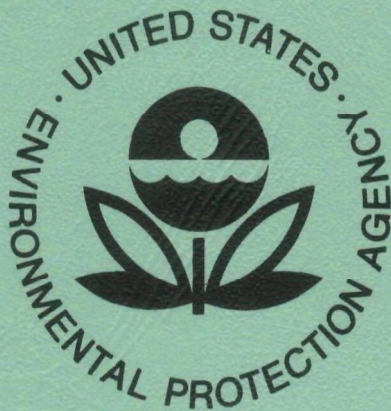


**TECHNICAL SUPPORT DOCUMENT
FOR
INDEPENDENCE STEAM ELECTRIC STATION
Independence County, Arkansas**



VOL. II

**ENVIRONMENTAL PROTECTION AGENCY
REGION VI
DALLAS, TEXAS**

**TECHNICAL SUPPORT DOCUMENT
FOR
INDEPENDENCE STEAM ELECTRIC STATION
Independence County, Arkansas**

VOL. II

**ENVIRONMENTAL PROTECTION AGENCY
REGION VI
DALLAS, TEXAS**

PART 6

TERRESTRIAL ECOLOGY

TECHNICAL SUPPORT DOCUMENT

PART 6

TERRESTRIAL ECOLOGY

CONTENTS

	<u>Page</u>
6.1 BASELINE	6.1-1
6.1.1 Vegetation	6.1-1
6.1.1.1 Methods	6.1-1
6.1.1.2 Survey Results	6.1-2
6.1.2 Amphibians and Reptiles	6.1-6
6.1.2.1 Methods	6.1-6
6.1.2.2 Survey Results	6.1-6
6.1.3 Birds	6.1-8
6.1.3.1 Methods	6.1-8
6.1.3.2 Survey Results	6.1-9
6.1.4 Mammals	6.1-11
6.1.4.1 Methods	6.1-12
6.1.4.2 Survey Results	6.1-12
6.2 IMPACT OF SO ₂ ON THE SITE VICINITY	6.2-1
6.2.1 Effect of SO ₂ on Soil	6.2-1
6.2.2 Effect of SO ₂ on Vegetation	6.2-1
6.3 REFERENCES	6.3-1

TABLES

	<u>Page</u>
6.1-1 Independence Site - Upland Forest Understory - July 1977 Survey (Diameter 2.5-10 cm)	6.1-14
6.1-2 Independence Site - Upland Forest Overstory - July 1977 Survey (Diameter 2.5-10 cm)	6.1-15
6.1-3 Independence Site - Upland Forest Shrub Layer - July 1977 Survey	6.1-16
6.1-4 Independence Site - Upland Forest Ground Layer - July 1977 Survey	6.1-17
6.1-5 Independence Site Total Trees and Shrubs Survey - July 1977	6.1-19
6.1-6 Reptiles and Amphibians Which May Occur in the Vicinity of the Independence Site	6.1-23
6.1-7 Birds Which May Occur in the Vicinity of the Independence Site	6.1-27
6.1-8 Mammals Which May Occur in the Vicinity of the Independence Site	6.1-39
6.2-1 Soil Sample Analysis Jackson and Independence Counties Summer, 1977	6.2-6
6.2-2 Effect of SO ₂ on Selected Vegetation	6.2-7

FIGURES

6.1-1 Site area habitat map showing survey routes and locations	6.1-43/44
6.1-2 Independence site - representative cross section of surveyed young hedgerow community.	6.1-45
6.1-3 Independence site - representative cross section of surveyed mature hedgerow community	6.1-46

PART 6
TERRESTRIAL ECOLOGY

6.1 BASELINE

6.1.1 Vegetation

Mature forest of a sufficient size to support an ecosystem free from outside competitive influences is a fast disappearing aspect of vegetational coverage within Arkansas. This is also true of the site and surrounding area. Replacement communities for these mature forest areas take a great length of time to develop. These conditions must be the primary consideration in the evaluation of the value of the site habitats presented in the following sections. The field survey program for terrestrial ecology was conducted by Dames & Moore in July 1977.

6.1.1.1 Methods

Vegetation was quantitatively sampled in the largest area of mature forest near the site (Study Area C, Figure 6.1-1). Forest overstory and understory as well as shrub layer and ground cover were surveyed along a transect established in this area. The quarter method (Cottam and Curtis, 1956) was used to assess understory and overstory woody vegetation. This method of forest inventory was accomplished by following a compass heading which ran through the habitat to be sampled and establishing sample points at 30-meter intervals. Once a sampling point was reached, the area around the point was divided into four quarters. The tree nearest the established point in each quarter was located, and the species, diameter at breast height (d.b.h. = diameter 1.5 meters above ground level), and point-to-tree distance were determined and recorded for each tree. This was done for both understory and overstory trees. Understory vegetation when present was considered to be trees of from 2.5 cm to 10.0 cm d.b.h (Table 6.1-1). Overstory vegetation (Table 6.1-2) was considered to consist of trees with diameters above 10.0 cm. Diameters were computed from circumference measurements.

The shrub layer (Table 6.1-3) was studied by taking inventory of all plant species over one meter in height but less than 2.5 cm in

diameter occurring within a circle having a radius of 10 meters and centered around the point located by the quarter method. Likewise a one meter square quadrat was centered around each point and all ground layer vegetation (less than one meter) was recorded (Table 6.1-4).

The hedgerows and field edges were surveyed by randomly placing a transect across one heavily wooded hedgerow (Study Area B, Figure 6.1-1) and one less mature field edge (Study Area A, Figure 6.1-1). Plant species were identified along the transect and measurements were made as to distance from adjacent field borders and changes in elevation. In this way, cross sectional diagrams were prepared to give a qualitative view of two typical and common habitats on site (Figures 6.1-2 and 6.1-3).

The entire site and immediate surrounding area were then surveyed and all species observed were recorded and placed in appropriate habitats in order to compile a site species list (Table 6.1-5).

6.1.1.2 Survey Results

Swamp Forest

This forest represented the least disturbed and oldest ecosystem surveyed during site investigations. A drainage ditch allowed the formation of a pond on the margin of this woodland. This, together with nearby beaver dams increased flooding and dampness within the forest. Some of the more common trees of this woodland (Table 6.1-5) were box elder (Acer negundo), silver maple (Acer saccharinum), hackberry (Celtis occidentalis), green ash (Fraxinus pennsylvanica), honey locust (Gleditsia triacanthos), water elm (Planera aquatica), and overcup oak (Quercus lyrata). Because of a closed canopy, shrub, understory, and ground cover were generally sparse. Species present in the understory and shrub layer included buttonbush (Cephalanthus occidentalis), swamp privet (Forestiera acuminata), and possum haw (Ilex decidua). Vines were common to the swamp forest and included pepper vine (Ampelopsis arborea), buckwheat vine (Brunnichia cirrhosa), trumpet creeper (Campsis radicans), Virginia creeper (Parthenocissus quinquefolia), and catbrier (Smilax bona-nox). Ground cover was present in scattered localities throughout the forest. Some of the more common herbaceous plants

included false nettle (Boehmeria cylindrica), wood nettle (Laportea canadensis), and day flower (Commelina virginica).

Portions of this forest adjacent to the pond contained species such as water elm and swamp privet that are characteristic of a river swamp community. The majority of this woodlot, however, was at a slightly greater elevation and possessed a species composition that indicated a successional change to a less hydric situation. The present forest composition most closely resembled that of a river border community. As succession continues within this forest type, a mixed bottomland forest dominated by sweet gum-red maple-swamp oak, may eventually form (Braun, 1950).

Upland Forest

An isolated woodlot (Study Area C) located between the site and the river contained less hydric species more characteristic of the Oak-Hickory Forest Region (Tables 6.1-1 through 6.1-4). This area is considered upland forest and offered an insight into what forest types occur on more well drained sites. This forest was younger in age than the river border community previously described, and the more open canopy within the forest allowed a greater development of understory, shrub layer, and ground cover.

Importance values for the overstory, understory, shrub layer, and ground cover were computed to characterize the species composition of this forest community (Tables 6.1-1 through 6.1-4). The importance values are the sum of the relative density, relative dominance, and relative frequency, also given in the tables. The forest understory (Table 6.1-1) was dominated by bitternut hickory and slippery elm. The overstory (Table 6.1-2) was dominated by red oak (Quercus rubra). Other important constituents of the overstory were bitternut hickory (Carya cordiformis), slippery elm (Ulmus rubra), ash (Fraxinus sp.) and sweet gum (Liquidambar styraciflua). The shrub layer (Table 6.1-3) was dominated by red buckeye (Aesculus pavia) and slippery elm, while less important species included bitternut hickory, possum haw, and hawthorn (Crataegus sp.). The ground cover (Table 6.1-4) was dominated by

Japanese honeysuckle (Lonicera japonica). This plant, however, was present in scattered local concentrations as is indicated by its extremely low relative frequency.

Many of the species of this forest such as false buckthorn (Bumelia lanuginosa), eastern redbud (Cercis canadensis), red buckeye, and post oak (Quercus stellata) suggest a close association to the Oak-Hickory Forest Region which occurs west of the site.

Woody Hedgerows and Forested Edge

The woody hedgerows and forested edge form the most widely scattered vegetation type in the site vicinity (Table 6.1-5). Most hedgerows are located between agricultural fields along drainage creeks. The creeks are generally seasonal streams carrying water only during periods of heavy precipitation. Examples of the structure of hedgerow communities in the area are presented in Figures 6.1-2 and 6.1-3.

The center of the hedgerow is lowest in elevation and forms the bed of the seasonal stream. Species of this low area generally are adapted to a moist habitat which is comparable to portions of the previously discussed poorly drained forest and swamp. Commonly encountered woody species included silver maple, ash, and buttonbush. Ground cover tended to be sparse in the center of most hedgerows. Species present included rose mallow (Hibiscus lasiocarpus), broadleaf uniola (Uniola latifolia), and poison ivy (Rhus radicans).

The elevated outer margins of the hedgerow comprise a better drained wooded habitat. Trees of common occurrence included honey locust, osage orange (Maclura pomifera), red mulberry (Morus rubra), and sycamore (Plantanus occidentalis). If the land presently in agriculture was allowed to proceed through the stages of natural succession, species composition would be expected to be similar. This forest type has been defined as a river border community (Braun, 1950).

Vines were of particular abundance in all portions of hedgerows and forested edge. Some of the more common species included raccoon grape (Ampelopsis cordata), buckwheat vine, trumpet creeper, Japanese honeysuckle, and Virginia creeper. Because hedgerows are very narrow in

width and often possess a rather open canopy, they are commonly invaded by early successional species that require an abundance of sunlight. Common invading species include common ragweed (Ambrosia artemisiifolia), giant ragweed (A. trifida), horseweed (Erigeron canadensis), pokeweed (Phytolacca americana), and horse nettle (Solanum carolinense).

