indeed, in 1968, Cloverport's mayor was quoted as saying that "This is a dying town, and it won't last long if we don't get some new blood in here." The city accordingly planned to develop a waterfront development to serve the recreational needs of the nearby booming population. The situation is described in a December 29, 1968 article in the Courier Journal newspaper, entitled "Dying Cloverport Ponders Major Surgery"; the article is quoted below:

"City officials and business leaders here want to convert this Ohio River town into a tourist and recreation center.

A study is underway to develop a master plan that would result in the removal of almost all houses, churches, and business places on the river side of U.S. Highway 60 here. According to officials of this city of 1,200 the buildings would be replaced with facilities that would draw tourists, historical buffs and water-sport enthusiasts.

Mayor William Hayden said, 'This is a dying town, and it won't last long if we don't get some new blood in here.'

The 'new blood' would begin with a construction of a boat ramp and the development of a small park by the Army Corps of Engineers in the town's west end.

Federal Money would finance the clearing and development of about a fourth-mile of land along the river bank. Consultants are now investigating what federal programs can be used.

In general, the recreation development would include a marina, boat ramps, swimming pool, a museum, picnic facilities, tennis courts, a playground and an 18-hole golf course. An amphitheater, built into the side of a hill about two blocks from downtown, is also part of the planning, the mayor said.

A. O. Johnston, Cloverport businessman and member of the City Council, said, "This is a natural. When the Cannelton lock and Dam are complete, we will have a 100-mile-long lake on the Ohio, and all the tributary streams will be deeper and wider.

'And this is needed,' said Johnston, because Rough River State Park is already overcrowded...On a summer day, you can't find the water for the boaters and swimmers."

Johnston and Bob Robertson, another businessman, pointed to the development of industry along the river in adjoining Hancock County, with two aluminum plants, two paper mills and a huge electric-power plant. They said this means the area - called by politicians "the Valley of Opportunity" - will need a recreation area to serve that industrialized region.

Robertson said, 'We have so much history, too. The first kerosene in America was produced here and the state's first tax-paid road ran between here and Bowling Green.' He also mentioned the home of Benjamin Holt, attorney general under President Abraham Lincoln, as a historic site. Cloverport also is reputed to be the point where

the Lincoln family crossed from Kentucky to Indiana.

At nearby Tar Springs, Louisville policeman Joe Martin has set up a training camp for young boxers that, if developed, could draw people from all over the United States, Johnston said.

Robertson said, 'Cloverport is the ideal spot for such a recreation center. There is not a place on the Ohio River with a better view of the river.'

Cloverport, he added, is about 75 miles west of Louisville and about 40 miles east of Owensboro and only 12 miles from the Lincoln Trail bridge over the Ohio between Hawesville and Cannelton, Ind.

The first coal oil in the United States came from cannel coal in this region, Robertson explained. It was this oil that was used in lamps in place of whale oil in the 1800s. The oil was shipped out of Cloverport, or Joe's Landing as it was known in the early part of the 19th century.

The land involved in the planning lies on both sides of Clover Creek where it empties into the Ohio. It was from near this point that the state's first tax-paid road was built - a route to Bowling Green.

The city council and others interested in the recreation plan have been working with Lee Taylor, former executive director of the Rough River Area Council, on methods for financing the project. Taylor has for years been advising small communities on ways to obtain federal loans and grants for such projects.

Roberston said William (illegible) and Associates, Chicago landscape architects, are drawing up a master plan, with no obligation to the city unless the necessary federal money can be obtained. Mayor Hayden said an application for federal help will be made soon.

The Corps of Engineers would build boat ramps and much of a playground or park area, but the Corps is not allowed to operate such a facility. It is turned over to local governmental agencies.

Additional help may be available through the Bureau of Outdoor Recreation and the Housing and Urban Development offices, Taylor said. A state agency, The Lincoln Trail Development District, has offered its services to Cloverport.