Species composition of hedgerows was generally uniform over much of the study area. Forested edge and hedgerows bordering the White River were similar to those located a greater distance from the river. This tends to support the assumption that the site would develop into a rather uniform forest with species comparable to those present along hedgerows if allowed to proceed through the stages of natural succession.

Herbaceous Hedgerows and Field Margins

This habitat was found along the margins of cultivated fields. Clearing in the recent past has prevented succession from proceeding to the stage in which woody species become established. Species composition (Table 6.1-5) was similar throughout the site area. Species of particular abundance and widespread occurrence included common ragweed, daisy fleabane (Erigeron annuus), horseweed, Johnson grass (Sorghum halepense), pepper grass (Lepidium virginicum), nodding spurge (Euphorbia maculata), and prickly lettuce (Lactuca scariola).

Ditch and Pond Bank

Vegetation bordering the drainage ditches and ponds in the site vicinity includes plants adapted to a moist or semi-aquatic habitat (Table 6.1-5). Clearing in the recent past has created an early successional community comprised of species such as tooth-cup (Ammannia coccinea), knotweed (Polygonum densiflorum), marsh yellow cress (Rorippa islandica), grass-leaved arrowhead (Sagittaria graminea), and blue vervain (Verbena hastata). Black willow (Salix nigra) constituted the initial woody invader of this habitat.

Summary

In summary, the forested section discussed under swamp forest has reached the highest degree of successional development onsite. This

forested tract as well as the upland forest block is relatively small when viewed in a regional perspective and can be expected to receive a higher degree of disturbances from surrounding cultivated land than larger wooded areas. Although woody hedgerows and forested edge may possess mature tree species, the relative narrow width enables surrounding early successional growth to heavily influence the species composition of understory, shrub layer, and ground cover. The remaining site area habitats should be considered of low ecological value since they are capable of developing through succession in a relatively short period of time..

No rare or endangered species or plant communities of ecological uniqueness were observed during site investigations.

6.1.2 Amphibians and Reptiles

Diverse habitats, both natural and man influenced, which are useful to many species of terrestrial and aquatic herpetiles (reptiles and amphibians) may be expected in the site vicinity. Of the 93 species of herpetiles which can be found in Arkansas (Conant, 1975), approximately 70 include the Independence site in their range (Table 6.1-6). Local population numbers and available habitat dictate which species occur on the site.

6.1.2.1 Methods

Amphibians and reptiles were recorded whenever they were encountered in all areas surveyed for vegetation, birds, and mammals. Additional observations were made during night-lighting efforts which covered 5.4 miles of State Highway 69 from its junction with State Highway 122 near the western boundary of the site to the eastern boundary of the site. Drainage canals near the survey route were also searched during the night-lighting effort. Identification and nomenclature follow Conant (1975).

6.1.2.2 Survey Results

The habitats near the site which are useful to herpetiles are generally limited to those which are undisturbed by man. The fence rows

and small woodlots found in the site area are typical havens for upland species such as the northern fence lizard (Sceloporus undulatus hyacinthinus), ground skink (Leiolopisma laterale), ornate box turtle (Terrapene ornata ornata), and the southern black racer (Coluber constrictor priapus). Cover is abundant in these areas, as is food in the form of insects for skinks and lizards, fruits and vegetation for the box turtle, and rodents for snakes. Population densities are probably quite low, particularly in the fence rows, as the amount of cover is limited by the width of the fence row. Hawks and owls probably prey heavily on any snake or lizard that ventures out into the surrounding fields.

The drainage canals near the site present habitat that is useful to many amphibians and several aquatic reptiles. Frogs and toads were abundant in these areas, and the marbled salamander (Ambystoma opacum) and spotted salamander (A. maculatum) could occur here. Turtles such as the snapping turtle (Chelydra serpentina), mud turtle (Kinosternon sp.), map turtle (Graptemys geographica), and softshell (Trionyx sp.) are expected here. Several species of water snakes as well as garter (Thamnophis sirtalis sirtalis) and ribbon snakes (T. sauritus sauritus) can find suitable habitat and food sources (frogs, toads) in these canals.

The White River is an important habitat for aquatic herpetiles. All the turtles mentioned previously as well as the red-eared slider (Chrysemys scripta elegans), Missouri slider (Chrysemys floridana hoyi), and stinkpot (Sternotherus odoratus) are expected to occur in the White River. Much of the shoreline near the site has been swept clean of debris so there is little habitat available to snakes or lizards except in cases where undisturbed vegetation is found near the river.

The species which were actually observed in the vicinity and are reasonably expected to occur on the site are presented in EIS Table 5.5-4. The green treefrog (Hyla cinerea), southern leopard frog (Rana utricularia), Fowler's toad (Bufo woodhousei fowleri), and dwarf American toad (Bufo americanus charlesmithi) were observed on the road during the night

survey. Upland chorus frogs (Pseudacris triseriata feriarum) were heard calling from drainage canals at night. The ornate box turtle was found along a fence row near the site and the red-eared slider was observed along the bank of the White River.

The only endangered or threatened herpetile that may occur on this site is the ornate box turtle. This herpetile is considered endangered in Arkansas and although it may occur on the site, is found primarily in prairie-grassland habitats in the interior highlands (northwestern) portion of the State. Habitats that are havens for this species occur off the site in the area and should provide ample food and cover for the migration of ornate box turtles that exist on this site.

6.1.3 Birds

Although a majority of the Independence site has been totally changed by man, this area is of considerable importance to several species of birds. Grain crops are a valuable food source to seed-eating and granivorous species while insects associated with agricultural lands are very attractive to insectivorous species. Fence rows in various stages of growth and scattered woodlots afford habitats to edge and woodland species, while the river and other water bodies attract aquatic birds and waterfowl.

Over 250 species of birds include the site within their natural ranges (Table 6.1-7). Twenty-five of these species were observed near the site. An additional eighteen species were seen during waterfowl surveys in the site vicinity.

6.1.3.1 Methods

Two methods of censusing avian populations were used on this site. These methods were an auto survey and a modified strip census. The auto survey covered 5.4 miles of paved and dirt roads in the site vicinity and was performed by driving slowly along the survey route and observing all birds seen or heard within 30 meters of each side of the road. This survey was run three mornings. The strip census was performed in two field edge habitats, one of recent vegetative growth (Study Area A) and the second of more mature species (Study Area B, Figure 6.1-1). In this

survey the observer walked a specified length of the edge habitat and noted all birds seen or heard within the habitat.

Additional observations were made at various points in the site area which did not lend themselves to quantitative sampling.

Waterfowl surveys were conducted in the site vicinity during the fall of 1976 (December) and the spring of 1977 (March). The fall survey was conducted with the use of a fixed-winged aircraft for one day's survey and a helicopter for the second day. The helicopter was used for both days during the spring. Areas covered included the White River from Batesville to Newport and then to Des Arc, the Black River from Newport to Elgin, and across the site itself from Oil Trough to Newark. The surveys were timed to coincide with fall and spring migrations in order to observe waterfowl uses of the area. Other waterbirds and shorebirds as well as hawks and eagles were noted wherever they occurred along the survey routes.

6.1.3.2 Survey Results

Mourning dove (Zenidura macroura), killdeer (Charadrius vociferas), and brown-headed cowbirds (Molothrus ater) were the most common birds near the site. This is to be expected as these birds utilize fields and croplands as feeding and gathering areas. The dove is migratory, although some individuals may be expected to live in the area. Killdeer are very common in fields and pastures, as are cowbirds. Cowbirds commonly feed in flocks containing red-winged blackbirds (Agelaius phoeniceus) and common grackles (Quiscalus quiscula) both of which occurred on the site. Other open field species observed here include the eastern meadowlark (Sturnella magna), common crow (Corvus brachyrhynchos), lark sparrow (Chondestes grammacus), horned lark (Eremophila alpestris), and scissor-tailed flycatcher (Muscivora forficata).

Study Area A, a field edge vegetated primarily with common ragweed, affords usable habitat to bird species associated with open fields and early successional plant species. Mourning doves occurred here in abundance. Red-winged blackbirds and common grackles were also common.

All of these species use the edge primarily for roosting, and feed in the nearby fields. Species observed here that utilize the edge for cover or nesting include the bobwhite (Colinus virginianus), red-bellied woodpecker (Centurus carolinus), cardinal (Richmondia cardinalis), and yellow-breasted chat (Icteria virens). The woodpecker and chat are probably more dependent on nearby deciduous trees than on this habitat, but they were observed feeding here.

The second strip census area (Study Area B) was a field edge with mature vegetation offering a more varied habitat for birds. The dominant species here was the indigo bunting (Passerina cyanea) which utilizes hedgerows and wood margins as preferred habitats. Other species found here were the cardinal, common flicker (Colaptes auratus), white-eyed vireo (Vireo griseus) and wood thrush (Hylocichla mustelina). A pair of red-bellied woodpeckers had a nest in a mature elm within the field edge.

Miscellaneous observations around the site included five immature little blue herons (Florida caerulea) and one spotted sandpiper (Actitis macularia) seen on the shore of Round Lake, along with six killdeer.

The two waterfowl surveys provided interesting data. Waterfowl were not very abundant in Arkansas during the fall of 1976 as water levels were lower than normal and waterfowl which had flown south at the time of the survey continued on to Louisiana where water was more plentiful. The first survey was accomplished in a single-engine airplane. No waterfowl were seen near the site, but several belted kingfishers (Megasceryle alcyon) were observed along the White River between Batesville and Newport. A helicopter was used the second day of the survey. Twenty-eight mallards (Anas platyrhynchos), fifteen great blue herons (Ardea herodias), several killdeer, one marsh hawk (Circus cyaneus), and an adult bald eagle (Haliaeetus leucocephalus) were seen on the White River between Newport and Batesville. The eagle was observed perched in a tree on the south side of the White River approximately 10 miles west of the Independence site. This species is listed as a rare and endangered species (Federal Register, 1977) and is included on the Black List in Arkansas as a species which nested in the State at one time but is no

longer recorded as a nesting species (Arkansas Department of Planning, 1974). The site, therefore, is not important to the eagle as a nesting area but could be utilized occasionally as a feeding and resting area during migration.

The spring waterfowl survey proved very fruitful. At the time of the survey, the Black River had reached flood stage due to heavy rains in Missouri. This caused much of the area on both sides of the Black River to be flooded, and likewise the White River was out of its banks south of Newport (confluence of Black and White Rivers). This condition afforded an abundance of water useful to waterfowl returning north. A helicopter was used on both survey days. During the first day, approximately 5000 ducks were seen in flooded fields along the Black River one mile north of Newport. The majority of these ducks were mallards, but several hundred widgeon (Anas americana) and a few shovelers (A. clypeata) were also seen. Several smaller flocks of mallards (20 to 30 ducks per flock) were seen on the White River from Newport to Batesville. The second survey proceeded south of Newport on the White River where 5000 to 6000 mallards were seen in at least ten different groups. As was noted on the Black River the previous day, these ducks were found in fields flooded by the river. Thirteen small groups of mallards were seen in the vicinity of the site along the White River. The only wood ducks (Aix sponsa) seen on this survey were observed on the White River near the site. Wood ducks are usually residents, whereas the other ducks seen are migrants.