The cost of the project is not known and none of the city officials would make a guess.

There are some 30 houses and other buildings that would be torn down to make way for the recreation area. The Town Hall, water works and one church, which would be a museum, would be kept. Officials here said that of five businessmen interviewed, all were enthusiastically behind the recreation project and said they wouldn't mind having to move their places of business. One added, 'It will mean a lot more business for me in the future.'

One landmark business, A. T. Martin's blacksmith shop, lies almost on the river bank, but the 87-year-old 'smithy' said anything that was good for Cloverport, he would go for.

The consensus seemed to be, 'It's the only way to save a dying community.'

5. Hardinsburg

Hardinsburg is far enough away from the Olin Chemical Plant in Brandenburg and the many new plants in Hancock County that it has received only a secondary impact - through increased employment. Many citizens of Hardinsburg and rural Breckinridge County commute to these "new" plants for work, but few new residents who come to work at the plants choose to establish homes in Hardinsburg. So Hardinsburg received none of the residents or business development they hoped for and none of the highway improvements initiated because of the industrial development.

In the words of some local officials, during the industrial boom of recent years, Hardinsburg "got left out". They hope, now, that the Breckinridge Project will do for them what near-by development has not.

6. Irvington

Irvington's experience with area industrial growth has been somewhat like that of Hardinsburg - too small and too far away to benefit from residential and business growth. But in some ways, it has been more negative. The young people, officials believe, are leaving Irvington

and moving to where the jobs are, whereas Hardinsburg is closer to the jobs and a larger, county seat from where young residents choose to continue their residence and merely commute to work.

According to recent interviews with local officials (October, 1980), the growth of Irvington is more-or-less at a stand still. The city has no Chamber of Commerce. Industrial development has also been harmed by the city's small size, its remoteness from industry, and its lack of sewers. City officials recently tried to annex some land to the city, but the public opposed it.

Irvington believes the Breckinridge Project can be a help to the city if a more direct access from Irvington to the plant site could be provided, or if wintertime snow removal operations could be improved on existing county roads.

7. Brandenburg

The City of Brandenburg experienced essentially no impact from the Hancock County industrial boom, but it has enjoyed its own "mini-boom" with the arrival of the area's first heavy industry, the Olin Chemical Plant, which created about 650 new jobs. According to local officials (October, 1980 interview), there was a housing shortage during the early stages, but Olin assisted in that by building housing from its own resources.

Officials reported that there have been some continuing traffic problems (the only access to the plant remains a gravel road), but consider that a minor problem compared to the benefit they have enjoyed from the plant. They were particularly pleased when, after the town was virtually destroyed by the 1974 tornado, Olin gave large donations for new city buildings and helped to rebuild the schools.

Brandenburg is looking forward to the Breckinridge Project and expects it to have a positive impact on the city. They are even hopeful that

Ashland could assist them with municipal problems such as solid waste control.

8. Muldraugh.

Muldraugh has been unaffected by Hancock County industrial development since it is so far away. The arrival of Olin Chemical in Brandenburg did have some impact, but the town could not respond by local residential and commercial growth because of the town's unique growth restraint - being surrounded by Fort Knox.

In recent interviews (October, 1980), local officials noted that there were some initial problems associated with the Olin Chemical plant, including a few pollution problems, one explosion and the derailment of a railroad tank car containing vinyl chloride.

Muldraugh has a positive attitude toward the Breckinridge Project and reports it will be pleased to see it go in.