No rare or endangered species are expected to occur on the site. The great blue heron and little blue heron could be expected on nearby water bodies like Round Lake and the White River. These species are on the Red List in Arkansas, meaning they are considered threatened as breeding populations. Whether these species actually breed near the site is unknown.

6.1.4 Mammals

The fact that the Independence site is located very near the transition zone between the mountain and delta regions as well as on a major

river makes this an interesting site ecologically. Mammals whose natural range includes the site area are given in Table 6.1-8. The site is so heavily utilized for agricultural purposes, however, that little of the area is in a natural state. The primary habitats existing on or near the site are presently cropland, fence rows and field edges, and small woodlots.

6.1.4.1 Methods

Fence rows and field edges were the most common undisturbed habitats near the site, therefore, trap lines for rodents were established in two of these areas. These traplines consisted of 34 snaptraps placed in pairs at trap sites located along transects in each type of field edge. These traps were set for three nights yielding results from 102 trap-nights per trapline.

The first trapline (Study Area A, Figure 6.1-1) was established in a field margin near the White River. The area was vegetated primarily with common ragweed indicating it had been plowed recently and was becoming revegetated with early successional plants. The second trapline (Study Area B) was located within a more mature hedgerow near the eastern loop of Hulsey Bend.

Medium and large mammals were surveyed, at night with the aid of spotlights, along State Highway 69 and farm roads in the study area. In addition, tracks and droppings were identified wherever encountered on-site.

6.1.4.2 Survey Results

Seven white-footed mice (Peromyscus leucopus) and three house mice (Mus musculus) were captured in Study Area A. The white-footed mouse is a common rodent in this area. It prefers brushy habitats but is frequently found in open areas. The house mouse is common wherever man is found and usually occurs around barns and out-buildings but does infest fields and field edges. This habitat offers very adequate cover in the form of dense, tall stands of ragweed which protect the rodents from both avian and terrestrial predators. Food is found in abundance when crops are present in adjacent fields, and natural grasses provide food when crops are unavailable.

Two white-footed mice were collected in Study Area B. The vegetation here is quite diverse. Mature trees of several species provide aerial cover, while a ground cover of poison ivy, rose mallow, and other species occurs nearer the forest floor. Food in the form of seeds, berries, nuts, insects, and crops (soybeans and milo) in the adjacent fields may be found in abundance here. Burrows of an eastern mole (Scalopus aquaticus) were observed along this hedgerow. This subterranean insectivore prefers the moist soil found within this habitat.

A single eastern gray squirrel (Sciurus carolinensis) was seen in the wooded fence row (Study Area B). It can find adequate food, cover, and nesting sites in the mature sycamore, cottonwood, elm, and oak trees found in this habitat. An eastern cottontail (Sylvilagus floridanus) was also seen here. It can be expected to feed heavily in the croplands and depend on the field edges for cover and nesting requirements and as a standby food source.

Raccoon (Procyon lotor) tracks were found around every area where water occurred. Raccoons are opportunistic feeders and eat anything from crayfish and salamanders to fruits and berries. Opossums (Didelphis marsupialis) are scavengers and opportunistic feeders which would also be found here.

A beaver (Castor canadensis) was seen swimming in one of the drainage canals adjacent to State Highway 69 during a night survey. Beaver dams were found on several of the canals and natural drainages near the site.

The whitetail deer (Odocoileus virginianus) is the only large mammal which regularly occurs in this area. The proliferation of cropland and lack of cover have made the entire Delta region somewhat non-productive for the deer. The northeast corner of Arkansas is practically all cropland and yielded the lowest harvest of deer in the State during the 1975-76 season (Arkansas Game and Fish Commission, 1976). Deer do feed heavily on crops when cover is nearby, but in instances where there is little cover as on the Independence site, deer are not expected to occur.

Table 6.1-1

Independence Site - Upland Forest Understory - July 1977 Survey
(Diameter 2.5-10 cm)

Scientific Name	Common Names	No. Trees	Rel. Freq. (%)	Rel. Den. (%)	Rel. Dom. (%)	Imp. Val.	Density Trees/Acre	Mean Basal Area sq in/tree	Total Basal Area sq in/acre
<u>Carya cordiformis</u>	Bitternut hickory	22	28.9	36.7	38.0	103.6	204.1	7.1	1445.7
<u>Ulmus rubra</u>	Slippery elm	16	24.4	26.7	34.0	85.1	148.4	8.7	1296.1
<u>Bumelia lanuginosa</u>	Fake buckthorn	4	8.9	6.7	2.2	17.8	37.1	2.2	82.3
<u>Gleditsia triacanthos</u>	Honey locust	3	4.4	5.0	5.5	14.9	27.8	7.6	211.1
<u>Liquidambar styraciflua</u>	Sweetgum	2	4.4	3.3	2.8	10.5	18.6	5.8	107.0
<u>Fraxinus sp.</u>	Ash	2	4.4	3.3	2.1	9.8	18.6	4.3	79.9
<u>Celtis occidentalis</u>	Hackberry	2	4.4	3.3	1.8	9.5	18.6	3.8	69.6
<u>Quercus rubra</u>	Red oak	1	2.2	1.7	3.8	7.7	9.3	15.6	144.7
<u>Juniperus virginiana</u>	Redcedar	1	2.2	1.7	2.3	6.1	9.3	9.6	89.3
<u>Quercus stellata</u>	Post oak	1	2.2	1.7	1.8	5.7	9.3	7.2	66.6
<u>Diospyros virginiana</u>	Persimmon	1	2.2	1.7	1.8	5.7	9.3	7.2	66.6
<u>Quercus velutina</u>	Black oak	1	2.2	1.7	1.2	5.1	9.3	5.1	47.2
<u>Morus rubra</u>	Red mulberry	1	2.2	1.7	1.2	5.1	9.3	5.1	47.4
<u>Cercis canadensis</u>	Eastern redbud	1	2.2	1.7	1.2	5.1	9.3	2.0	18.6
TOTALS		60	99.6	100.2	99.9	299.6	556.9		3809.4

Rel. Freq. = Relative Frequency
Rel. Dens. = Relative Density

Rel. Dom. = Relative Dominance
Imp. Val. = Importance Value

Source: Cottam and Curtis, 1956

Table 6.1-2

Independence Site - Upland Forest Overstory - July 1977 Survey
(Diameter 2.5-10 cm)

Scientific Name	Common Names	No. Trees	Rel. Freq. (%)	Rel. Den. (%)	Rel. Dom. (%)	Imp. Val.	Density Trees/Acre	Mean Basal Area sq in/tree	Total Basal Area sq in/acre
<u>Quercus rubra</u>	Red oak	11	16.9	18.3	47.2	82.4	25.7	212.8	5468.2
<u>Carya cordiformis</u>	Bitternut hickory	14	19.0	23.3	6.9	49.2	32.7	24.3	794.6
<u>Ulmus rubra</u>	Slippery elm	12	14.2	20.0	67.1	46.3	28.0	49.9	1397.9
<u>Fraxinus</u> sp.	Ash	8	19.0	13.3	6.8	39.1	18.7	41.9	782.7
<u>Liquidambar styraciflua</u>	Sweetgum	4	7.1	6.7	14.8	28.6	9.3	183.5	1715.0
<u>Quercus veluntina</u>	Black oak	2	4.7	3.3	5.3	13.3	4.7	131.2	613.2
<u>Cercis canadensis</u>	Eastern redbud	3	4.7	5.0	1.4	11.1	7.0	23.7	166.0
<u>Gleditsia triacanthos</u>	Honey locust	2	4.7	3.3	1.0	9.0	4.7	24.5	114.7
<u>Quercus stellata</u>	Post oak	1	2.3	1.7	1.6	5.6	2.3	81.5	190.4
<u>Quercus nuttallii</u>	Nuttall's oak	1	2.3	1.7	1.3	5.3	2.3	62.4	145.7
<u>Bumelia lanuginosa</u>	False buckthorn	1	2.3	1.7	1.1	5.1	2.3	55.9	130.5
<u>Celtis occidentalis</u>	Hackberry	1	2.3	1.7	0.6	4.6	2.3	30.3	70.7
TOTALS		60	99.5	100.0	100.0	299.6	140.0		11,589.6

Rel. Freq. = Relative Frequency
Rel. Dens. = Relative Density

Rel. Dom. = Relative Dominance
Imp. Val. = Importance Value

Source: Cottam and Curtis, 1956

Table 6.1-3

Independence Site - Upland Forest Shrub Layer - July 1977 Survey

Scientific Name	Common Name	Rel. Freq. (%)	Rel. Den. (%)	Rel. Dom. (%)	Imp. Val.	Density/Acre
<u>Aesculus pavia</u>	Red buckeye	15.9	30.2	36.3	82.4	433
<u>Ulmus rubra</u>	Slippery elm	20.3	28.0	24.5	72.8	404
<u>Fraxinus</u> sp.	Ash	10.1	8.4	9.6	28.1	125
<u>Carya cordiformis</u>	Butternut hickory	11.6	8.9	6.1	26.6	125
<u>Ilex decidua</u>	Possum haw	5.8	5.8	6.4	18.0	87
<u>Crataegus</u> sp.	Hawthorn	7.2	3.1	4.8	15.1	48
<u>Quercus rubra</u>	Red oak	4.3	4.0	2.7	11.0	58
<u>Cercis canadensis</u>	Eastern redbud	5.8	2.7	2.5	11.0	39
<u>Quercus velutina</u>	Black oak	2.9	2.2	1.9	7.0	29
<u>Morus rubra</u>	Red mulberry	2.9	0.9	1.0	4.8	10
<u>Nyssa sylvatica</u>	Blackgum	2.9	0.9	0.6	4.4	10
<u>Prunus serotina</u>	Black cherry	1.4	0.4	0.6	2.4	10
<u>Bumelia lanuginosa</u>	False buckthorn	1.4	0.4	0.3	2.1	10
TOTALS		99.5	99.9	99.8	299.4	1388

Rel. Freq. = Relative Frequency
 Rel. Dens. = Relative Density

Rel. Dom. = Relative Dominance
 Imp. Val. = Importance Value

Table 6.1-4

Independence Site - Upland Forest Ground Layer - July 1977 Survey

Page 1 of 2

Scientific Name	Common Name	Rel. Freq. (%)	Rel. Den. (%)	Rel. Dom. (%)	Imp. Val.	Density/Acre
<u>Lonicera japonica</u>	Japanese honeysuckle	4.4	35.0	25.0	64.4	17,908
<u>Campsis radicans</u>	Trumpet creeper	8.9	5.6	13.4	27.9	2,904
Graminae	Grass	11.1	10.0	5.8	26.9	5,324
<u>Silene stellata</u>	Starry campion	8.9	6.9	8.5	24.3	3,872
<u>Amsonia tabernaemontana</u>	Blue-star	2.2	6.9	12.2	21.3	3,388
<u>Geum canadense</u>	White avens	4.4	5.6	8.5	18.5	2,904
<u>Fraxinus</u> sp.	Ash	11.1	3.1	1.8	16.0	1,452
<u>Berchemia scandens</u>	Supple-jack	6.7	5.0	3.4	15.1	2,420
<u>Carex</u> sp.	Sedge	2.2	5.0	7.6	14.8	2,420
<u>Parthenocissus quinquefolia</u>	Virginia creeper	6.7	5.0	2.7	14.4	2,420
<u>Celtis occidentalis</u>	Hackberry	6.7	2.5	0.9	10.1	1,452
<u>Ulmus rubra</u>	Slippery elm	6.7	1.9	1.5	10.1	968
<u>Rhus radicans</u>	Poison ivy	4.4	2.5	2.5	9.3	1,452

6.1-17

Table 6.1-4 (Continued)

Scientific Name	Common Name	Rel. Freq. (%)	Rel. Den. (%)	Rel. Dom. (%)	Imp. Val.	Density/Acre
<u>Cercis canadensis</u>	Eastern redbud	4.4	1.3	1.8	7.5	484
<u>Rubus</u> sp.	Bramble	2.2	0.6	3.0	5.8	484
<u>Labiate</u>	Mint	2.2	1.3	0.3	3.8	484
<u>Menispermum canadense</u>	Moonseed	2.2	0.6	0.3	3.1	484
<u>Smilax bona-nox</u>	Catbrier	2.2	0.6	0.3	3.1	484
<u>Quercus rubra</u>	Red oak	2.2	0.6	0.3	3.1	484
TOTALS		99.8	100.0	99.7	299.5	51,788

Rel. Freq. = Relative Frequency

Rel. Dens. - Relative Density

Rel. Dom. = Relative Dominance

Imp. Val. - Importance Value

Source: Cottam and Curtis, 1956

Table 6.1-5

Independence Site Total Trees and Shrubs Survey - July 1977

Page 1 of 4

SCIENTIFIC NAME	COMMON NAME	HABITAT				
		Swamp Forest	Upland Forest	Woody Hedgerow	Herbaceous Hedgerow	Ditch and Pond Bank
<u>TREES AND SHRUBS</u>						
<u>Acer negundo</u>	Box elder	X		X		
<u>A. saccharinum</u>	Silver maple	X		X		
<u>Aesculus pavia</u>	Red buckeye		X			
<u>Arundinaria gigantea</u>	Cane			X		
<u>Bumelia lanuginosa</u>	False buckthorn		X			
<u>Carya cordiformis</u>	Bitternut hickory		X			
<u>C. illinoensis</u>	Pecan			X		
<u>Celtis occidentalis</u>	Hackberry	X	X	X		
<u>Cephalanthus occidentalis</u>	Buttonbush	X		X		
<u>Cercis canadensis</u>	Eastern redbud		X			
<u>Cornus drummondii</u>	Rough-leaved dogwood			X		
<u>Corylus americana</u>	Hazelnut			X		
<u>Crataegus</u> sp.	Hawthorn		X			
<u>Diospyros virginiana</u>	Persimmon		X	X		
<u>Forestiera acuminata</u>	Swamp privet	X				
<u>Fraxinus americana</u> var <u>americana</u>	White ash			X		
<u>F. pennsylvanica</u> var <u>subintegerruna</u>	Green ash	X				
<u>F. tomentosa</u>	Pumpkin ash			X		

6.1-19

Table 6.1-5 (Continued)

	SCIENTIFIC NAME	COMMON NAME	HABITAT				
			Swamp Forest	Upland Forest	Woody Hedgerow	Herbaceous Hedgerow	Ditch and Pond Bank
	<u>Gleditsia triacanthos</u>	Honey locust	X	X	X		
	<u>Ilex decidua</u>	Possum haw	X	X	X		
	<u>Maclura pomifera</u>	Osage orange			X		
	<u>Morus rubra</u>	Red mulberry		X	X		
	<u>Nyssa sylvatica</u>	Black gum		X			
	<u>Planera aquatica</u>	Water elm	X				
	<u>Platanus occidentalis</u>	Sycamore			X		
	<u>Populus deltoides</u>	Cottonwood			X		
6.1-20	<u>Prunus serotina</u>	Black cherry		X			
	<u>Quercus lyrata</u>	Overcup oak	X				
	<u>Q. nuttallii</u>	Nuttalls oak		X			
	<u>Q. rubra</u>	Red oak		X			
	<u>Q. stellata</u>	Post oak		X			
	<u>Q. velutina</u>	Black oak		X			
	<u>Rhus glabra</u>	Smooth sumac			X		
	<u>R. radicans</u>	Poison ivy	X	X	X		
	<u>Rubus sp.</u>	Bramble		X			
	<u>Salix nigra</u>	Black willow			X		
	<u>Sambucus canadensis</u>	Common elderberry			X		
	<u>Sassafras albidum</u>	Sassafras			X		
	<u>Ulmus rubra</u>	Slippery elm	X	X	X		
	<u>Juniperus virginiana</u>	Redcedar		X			
	<u>Liquidambar styraciflua</u>	Sweetgum		X			

Table 6.1-5 (Continued)

Page 3 of 4

SCIENTIFIC NAME	COMMON NAME	HABITAT				
		Swamp Forest	Upland Forest	Woody Hedgerow	Herbaceous Hedgerow	Ditch and Pond Bank
<u>VINES</u>						
<u>Ampelopsis arborea</u>	Pepper vine	X				
<u>A. cordata</u>	Raccoon grape			X		
<u>Berchemia scandens</u>	Supple-jack		X			
<u>Brunnichia cirrhosa</u>	Buckwheat vine	X	X	X		
<u>Campsis radicans</u>	Trumpet creeper	X	X	X	X	
<u>Ipomoea pandurata</u>	Wild potato vine			X		
<u>Lonicera japonica</u>	Japanese honeysuckle		X	X		
<u>Menispermum canadense</u>	Moonseed		X	X		
<u>Parthenocissus quinquefolia</u>	Virginia creeper	X	X	X		
<u>Passiflora incarnata</u>	Maypops			X	X	
<u>Smilax bona-nox</u>	Catbrier	X	X			
<u>Vitus rotundifolia</u>	Muscadine			X		
<u>HERBS</u>						
<u>Amaranthus hybridus</u>	Green amaranth				X	X
<u>Ambrosia artemisiifolia</u>	Common ragweed			X	X	
<u>A. trifida</u>	Giant ragweed			X	X	
<u>Ammannia coccinea</u>	Tooth-cup					X
<u>Amsonia tabernaemontana</u>	Blue-star		X			
<u>Boehmeria cylindrica</u>	False-nettle	X				
<u>Carex sp.</u>	Sedge		X			
<u>Commelina virginica</u>	Day flower	X				

Table 6.1-5 (Continued)

SCIENTIFIC NAME	COMMON NAME	HABITAT				
		Swamp Forest	Upland Forest	Woody Hedgerow	Herbaceous Hedgerow	Ditch and Pond Bank
<u>Erigeron annuus</u>	Daisy fleabane				X	
<u>E. canadensis</u>	Horseweed			X	X	
<u>Euphorbia maculata</u>	Nodding spurge				X	
<u>Geum canadense</u>	White avens		X			
Graminae	Grass		X			
<u>Hibiscus lasiocarpus</u>	Rose mallow			X		X
Labiatae	Mint		X			
<u>Lactuca scariola</u>	Prickley lettuce				X	
<u>Laportea canadensis</u>	Wood nettle	X				
<u>Lepidium virginicum</u>	Pepper grass				X	
<u>Lespedezia cuneata</u>	Sericea lespedezia				X	
<u>Phytolacca americana</u>	Pokeweed			X		
<u>Polygonum densiflorum</u>	Knotweed					X
<u>Rorippa islandica</u>	March yellow cress					X
<u>Sagittaria graminea</u>	Grass-leaved arrowhead					X
<u>Silene stellata</u>	Starry campion		X			
<u>Solanum carolinense</u>	Horse nettle			X		
<u>Sorghum halepense</u>	Johnson grass				X	
<u>Uniola latifolia</u>	Broadleaf uniola			X		
<u>Verbena hastata</u>	Blue vervain					X
<u>Viola</u> sp.	Violet	X				
<u>Xanthium strumarium</u>	Cocklebur			X	X	X

Table 6.1-6

Reptiles and Amphibians Which May
Occur in the Vicinity of the Independence Site

Page 1 of 4

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Hedgerows & Field Edges	Forests	Rivers & Lakes
REPTILES					
<u>Chelydra serpentina</u>	Snapping turtle				X
<u>Macroclemys temmincki</u>	Alligator snapping turtle				X
<u>Sternotherus odoratus</u>	Stinkpot				X
<u>Kinosternon subrubrum hippocrepis</u>	Mississippi mud turtle				X
<u>Terrapene carolina triunguis</u>	Three-toed box turtle		X	X	
<u>T. ornata ornata</u>	Ornate box turtle		X	X	
<u>Graptemys geographica</u>	Map turtle				X
<u>G. kohni</u>	Mississippi map turtle				X
<u>G. pseudogeographica ouachitensis</u>	Ouachita map turtle				X
<u>Chrysemys scripta elegans</u>	Red-eared turtle				X
<u>C. concinna hieroglyphica</u>	Slider				X
<u>C. floridama hoyi</u>	Missouri slider				X
<u>C. picta dorsalis</u>	Southern painted turtle				X
<u>Deirochelys reticularia miaria</u>	Western chicken turtle				X
<u>Trionyx muticus muticus</u>	Midland smooth softshell				X
<u>T. spiniferus hartwegi</u>	Western spiny softshell				X
<u>Anolis carolinensis</u>	Green anole		X	X	
<u>Sceloporus undulatus hyacinthinus</u>	Northern fence lizard		X	X	
<u>Cnemidophorus sexlineatus</u>	Six-lined racerunner		X	X	

Table 6.1-6 (Continued)