REPORT VII
VOLUME 3

INTRODUCTION

Ashland Synthetic Fuels, Inc. (ASFI) and Airco Energy Company, Inc. (AECI) have recently formed the Breckinridge Project and are currently conducting a process and economic feasibility study of a commercial scale facility to produce synthetic liquid fuels from coal. The coal conversion process to be used is the H-Coal[®] process, which currently is in the pilot plant testing stage under the auspices of the U. S. Department of Energy at the H-Coal[®] Pilot Plant project near Catlettsburg, Kentucky. The preliminary plans for the commercial plant are for a 22,050 metric ton/day (20,000 ton/day) nominal coal consumption capacity utilizing the abundant high sulfur Western Kentucky coals. The Western Kentucky area offers a source of the coal along with adequate water, power, labor, transportation and other factors critical to the successful siting of a plant. Various studies by Federal and State governments, as well as private industry, have reached similar conclusions regarding the suitability of such plant sites in Western Kentucky. Of the many individual sites evaluated, a site in Breckinridge County, Kentucky, approximately 4 kilometers (2.5 miles) west of the town of Stephensport, has been identified as the plant location. Actions have been taken to obtain options to insure that this site will be available when needed.

ASFI and AECI have initiated baseline environmental studies of the proposed site to characterize the existing environment. These will help determine the constraints placed on the location and design of the facilities within the plant due to the need to mitigate any adverse impacts of the plant. These baselines studies will enable ASFI and AECI to plan and proceed in accordance with the other requirements of the National Environmental Policy Act (NEPA) and other Federal and State environmental protection statutes.

Report VII is a compilation of the results of extensive research into Environmental, Socioeconomic, Safety and Health considerations at the proposed site. The report answers pertinent questions of environmental impact and provides plans for compliance with State and Federal regulations in the areas of air, water, and solid waste management. It also contains an in-depth survey into geological characteristics of the area with an intent toward leaving the surrounding areas as relatively undisturbed as possible; and a plan for proper maintenance of health and safety at the facility.

Volume 3 of Report VII contains Cultural and Economic studies used for assessing the socioeconomic impact related to the construction and operation of the facility at the proposed site. It is presented in two parts:

PART I CULTURAL RESOURCE ASSESSMENT

This assessment presents data collected by Dames and Moore from an archaeological reconnaissance of the plant site; and,

PART II SOCIOECONOMIC BACKGROUND DATA

This is a report containing background data for use in the socioeconomic impact analysis of the Breckinridge Project. The research was conducted by Watkins and Associates, Inc., a prominent Lexington, Kentucky, planning and engineering firm, working closely with cities, counties, regional planning districts, the Kentucky Department of Energy, and the Urban Studies Center of the University of Louisville.

Parts I and II are self-contained reports with their own respective tables of contents.

INITIAL EFFORT REPORTS REFERENCE

Report I - Executive Summary

Report II - Breckinridge Project Design Basis

Report III - Specifications

Volume 1 - Specifications A through J

Volume 2 - Specifications K through W

Report IV - Process Units

Volume 1 - Plants 26, 27 and 1

Volume 2 - Plants 2, 3 and 4

Volume 3 - Plants 5, 6 and 17

Volume 4 - Plant 7

Volume 5 - Plants 8, 9 and 10

Volume 6 - Plant 12

Volume 7 - Plants 15 and 18

Report V - Utilities and Offsites Units

Volume 1 - Plants 19, 20, 21, 22, 23 and 30

Volume 2 - Plants 31, 32, 33 and 34

Volume 3 - Plant 35

Volume 4 - Plants 36, 37, 38, 39, 40, 41, 42 and 44

Report VI - Project Management Plan

Report VII - Environmental, Socioeconomic, Safety and Health

Volume 1 - Introduction and Background

Volume 2 - Environmental Baseline

Volume 3 - Cultural and Socioeconomic

Volume 4 - Health and Safety

Report VIII - Capital Cost Estimate

Report IX - Operating Cost Estimate

Report X - Economic Analysis and Financial Plan

Report XI - Technical Audit

Volume 1 - Engineering Comparisons

Volume 2 - Engineering Comparisons

Volume 3 - Critical Design Areas

Volume 4 - Critical Review of the Design Basis

Volume 5 - Critical Review of the Design Basis

REPORT VII
ENVIRONMENTAL, SOCIOECONOMIC, SAFETY AND HEALTH

TABLE OF CONTENTS

VOLUME 1 - INTRODUCTION AND BACKGROUND

- Introduction
- Federal and State Regulations
- Air Quality Management Plan
- Water Quality Management Plan
- Solid Waste Management Plan

VOLUME 2 - ENVIRONMENTAL BASELINE

- Introduction
- Review of Significant Findings
- Ambient Air Quality Monitoring
- Sound
- Aquatic Ecology
- Vegetation
- Wildlife
- Geology
- Soils
- Surface Water
- Ground Water

VOLUME 3 - CULTURAL AND ECONOMIC

- Cultural Resource Assessment
- Socioeconomic Background Data

VOLUME 4 - HEALTH AND SAFETY

- Introduction
- Organization and Administration
- Governmental and Internal Requirements
- Safety in Design
- Fire and Explosion Protection
- Hazard Controls and Protection
- Industrial Health
- Training and Motivation
- Safety Compliance and Accident Investigation
- Items Requiring Further Study

PART I
CULTURAL RESOURCE ASSESSMENT

Table of Contents

	Page
LIST OF FIGURES	vii
LIST OF TABLES	vii
1.0 INTRODUCTION	1
2.0 MANAGEMENT SUMMARY	8
2.1 Plant Site	8
2.2 Potential Waste Disposal Sites	13
3.0 ENVIRONMENTAL BACKGROUND	16
3.1 Topography	16
3.2 Geology	17
3.3 Soils	18
3.4 Flora	18
3.5 Fauna	19
3.6 Culture History	21
3.6.1 Paleo-Indian Tradition	22
3.6.2 Archaic Period	23
3.6.3 Woodland Tradition	26
3.6.4 Village Farming Tradition	28
3.6.5 Historic Period	30
4.0 PREVIOUS ARCHAEOLOGICAL RESEARCH	35
5.0 PROJECT SITE INVESTIGATIONS	40
5.1 Survey Results	42
5.1.1 Archaeological Sites	42
5.1.2 Standing Structures	50
5.1.3 Cemeteries	53
6.0 CULTURAL RESOURCE ANALYSIS AND RECOMMENDATIONS	54
7.0 REFERENCES	62
8.0 VITAE	67

LIST OF FIGURES

- Figure 1.0-1 Ashland Synthetic Fuels Project Site Showing Location of Plant Site and Potential Waste Disposal Areas.
- Figure 1.0-2 Ashland Synthetic Fuels Proposed Plant Site.
- Figure 1.0-3 Proposed Boundary of Potential Northern Waste Disposal Area.
- Figure 1.0-4 Proposed Boundary of Potential Southern Waste Disposal Area.

LIST OF TABLES

- Table 2.1-1 Plant Site: Cultural Resources Recommended for Additional Assessment.
- Table 2.1-2 Plant Site: Cultural Resources for Which No Further Work is Recommended.
- Table 2.1-3 Standing Structure Recommendations
- Table 2.2-1 Potential Waste Disposal Areas. Cultural Resources Recommended for Additional Assessment
- Table 2.2-2 Potential Waste Disposal Areas. Cultural Resources for Which No Further Work is Recommended
- Table 5.1-1 Tabulation of Materials Recovered from Archaeological Sites
- Table 6.0-1 Plant Site. Archaeological Sites Discovered during Surveys Conducted in 1975 and 1980