Page 2 of 4
Habitat

Scientific Name	Common Name	Cropland & Fields	Hedgerows & Field Edges	Forests	Rivers & Lakes
<u>Leiolopisma laterale</u>	Ground skink		X	X	
<u>Eumeces fasciatus</u>	Five-lined skink		X	X	
<u>E. laticeps</u>	Broad-headed skink		X	X	
<u>Ophisaurus attenuatus attenuatus</u>	Western slender glass lizard		X	X	
<u>Natrix cyclopion</u>	Green water snake				X
<u>N. rhombifera</u>	Diamondback water snake				X
<u>N. erythrogaster neglecta</u>	Northern copper belly				X
<u>N. sipedon pleuralis</u>	Midland water snake				X
<u>N. fasciata confluens</u>	Broad-banded water snake				X
<u>N. grahami</u>	(S) Graham's water snake				X
<u>Storeria dekayi wrightorum</u>	Midland brown snake		X	X	
<u>S. occipitomaculata</u>	Northern red-bellied snake		X	X	
<u>Thamnophis sirtalis sirtalis</u>	Eastern garter snake		X	X	X
<u>T. proximus</u>	Western ribbon snake				X
<u>Virginia valeriae elegans</u>	Western earth snake		X		
<u>Heterodon platyrhinos</u>	Eastern hognose snake		X	X	
<u>Diadophis punctatus stictogenys</u>	Mississippi ringneck snake			X	
<u>Carphophis amoenus vermis</u>	Western worm snake			X	
<u>Farancia abacura reinwardti</u>	Western mud snake				X
<u>Coluber constrictor priapus</u>	Southern black racer		X	X	
<u>Masticophis flagellum flagellum</u>	Eastern coachwhip		X	X	
<u>Opheodrys aestivus</u>	Rough green snake		X	X	

Table 6.1-6 (Continued)

Page 3 of 4

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Hedgerows & Field Edges	Forests	Rivers & Lakes
<u>Elaphe obsoleta obsoleta</u>	Black rat snake		X	X	
<u>Lampropeltis getulus holbrooki</u>	Speckled kingsnake		X	X	
<u>L. triangulum sypila</u>	Red milk snake		X	X	
<u>L. calligaster calligaster</u>	Prairie kingsnake		X	X	
<u>Cemophora coccinea</u>	(S) Scarlet snake		X	X	
<u>Tantilla gracilis hallowelli</u>	Northern flat-headed snake		X	X	
<u>Agkistrodon contortrix contortrix</u>	Southern copperhead		X	X	
<u>A. piscivorus leucostoma</u>	Western cottonmouth			X	X
<u>Sistrurus miliarius streckeri</u>	Western pygmy rattlesnake			X	
<u>Crotalus horridus atricaudatus</u>	Canebrake rattlesnake			X	
AMPHIBIANS					
<u>Necturus maculosus louisianensis</u>	Louisiana waterdog				X
<u>Amphiuma tridactylum</u>	Tree-toed amphiuma				X
<u>Siren intermedia nettingi</u>	Western lesser siren				X
<u>Ambystoma opacum</u>	Marbled salamander				X
<u>A. texanum</u>	Small-mouthed salamander				X
<u>A. maculatum</u>	Spotted salamander				X
<u>A. tigrinum</u>	Eastern tiger salamander				X
<u>Notophthalmus viridescens louisianensis</u>	Central newt				X
<u>Bufo americanus charlesmithi</u>	Dwarf american toad		X	X	
<u>B. woodhousei fowleri</u>	Fowler's toad		X	X	

Table 6.1-6 (Continued)

Page 4 of 4

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Hedgerows & Field Edges	Forests	Rivers & Lakes
<u>Acris crepitans blanchardi</u>	Blanchard's cricket frog				X
<u>Hyla crucifer crucifer</u>	Northern spring peeper		X	X	X
<u>H. cinerea</u>	Green treefrog				X
<u>H. chrysoscelis</u>	Gray treefrog				X
<u>Pseudacris triseriata feriarum</u>	Upland chorus frog				X
<u>Gastrophryne carolinensis</u>	Eastern narrow-mouthed toad		X	X	
<u>Rana catesbeiana</u>	Bullfrog				X
<u>R. clamitans clamitans</u>	Bronze frog				X
<u>R. utricularia</u>	Southern leopard frog				X
<u>R. palustris</u>	Pickereel frog				X

Note: (S) = Species of special concern due to lack of distributional data.

Table 6.1-7
Birds Which May Occur in
the Vicinity of the Independence Site

Page 1 of 12

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Gavia immer</u>	Common loon				X
<u>Podiceps auritus</u>	Horned grebe				X
<u>P. nigricollis</u>	Eared grebe				X
<u>Aechmophorus occidentalis</u>	Western grebe				X
<u>Podilymbus podiceps</u>	Pied-billed grebe				X
<u>Pelecanus erythrorhynchos</u>	White pelican				X
<u>Phalacrocorax auritus</u>	(B) Double-crested cormorant				X
<u>Ardea herodias</u>	(R) Great blue heron				X
<u>Butorides virescens</u>	Green heron				X
<u>Florida caerulea</u>	(R) Little blue heron				X
<u>Bubulcus ibis</u>	Cattle egret				X
<u>Casmerodius albus</u>	(R) Great egret				X
<u>Nycticorax nycticorax</u>	(R) Black-crowned night heron				X
<u>Nyctanassa violacea</u>	(R) Yellow-crowned night heron				X
<u>Botaurus lentiginosus</u>	American bittern				X
<u>Branta canadensis</u>	Canada Goose				X
<u>Anser albifrons</u>	White-fronted goose				X
<u>Chen caerulescens</u>	Snow goose				X

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Anas platyrhynchos</u>	Mallard				X
<u>A. rubripes</u>	Black duck				X
<u>A. strepera</u>	Gadwall				X
<u>A. acuta</u>	Pintail				X
<u>A. crecca</u>	Green-winged teal				X
<u>A. discors</u>	Blue-winged teal				X
<u>A. americana</u>	American wigeon				X
<u>A. clypeata</u>	Northern shoveler				X
<u>Aix sponsa</u>	Wood duck				X
<u>Aythya americana</u>	Redhead				X
<u>A. collaris</u>	Ring-necked duck				X
<u>A. valisineria</u>	Canvasback				X
<u>A. marila</u>	Greater scaup				X
<u>A. affinis</u>	Lesser scaup				X
<u>Bucephala clangula</u>	Common goldeneye				X
<u>B. albeola</u>	Bufflehead				X
<u>Clangula hyemalis</u>	Oldsquaw				X
<u>Melanitta nigra</u>	Black scoter				X
<u>Oxyura jamaicensis</u>	(R) Ruddy duck				X
<u>Lophodytes cucullatus</u>	(R) Hooded merganser				X
<u>Mergus merganser</u>	Common merganser				X
<u>M. serrator</u>	Red-breasted merganser				X

Table 6.1-7 (Continued)

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Cathartes aura</u>	Turkey vulture	X	X	X	
<u>Coragyps atratus</u>	Black vulture	X	X	X	
<u>Accipiter striatus</u>	(B) Sharp-shinned hawk	X	X		
<u>A. cooperii</u>	Cooper's hawk	X	X		
<u>Buteo jamaicensis</u>	Red-tailed hawk	X	X	X	
<u>B. lineatus</u>	(R) Red-shouldered hawk	X	X	X	
<u>B. platypterus</u>	Broad-winged hawk	X	X	X	
<u>Aquila chrysaetos</u>	(E,B) Golden eagle	X		X	
<u>Haliaeetus leucocephalus</u>	(E,B) Southern bald eagle			X	X
<u>Circus cyaneus</u>	(B) Marsh hawk	X	X	X	
<u>Pandion haliaetus</u>	(B) Osprey				X
<u>Falco sparverius</u>	American kestrel	X	X		
<u>Colinus virginianus</u>	Bobwhite	X	X	X	
<u>Meleagris gallopavo</u>	Turkey			X	
<u>Rallus elegans</u>	(R) King rail				X
<u>R. limicola</u>	Virginia rail				X
<u>Porzana carolina</u>	Sora				X
<u>Porphyryula martinica</u>	(R) Purple gallinule				X
<u>Gallinula chloropus</u>	Common gallinule				X
<u>Fulica americana</u>	American coot				X
<u>Charadrius vociferus</u>	Killdeer	X			

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Philohela minor</u>	American woodcock	X		X	X
<u>Capella gallinago</u>	Common snipe	X		X	X
<u>Bartramia longicauda</u>	Upland sandpiper				X
<u>Actitis macularia</u>	Spotted sandpiper				X
<u>Tringa solitaria</u>	Solitary sandpiper				X
<u>T. melanoleuca</u>	Greater yellowlegs				X
<u>T. flavipes</u>	Lesser yellowlegs				X
<u>Catotrophorus semipalmatus</u>	Willet				X
<u>Calidris melanotos</u>	Pectoral sandpiper				X
<u>C. minutilla</u>	Least sandpiper				X
<u>C. pusilla</u>	Semipalmated sandpiper				X
<u>C. alba</u>	Sanderling				X
<u>Limnodromus griseus</u>	Short-billed dowitcher				X
<u>L. scolopaceus</u>	Long-billed dowitcher				X
<u>Micropalama himantopus</u>	Stilt sandpiper				X
<u>Recurvirostra americana</u>	American avocet				X
<u>Larus argentatus</u>	Herring gull				X
<u>L. delawarensis</u>	Ring-billed gull				X
<u>L. atricilla</u>	Laughing gull				X
<u>L. pipixcan</u>	Franklin's gull				X
<u>L. philadelphia</u>	Bonaparte's gull				X

Table 6.1-7 (Continued)

Page 5 of 12

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Sterna forsteri</u>	Forster's tern				X
<u>S. hirundo</u>	Common tern				X
<u>S. albifrons</u>	Least tern				X
<u>Hydroprogne caspia</u>	Caspian tern				X
<u>Chlidonias niger</u>	Black tern				X
<u>Columba livia</u>	Rockdove	X			
<u>Zenaida macroura</u>	Mourning dove	X	X	X	
<u>Coccyzus americanus</u>	Yellow-billed cuckoo			X	
<u>C. erythrophthalmus</u>	Black-billed cuckoo			X	
<u>Tyto alba</u>	Barn owl	X	X	X	
<u>Otus asio</u>	Screech owl	X	X	X	
<u>O. flammeolus</u>	Great horned owl	X	X	X	
<u>Strix varia</u>	Barred owl	X	X	X	
<u>Asio flammeus</u>	Short-eared owl	X	X	X	
<u>Caprimulgus carolinensis</u>	Chuck-will's-widow			X	
<u>C. vociferus</u>	Whip-poor-will			X	
<u>Chordeiles minor</u>	Common nighthawk			X	
<u>Chaetura pelagica</u>	Chimney swift	X	X		
<u>Archilochus colubris</u>	Ruby-throated hummingbird		X	X	
<u>Megaceryle alcyon</u>	Belted kingfisher				X