PART II SOCIOECONOMIC BACKGROUND DATA

TABLE OF CONTENTS

	<u>Pages</u>
Introduction	1
The Breckinridge Project	3
Project Schedule	6
Manpower Requirements	6
Plant and Site Features	6
Access Improvements	6
Materials Coming In	11
Utilities	11
Archaeology	11
Adjacent Development	12
Community Services Provided by Plant	12
Community Assistance	12
Medical Care	12
Police and Fire Protection	12
Education	12
Housing	13
Employment Assistance	13
Recreation	13
Food Services	13
Banking	13
Overview of Area Potentially Impacted	14
The General Area	14
The Four County Area	18
History of Growth and Development	22
Early Settlement (1776-1800)	23
The Pre-Civil War Era (1800-1860)	24
Mills	24
Communities	25
Riverboats	26
Coal Mining and Coal Oil	28
Agriculture	30
The Civil War Era (1861-1864)	30
The Post Civil War Era	32
The End of Slavery	32
Economic Decline	33
Railroads	34
Education	36
Entering the New Century	36
A Depression Between Two Wars	38
The Post World War II War Boom (1946-Present)	39

	<u>Pages</u>
Population	42
Historic Trends	42
Population Characteristics	47
Area Economy	50
Agriculture	50
Industry	52
Other Employment	56
Area Banks	56
Unemployment	56
Personal Income	56
Low Income Families	61
Skilled Labor and Labor Organizations	61
Tourism	67
Economic Development	67
Commercial Sales	69
Land Use	71
Area Overview	71
Land Use Classification	73
Forest Land	73
Agriculture	76
Urban Land Use	76
Transportation	79
Highways	79
Commuting Patterns	84
Rail System	87
Barge System	89
Airports	91
Schools and Education	93
Public and Private Schools	93
Water, Sewer and Solid Waste	101
Muldraugh (Meade County)	101
Water	101
Sewer	103
Solid Waste	103
Flaherty (Meade County)	103
Ekron (Meade County)	103
Doe Valley (Meade County)	103
Water	104
Sewer	104
Brandenburg (Meade County)	104
Water	104
Sewer	104
Solid Waste	105
Irvington (Breckinridge County)	105
Water	105
Sewer	105
Solid Waste	105

	<u>Page</u>
Hardinsburg (Breckinridge County)	106
Water	106
Sewer	107
Solid Waste	107
Kingswood; Westview (Breckinridge County)	107
Cloverport (Breckinridge County)	108
Water	108
Sewer	108
Solid Waste	109
Hawesville (Hancock County)	109
Water	109
Sewer	110
Solid Waste	110
Lewisport (Hancock County)	110
Water	110
Sewer	111
Solid Waste	111
Tell City (Perry County)	111
Water	111
Sewer	111
Solid Waste	112
Cannelton (Perry County)	112
Other Perry County Cities	112
Summary Assessment	112
Public Protection (Police, Fire Department)	114
Social Disturbances	114
Police Departments	114
Fire Departments	118
Housing	120
Overview of Housing Trends in Kentucky	120
Area Housing Production	121
Housing Availability	122
Inventory of Present Homes	124
Homes Sales	128
Vacancy Rates	128
Subdivisions	128
Trailer Spaces Available	128
Area Economic Factors	133
Cost	133
Housing Assistance	133
Health Care	137
Health Care Personnel	137
Health Care Facilities	137
Training and Recruitment	142
Health Conditions and Needs	144
Emergency Preparedness Plans	144

	<u>Page</u>
Cultural and Recreational Facilities	145
Major Recreation Areas	145
Inventory of City Cultural and Recreation Facilities	147
Church Assistance	147
Archaeological Features	150
Attitudes and Cultural Values	150
Government and Institutional - Financial Resources	152
Government Form and Structure	152
Government Financing	153
General Overview of Revenue	153
Property Tax	153
School Taxes	153
Other Tax Revenue	160
Comments on Revenue	160
Local Assessment of Capabilities	160
General Financing Problem	162
Impacts Associated with Industrial Growth During the Last 30 Years	171
Lewisport	171
Hawesville	174
Tell City	179
Cloverport	180
Hardinsburg	183
Irvington	183
Brandenburg	184
Muldraugh	185