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Colaptes auratus</u>	Common flicker			X	
<u>Dryocopus pileatus</u>	Pileated woodpecker			X	
<u>Centurus carolinus</u>	Red-bellied woodpecker			X	
<u>Melanerpes erythrocephalus</u>	Red-headed woodpecker			X	
<u>Sphyrapicus varius</u>	Yellow-bellied sapsucker			X	
<u>Dendrocopos villosus</u>	Hairy woodpecker			X	
<u>D. pubescens</u>	Downy woodpecker			X	
<u>Tyrannus tyrannus</u>	Eastern kingbird	X	X		
<u>Muscivora forficata</u>	Scissor-tailed flycatcher	X	X		
<u>Myiarchus crinitus</u>	Great crested flycatcher			X	
<u>Sayornis phoebe</u>	Eastern phoebe			X	
<u>Empidonax flaviventris</u>	Yellow-bellied flycatcher			X	
<u>E. virescens</u>	Acadian flycatcher			X	
<u>E. traillii</u>	(R) Willow flycatcher			X	
<u>E. minimus</u>	Least flycatcher		X	X	
<u>E. difficilis</u>	Western flycatcher			X	
<u>Contopus virens</u>	Eastern wood pewee			X	
<u>Eremophila alpestris</u>	Horned lark	X	X		
<u>Iridoprocne bicolor</u>	Tree swallow	X	X		X
<u>Riparia riparia</u>	Bank swallow	X	X		
<u>Stelgidopteryx ruficollis</u>	Rough-winged swallow	X	X		

Table 6.1-7 (Continued)

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Hirundo rustica</u>	Barn swallow	X	X		
<u>Petrochelidon pyrrhonota</u>	Cliff swallow	X	X		
<u>Progne subis</u>	Purple martin	X	X		
<u>Cyanocitta cristata</u>	Blue jay		X	X	
<u>Corvus brachyrhynchos</u>	Common crow	X	X	X	
<u>C. ossifragus</u>	Fish crow	X	X	X	X
<u>Parus carolinensis</u>	Carolina chickadee			X	
<u>P. bicolor</u>	Tufted titmouse			X	
<u>Sitta carolinensis</u>	White-breasted nuthatch			X	
<u>S. canadensis</u>	Red-breasted nuthatch			X	
<u>Certhia familiaris</u>	Brown creeper			X	
<u>Troglodytes aedon</u>	House wren		X	X	
<u>T. troglodytes</u>	Winter wren		X	X	
<u>Thryomanes bewickii</u>	(R) Bewick's wren	X	X	X	
<u>Thryothorus ludovicianus</u>	Carolina wren		X	X	
<u>Telmatodytes palustris</u>	Long-billed marsh wren				X
<u>Cistothorus platensis</u>	(R) Short-billed marsh wren				X
<u>Mimus polyglottos</u>	Mockingbird		X	X	
<u>Dumetella carolinensis</u>	Gray catbird		X	X	
<u>Toxostoma rufum</u>	Brown thrasher		X	X	
<u>Turdus migratorius</u>	American robin	X	X	X	
<u>Hylocichla mustelina</u>	Wood thrush		X	X	

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Catharus guttatus</u>	Hermit thrush		X	X	
<u>C. ustulatus</u>	Swainson's thrush		X	X	
<u>C. minimus</u>	Gray-cheeked thrush		X	X	
<u>C. fuscescens</u>	Veery		X	X	
<u>Sialia sialis</u>	Eastern bluebird		X	X	
<u>Polioptila caerulea</u>	Blue-gray gnatcatcher			X	
<u>Regulus satrapa</u>	Golden-crowned kinglet			X	
<u>R. calendula</u>	Ruby-crowned kinglet			X	
<u>Anthus spinoletta</u>	Water pipit	X			X
<u>A. spragueii</u>	Sprague's pipit	X			X
<u>Bombycilla cedrorum</u>	Cedar waxwing		X	X	
<u>Lanius ludovicianus</u>	Loggerhead shrike	X	X		
<u>Sturnus vulgaris</u>	Starling	X	X	X	
<u>Vireo griseus</u>	White-eyed vireo		X	X	
<u>V. bellii</u>	Bell's vireo		X	X	
<u>V. flavifrons</u>	Yellow-throated vireo	X	X	X	
<u>V. solitarius</u>	Solitary vireo			X	
<u>V. olivaceus</u>	Red-eyed vireo			X	
<u>V. philadelphicus</u>	Philadelphia vireo			X	
<u>V. gilvus</u>	Warbling vireo			X	

Table 6.1-7 (Continued)

Page 9 of 12

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Mniotilta varia</u>	Black-and-white warbler			X	
<u>Protonotaria citrea</u>	Prothonotary warbler			X	X
<u>Limnothlypis swainsonii</u>	Swainson's warbler			X	
<u>Helmitheros vermivorus</u>	Worm-eating warbler			X	
<u>Vermivora chrysoptera</u>	Golden-winged warbler	X		X	
<u>V. pinus</u>	Blue-winged warbler	X			
<u>V. ruficapilla</u>	Nashville warbler		X	X	
<u>Parula americana</u>	Northern parula			X	
<u>Dendroica petechia</u>	Yellow warbler		X		
<u>D. magnolia</u>	Magnolia warbler		X	X	
<u>D. coronata</u>	Yellow-rumped warbler			X	
<u>D. cerulea</u>	Cerulean warbler			X	X
<u>D. fusca</u>	Blackburnian warbler			X	
<u>D. dominica</u>	Yellow-throated warbler			X	
<u>D. pensylvanica</u>	Chestnut-sided warbler		X	X	
<u>D. castanea</u>	Bay-breasted warbler			X	
<u>D. striata</u>	Blackpoll warbler			X	
<u>D. pinus</u>	Pine warbler			X	
<u>D. discolor</u>	Prairie warbler		X	X	

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Seiurus aurocapillus</u>	Ovenbird			X	
<u>S. noveboracensis</u>	Northern waterthrush				X
<u>S. motacilla</u>	Louisiana waterthrush				X
<u>Oporornis formosus</u>	Kentucky warbler		X	X	
<u>O. philadelphia</u>	Mourning warbler		X	X	
<u>Geothlypis trichas</u>	Common yellowthroat		X	X	
<u>Icteria virens</u>	Yellow-breasted chat		X	X	
<u>Wilsonia citrina</u>	Hooded warbler			X	
<u>W. pusilla</u>	Wilson's warbler		X	X	
<u>W. canadensis</u>	Canada warbler		X	X	
<u>Setophaga ruticilla</u>	American redstart			X	
<u>Passer domesticus</u>	House sparrow	X	X		
<u>Dolichonyx oryzivorus</u>	Bobolink	X	X		
<u>Sturnella magna</u>	Eastern meadowlark	X	X		
<u>S. neglecta</u>	Western meadowlark	X	X		
<u>Agelaius phoeniceus</u>	Red-winged blackbird	X	X		
<u>Icterus spurius</u>	Orchard oriole		X		
<u>I. galbula</u>	Northern oriole		X		
<u>Euphagus carolinus</u>	Rusty blackbird	X	X		
<u>E. cyanocephalus</u>	Brewer's blackbird	X	X		
<u>Quiscalus quiscula</u>	Common grackle	X	X		
<u>Molothrus ater</u>	Brown-headed cowbird	X	X		

Table 6.1-7 (Continued)

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Piranga olivacea</u>	Scarlet tanager			X	
<u>P. rubra</u>	Summer tanager			X	
<u>Cardinalis cardinalis</u>	Cardinal		X	X	
<u>Pheucticus ludovicianus</u>	Rose-breasted grosbeak		X	X	
<u>Guiraca caerulea</u>	Blue grosbeak		X		
<u>Passerina cyanea</u>	Indigo bunting		X	X	
<u>P. ciris</u>	Painted bunting		X	X	
<u>Spiza americana</u>	Dickcissel	X	X		
<u>Hesperiphona vespertina</u>	Evening grosbeak			X	
<u>Carpodacus purpureus</u>	Purple finch	X	X		
<u>Acanthis flammea</u>	Common redpoll	X	X		
<u>Spinus pinus</u>	Pine siskin			X	
<u>S. tristis</u>	American goldfinch	X	X		
<u>Loxia curvirostra</u>	Red crossbill			X	
<u>Pipilo erythrophthalmus</u>	Rufous-sided towhee		X	X	
<u>Passerculus sandwichensis</u>	Savannah sparrow	X			
<u>Ammodramus savannarum</u>	(R) Grasshopper sparrow	X			
<u>A. henslowii</u>	Henslow's sparrow	X			
<u>Ammodramus lecontei</u>	Le Conte's sparrow	X			
<u>Pooecetes gramineus</u>	Vesper sparrow	X			
<u>Chondestes grammacus</u>	Lark sparrow	X	X		
<u>Aimophila aestivalis</u>	(R) Bachman's sparrow	X	X		

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Junco hyemalis</u>	Dark-eyed junco	X	X	X	
<u>Spizella passerina</u>	Chipping sparrow	X			
<u>S. pusilla</u>	Field sparrow	X	X		
<u>Zonotrichia querula</u>	Harris's sparrow		X	X	
<u>Z. leucophrys</u>	White-crowned sparrow		X	X	
<u>Z. albicollis</u>	White-throated sparrow		X	X	
<u>Passerella iliaca</u>	Fox sparrow		X	X	
<u>Melospiza lincolni</u>	Lincoln's sparrow		X		
<u>M. georgiana</u>	Swamp sparrow		X		
<u>M. melodia</u>	Song sparrow		X	X	
<u>Calcarius lapponicus</u>	Lapland longspur	X			
<u>C. pictus</u>	Smith's longspur	X			
<u>C. ornatus</u>	Chestnut-collared longspur	X			
<u>Plectrophenax nivalis</u>	Snow bunting	X			

Note: (E) = Federally protected endangered species

(B) = Species that nested in Arkansas at one time but have no recent nesting records