FIGURES

	<u>Page</u>
Figure 1. Pilot Plant at Catlettsburg, Kentucky	3
Figure 2. Topographic Map: Plant Site	4
Figure 3. Preliminary Major Milestone Schedule	7
Figure 4. Preliminary Manpower Estimates	8
Figure 5. Regional Location of Four County Impact Area	15
Figure 6. General Area Potentially Impacted by Breckinridge Project	16
Figure 7. Approximate Site Locations for Proposed Synfuel Plants .	17
Figure 8. Four County Impact Area	19
Figure 9. Trend in Area Population, by County	44
Figure 10. Trend in Area Population, by City	46
Figure 11. Industrial Plant Locations within Four County Area . . .	53
Figure 12. Approximate Boundaries of Physiographic Regions in the Four County Area	72
Figure 13. Forest Area in Four County Area	75
Figure 14. Four County Area Map for Ashland Synfuel Project	80
Figure 15. General Area Potentially Impacted by Breckinridge Project	81
Figure 16. Major Railroads Serving Four County Area	88
Figure 17. Area Locks and Dams	90
Figure 18. Airports Serving Four County Area	92
Figure 19. School Locations in Four County Area	97
Figure 20. Water and Sewage Treatment Plants	102
Figure 21. Major Health Care Facilities	143
Figure 22. Major Recreation Areas	146

TABLES

	<u>Page</u>
Table 1. Manning Requirements Anticipated at Typical Synfuel Plants	9
Table 2. Estimated Manning Requirements for Breckinridge Project . .	10
Table 3. Major Cities and Towns in 4-County Region	21
Table 4. Trend in Area Population, by County	43
Table 5. Trend in Urban Population, by City	45
Table 6. Racial Composition of 4-County Population - 1970	48
Table 7. Composition, by Age of 4-County Population - 1970	48
Table 8. Number of Agricultural Jobs in 4-County Area during 1978, and the Percentage of Total Employment this Represents . .	51
Table 9. Number of Agricultural Jobs in 4-County Area during 1970, and the Percentage of Total Employment this Represents . .	51
Table 10. Major Area Industries	54
Table 11. Employment in 4-County Area for Various Employers of Interest (1978)	57
Table 12. Banks and Savings and Loan Institutions in the Four County Area	58
Table 13. Area Unemployment Rates (October, 1980)	59
Table 14. Per Capita Income for Area Cities & Counties (1977)	60
Table 15. Statistics Describing Status of Low Income Citizens in 4-County Area	62
Table 16. Representative Area Labor Unions	62
Table 17. Membership in Various Union Locals in Green River & Lincoln Trail Area Development District and Louisville Area	63
Table 18. Recent Rates (October 1, 1979 - July 31, 1980) Paid for Unskilled Labor in Lincoln Trail Area Development District	66
Table 19. Skilled Labor Rates for Union Workers in Louisville Area .	68
Table 20. Retail Sales in 1978, as Estimated by Editor and Publisher Market Guide, 1978 Edition	70

	<u>Page</u>
Table 21. Distribution of Land Use, by Use Classification, in the Four County Area	74
Table 22. Number of Farms in 4-County Area from 1969-1974	77
Table 23. Acreage in Farmland in 4-County Area from 1969-1974	77
Table 24. Urban Land Use Features and Control in 4-County Area	78
Table 25. Highway Conditions & Traffic Counts in 4-County Area	82
Table 26. Percent of Employees Working Inside & Outside County of Residence	85
Table 27. Number of Employees Working in County of Residence & Commuting from County of Residence to Work in Other Counties	85
Table 28. Number of Employees Commuting Out of Each County to Work in Other Counties Within the 4-County Area	86
Table 29. Area Public and Private Schools	94
Table 30. Summary of Area Vocational Schools, Colleges & Day Care Centers	99
Table 31. Estimated Adequacy of Area Water, Sewer and Solid Waste Systems at the Present and for Handling Future Growth	113
Table 32. Recent Statistics on Various Social Disturbances in the Four County Area	115
Table 33. Current Staff and Equipment in the County Sheriff Departments in the 4-County Area	116
Table 34. Current Staff and Equipment in the City Police Departments	117
Table 35. Current Staff, Equipment, & Condition of Area Fire Departments	119
Table 36. Number of Plumbing Permits Issued in the Four-County Area from 1975-1979	123
Table 37. Estimate, According to a Model Developed by the Urban Studies Center, of the Number of Housing Starts in the Four County Area from 1970-1978	123
Table 38. 1980 Total Population and Number of Housing Units, 1980 Preliminary Results, U.S. Bureau of the Census	125
Table 39. 1980 Inventory of Housing Units, Preliminary Results, U.S. Bureau of the Census	125

	<u>Page</u>
Table 40. Estimate of the Number of Mobile Homes and Mobile Home Park Spaces in the Four County Area, from 1970-1978	126
Table 41. The Percentage of Housing Unit Additions, from 1970-1978, Which were Mobile Homes	126
Table 42. Distribution of Mobile Homes Located in Breckinridge County, Provided by the County Property Valuation Office on October 10, 1980	127
Table 43. Housing Sales in the Four-County Area from 1970-1978, as Reported by the Kentucky Dept. of Revenue	129
Table 43A. Growth in Estimated Number of Residential RECC Customers in Breckinridge County, 1970-1979	129
Table 44. Approximate Availability of Housing for Rent or Sale during October, 1980 as Estimated by Local Officials during Inter- views	130
Table 45. Approximate Present and Planned Availability of Subdivision Lots in the 8 Major Cities, as Reported by Local Officials during Interviews, October, 1980	131
Table 46. Approximate Availability of Spaces in Trailer Courts in the 8 Major Cities, as Estimated by Local Officials during Interviews, October, 1980	132
Table 47. Relative Changes in Housing Prices and Personal Income in the Four County Area During Recent Years	134
Table 48. Distribution of 1979 Housing Prices in the Four County Area	135
Table 49. Recent Housing Assistance by State and Federal Programs in the Four County Area	136
Table 50. Number of Fulltime Health Care Professionals in the Four County Area	138
Table 51. Per Capita Birth, Death and Physician Density Statistics for the Four County Area	138
Table 52. Number of Health Care Personnel in Each of the 8 Major Area Cities, as Reported by Local Officials During Interviews (October, 1980)	139
Table 53. Health Care Facilities in the Four County Area	140
Table 54. Emergency Medical Services in the Four County Area, as Reported by Local Officials during Interviews (October, 1980)	141

	<u>Page</u>
Table 55. Recreation Areas in Perry County, Within the Hoover National Forest	148
Table 56. Inventory of Cultural and Recreational Facilities in the Eight Major Cities, as Reported by Local Officials during Interviews (October, 1980)	149
Table 57. Total Revenue, and its Distribution for the Four Counties during the 1976-1977 Fiscal Year	154
Table 58. Property Tax Rates Per \$100 Assessed Valuation Levied by Area Counties Through the County Property Valuation Administrator, 1980	155
Table 59. Property Tax Rates (Per \$100 Assessed Valuation) Levied by Area Cities, 1980	156
Table 60. Calculation of Estimated County Income, for 1980, from Property Taxes (Prior to Appeals, Delinquency, etc.) . . .	157
Table 61. Property Value Assessments, 1980, Prior to Appeals, Delinquency, etc.	158
Table 62. Property Tax Rate (Per \$100 of Assessed Valuation in the School District) Levied by Area School Districts, 1980 . .	159
Table 63. Assessment of Local Finances, Planning, Bonding and Government Problems by Local Officials during Interviews in October, 1980	161

A CULTURAL RESOURCE ASSESSMENT
OF THE PROPOSED COAL CONVERSION FACILITY
AND TWO ALTERNATE SOLID WASTE DISPOSAL
SITES, BRECKINRIDGE COUNTY, KENTUCKY
FOR ASHLAND SYNTHETIC FUELS, INC.

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