(R) = Breeding populations are threatened or endangered in Arkansas

Table 6.1-8

Mammals Which May Occur in the Vicinity of the Independence Site

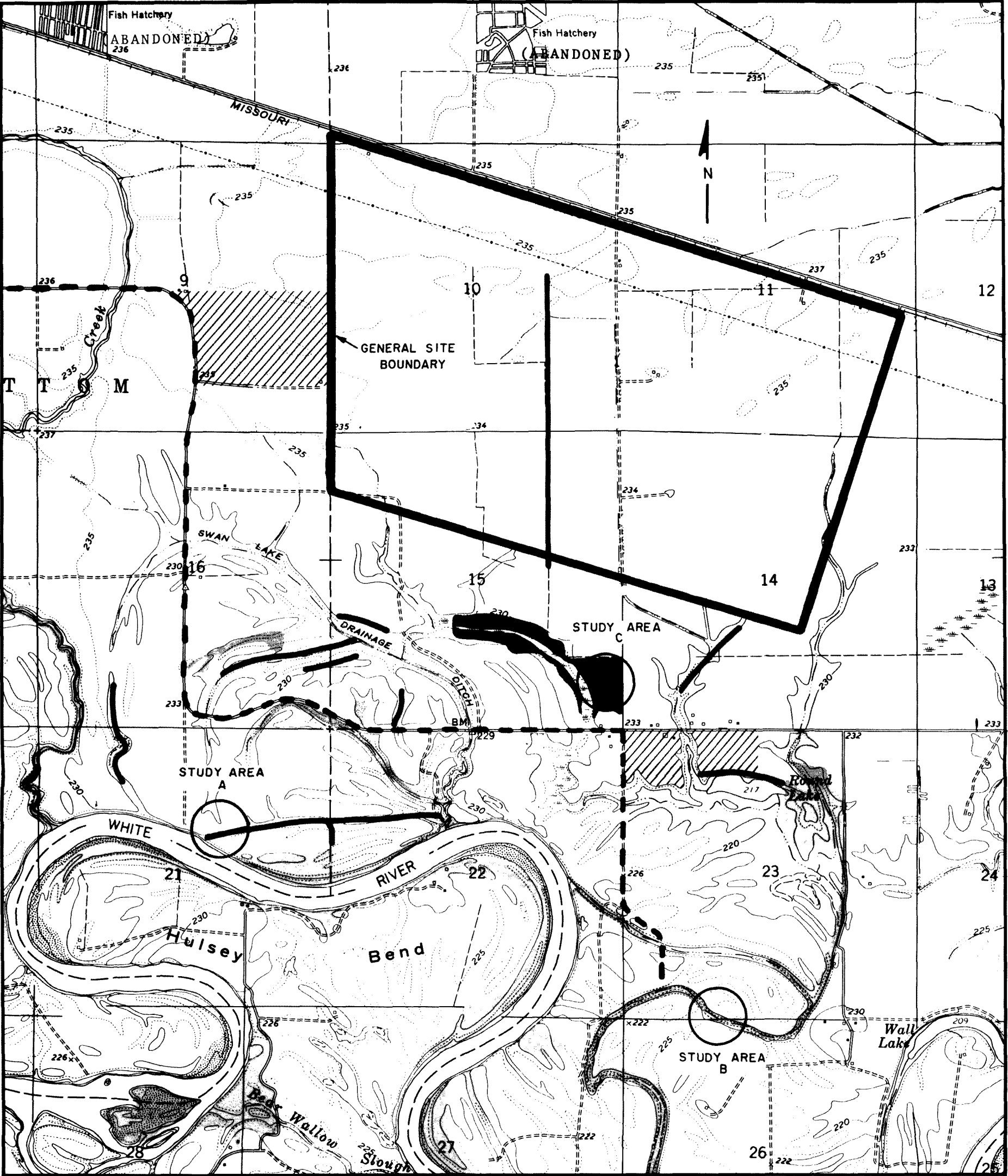
Page 1 of 3

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Didelphis marsupialis</u>	Opossum		X	X	
<u>Sorex longirostris</u>	Southeastern shrew	X	X	X	
<u>Cryptotis parva</u>	Least shrew	X	X		
<u>Blarina brevicauda</u>	Shorttail shrew	X	X	X	
<u>Scalopus aquaticus</u>	Eastern mole	X	X	X	
<u>Myotis lucifugus</u>	Little brown myotis			X	X
<u>M. austroriparius</u>	Mississippi myotis	X			X
<u>M. grisescens</u>	Gray myotis	X			X
<u>M. keeni</u>	Keen myotis			X	X
<u>M. sodalis</u>	Indiana myotis			X	X
<u>M. subulatus</u>	Small-footed myotis		X	X	
<u>Pipistrellus subflavus</u>	Eastern pipistrel			X	X
<u>Eptesicus fuscus</u>	Big brown bat			X	
<u>Lasiurus borealis</u>	Red bat			X	
<u>L. cinereus</u>	Hoary bat			X	
<u>Nycticeius humeralis</u>	Evening bat			X	
<u>Plecotus rafinesquei</u>	Eastern big-eared bat			X	
<u>Ursus americanus</u>	Black bear			X	
<u>Procyon lotor</u>	Raccoon	X	X	X	
<u>Mustela frenata</u>	Longtail weasel			X	
<u>M. vison</u>	Mink			X	X

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Lutra canadensis</u>	River otter			X	X
<u>Spilogale putorius</u>	Spotted skunk		X	X	
<u>Mephitis mephitis</u>	Striped skunk	X	X	X	
<u>Canis latrans</u>	Coyote	X	X	X	
<u>Vulpes fulva</u>	Red fox	X	X	X	
<u>Urocyon cinereoargenteus</u>	Gray fox	X	X	X	
<u>Felis concolor</u>	Mountain lion			X	
<u>Marmota monax</u>	Woodchuck	X	X		
<u>Tamias striatus</u>	Eastern chipmunk		X	X	
<u>Sciurus carolinensis</u>	Eastern gray squirrel			X	
<u>Sciurus niger</u>	Eastern fox squirrel			X	
<u>Glaucomys volans</u>	Southern flying squirrel			X	
<u>Geomys bursarius</u>	Plains pocket gopher	X	X		
<u>Castor canadensis</u>	Beaver			X	X
<u>Reithrodontomys humulis</u>	Eastern harvest mouse	X	X		
<u>Reithrodontomys megalotis</u>	Western harvest mouse	X	X		
<u>Reithrodontomys fulvescens</u>	Fulvous harvest mouse	X	X		
<u>Peromyscus maniculatus</u>	Deer mouse	X	X	X	
<u>Peromyscus leucopus</u>	White-footed mouse		X	X	
<u>Peromyscus gossypinus</u>	Cotton mouse		X	X	
<u>Peromyscus nuttalli</u>	Golden mouse		X	X	
<u>Neotoma floridana</u>	Eastern woodrat		X	X	

Table 6.1-8 (Continued)

Scientific Name	Common Name	Habitat			
		Cropland & Fields	Fence Rows & Field Edges	Forests	Rivers & Lakes
<u>Oryzomys palustris</u>	Rice rat	X	X	X	
<u>Sigmodon hispidus</u>	Cotton rat	X	X		
<u>Synaptomys cooperi</u>	Southern bog lemming	X			
<u>Pitymys pinetorum</u>	Pine vole			X	
<u>Ondatra zibethicus</u>	Muskrat				X
<u>Rattus norvegicus</u>	Norway rat	X	X		
<u>Mus musculus</u>	House mouse	X	X		
<u>Sylvilagus floridanus</u>	Eastern cottontail	X	X	X	
<u>S. aquaticus</u>	Swamp rabbit			X	
<u>Odocoileus virginianus</u>	Whitetail deer	X	X	X	



LEGEND:

- UPLAND FOREST
- SWAMP FOREST
- HEDGEROW
- FIELD EDGE
- PASTURE
- CROPLAND
- SURVEY ROUTE

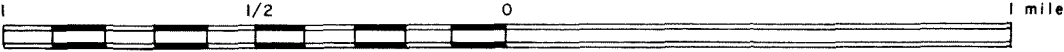


Figure 6.1-1 Site area habitat map showing survey routes and locations

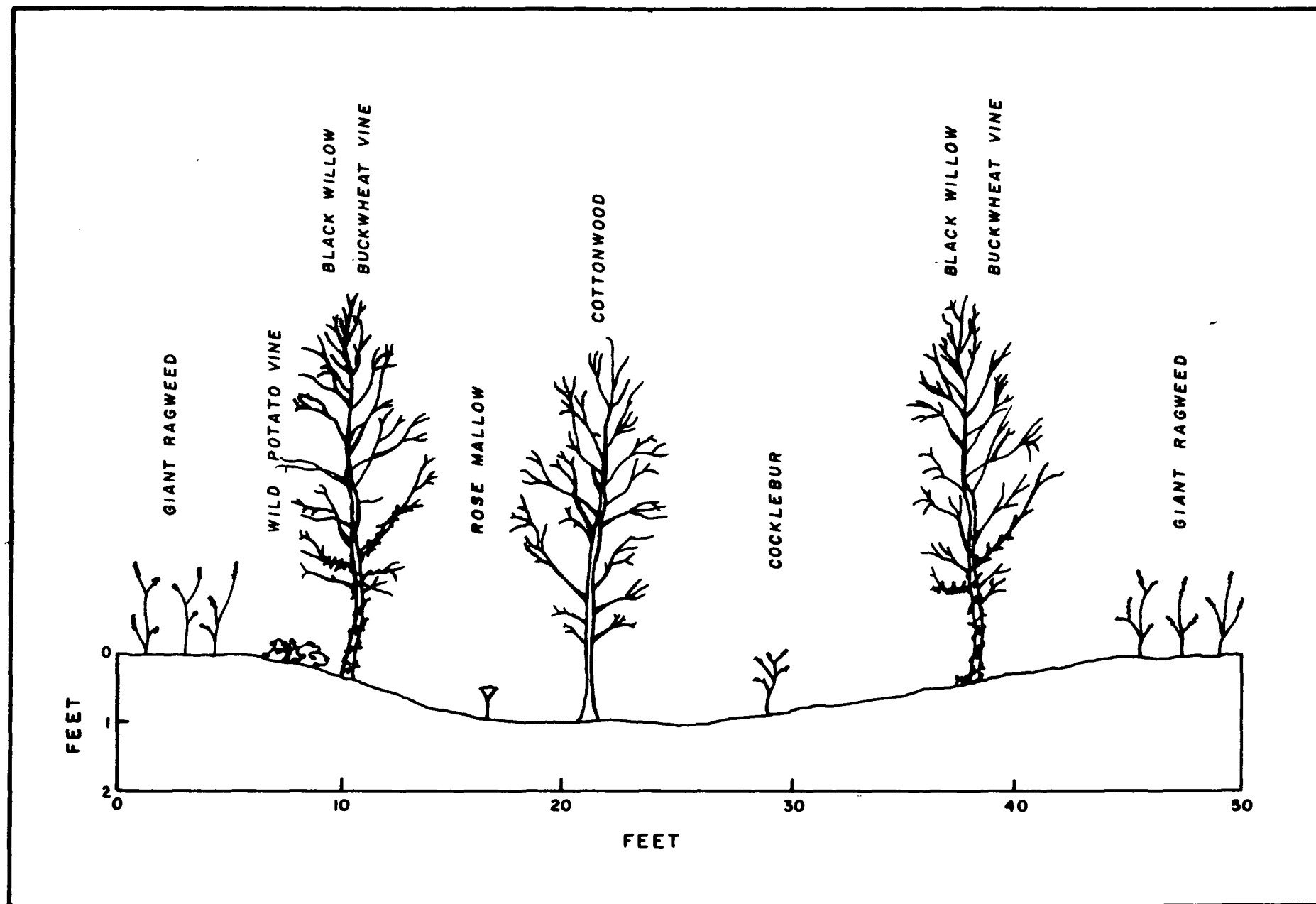


Figure 6.1-2. Independence site - representative cross section of surveyed young hedgerow community.

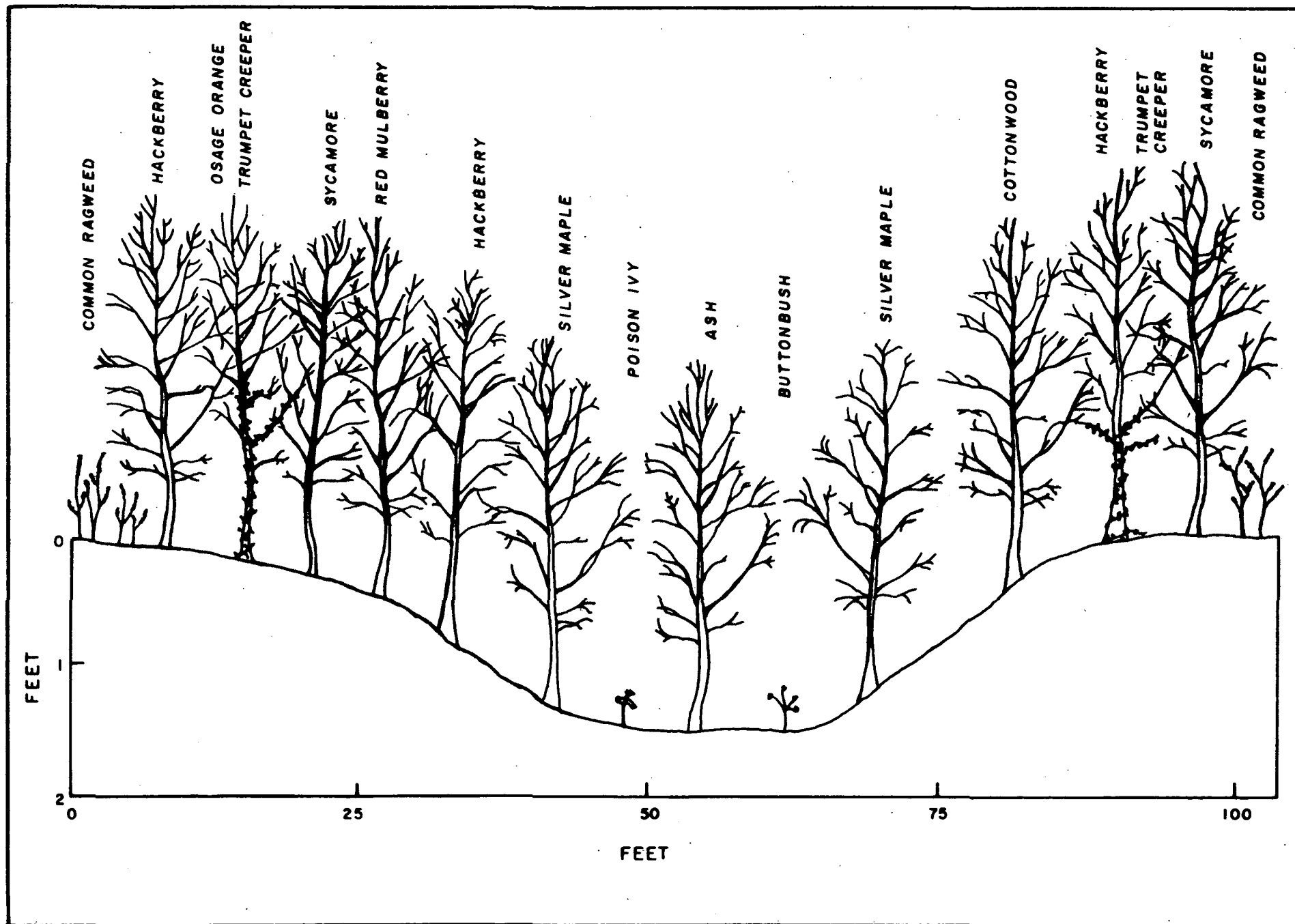


Figure 6.1-3. Independence site - representative cross section of surveyed mature hedgerow community.

6.2 IMPACT OF SO_2 ON THE SITE VICINITY

National Secondary Ambient Air Standards have been established for the protection of public welfare, which includes the effects on vegetation, materials and animals. These standards were revised in 1973, and the standard for SO_2 was made less restrictive. The standards established for SO_2 were 0.5 ppm for 3 hours, and 0.14 ppm for 24 hours. These standards are sufficient to protect the public welfare from any known or anticipated adverse effects associated with the presence of SO_2 in the ambient air. The proposed plant will not only meet the Federal Secondary Ambient Air Standards, but will be below them. The conclusions presented here are based on this assurance.

6.2.1 Effect of SO_2 on Soil

The soil in the Independence site vicinity is typified as belonging to the Bottomland and Terrace soils of the Mississippi Alluvial Plain. Generally, these soils are deep alluvial material with texture varying from coarse to fine. Soil samples were taken from a soybean field, a pasture, and a forested area near the site in Independence County and from a soybean field, cemetery, and forested area in Jackson County. The resultant analysis of soils is presented in Table 6.2-1. This analysis indicates that the parameters tested are in the range for optimum growth of the plants present.

In considering arable soil, it is generally accepted that SO_2 has no detrimental effects because these soils are well limed and because CaCO_3 in the soil converts the SO_2 to calcium sulfate which is a component in many fertilizers.

6.2.2 Effect of SO_2 on Vegetation

More work has been done on the response of vegetation to SO_2 than any other air pollutant. Barrett and Benedict (1970) have stated that injury to vegetation by SO_2 is usually found only in areas adjacent to or close to the source. In the experience of Drs. Hendrix, Powell, and Taylor (Dr. Hendrix, 1977 personal communication), if damage occurred it was generally within 6 miles of power plants. The determination of SO_2

levels in the atmosphere is relatively simple, and automatic methods of monitoring in sub-ppm concentrations are available. Because of this, it has been possible to establish the ground level concentrations which have a probability of producing injury to vegetation.

Injury to vegetation by SO_2 occurs most frequently on foliage. Occasionally, flowers or fruit are injured. Injury consists of killing cells and is always accompanied by visible symptoms. There has been a theory that vegetation can be injured by SO_2 without visible symptoms. According to Katz (1949), Thomas (1951), and many others, no basis has been found which can be used to prove this theory. In fact, no significant yield reduction of crops has been found unless the area of visible markings on the leaves was more than about 5 percent. In summary, there is no "hidden injury" to vegetation by SO_2 , and no economic damage is observed until 5 percent of the leaf surface is affected.

When exposures to SO_2 are intermittent, rather than continuous, damage is less likely to occur. Zahn (1970) states that the reason for this is that the leaf tissue changes SO_2 to SO_3 to SO_4 during the period when no SO_2 is in the air. SO_4 is only 3 percent as toxic as SO_2 or SO_3 , and according to Thomas and others (1950), is used by the plant as an essential element for growth.

Sulfur dioxide in the atmosphere is injurious to vegetation only when it occurs at high enough concentrations, for long enough periods of time, and when vegetation is present in a sensitive state. Under other conditions, SO_2 would not injure vegetation.

A number of studies have been done on the effect of SO_2 on rice. Taniyama, Arikado, and Iwata (1971) exposed rice to 0.271 ppm up to 1.415 ppm for up to 30 days. Typical symptoms failed to develop on either the leaf blades or sheaths. Plant height and leaf area were not decreased, but the number of tillers was decreased as the concentration of SO_2 increased. The average number of tillers was decreased from 15.2 to 15.0 with exposure to 0.271 ppm for 30 days, and to 14.7 after exposure to 0.719 ppm for 30 days. Taniyama and Arkikado (1969) found that exposure of rice plants to high levels of SO_2 decreased the food manufacturing capacity of rice leaves. They exposed plants at levels of 6, 10,

20, 40, 60, and 70 ppm for 1 hour. At concentrations up to 20 ppm, the food producing capacity was normal 2 hours after fumigation ceased. Thus, it is evident that exposure of rice to two times the National Standard, but for 30 days, i.e., 30 times longer, has the effect of reducing tillering 1.4 percent. Exposure to 5 times the National Standard for 30 days reduced tillering only 3.4 percent. No other effect was noted. Experience with small grains indicates that a reduction in tillering does not usually lead to reduced yields, due to increased size of the remaining heads of grain. In terms of short-term exposures to high levels, exposure of rice to 40 times the National Standard for 1 hour affected the food producing capacity of the leaf for less than 2 hours.

According to Barrett and Benedict (1970), barley, rye, and wheat are considered relatively sensitive to SO_2 . However, Zimmerman (1952) found that barley was not injured by 0.66 ppm SO_2 exposure for 5 hours. When exposed to 1.35 ppm for one hour at 53 percent relative humidity, 17 percent of the leaf area was injured. At the same SO_2 exposure, and 76 percent relative humidity, 18 percent of the leaf area was injured. Bermuda grass was not injured by exposure to 1.8 ppm for 6 hours, according to Brennan and Halisky (1970). Grain sorghum was not injured by exposure to 0.5 ppm SO_2 for 8 hours. Oats, exposed to 2.0 ppm for 30-minute periods five times a day for 7 days were not injured, according to Zimmerman (1952). Rye, exposed to 0.77 ppm for 10 days (8 hours per day) sustained no economic damage, according to Guderian and Stratmann (1968). Swain and Johnson (1936) found that wheat, another relatively susceptible crop, exposed to 0.19 ppm for 24 days was not injured. When exposed to 1.35 ppm for 1 hour at 76 percent relative humidity, no injury occurred to the wheat. At 53 percent relative humidity, 4.2 percent of the foliage was damaged at this exposure level.

In one study Hendrix (1977, personal communication) found that cotton, when exposed to 0.5 ppm for 8 hours, was not injured. Soybeans, exposed to 0.5 ppm to 6.0 ppm for 30 minutes, were injured to the extent that yield decreased 0.66 percent. This work was concerned with the

relationship between percent leaf necrosis and yield decrease, and did not relate dosage to damage. Assuming that the damage occurred at 6 ppm for 30 minutes, this is an exposure factor of 3 (6 ppm x 0.5 hr.). The exposure factor allowed by the National Standard of 0.5 ppm for 3 hours gives an exposure factor 1.5 (0.5 x 3). This is less than the experimental exposure factor by one-half, and 6 ppm for 38 minutes did not cause economic damage to soybeans. This is substantiated by Tingey and others (1973), who found the threshold level for damage to soybeans to be 0.5 ppm SO₂ for 4 hours. Hence, the National Standard will protect soybeans (Hendrix, 1977 personal communication).

Pecans have been found to be resistant to high-level, short-term SO₂ exposure. No damage was apparent when pecan trees were exposed to 1.0 ppm for 4 hours; however, damage occurred when plants were exposed to 0.1 ppm for 96 hours. Damage was also apparent when pecans were exposed to 0.1 ppm for 48 hours and then exposed to 0.3 ppm for 4 additional hours (Hendrix, 1977 personal communication).

Dreisinger (1967, 1970) found that maple, exposed to 0.5 ppm for 30 days had some discolorations of the foliage. When maples were exposed to 0.75 ppm for 8 hours per day for 30 days, there was some leaf discoloration, but no leaf area was killed. When they were exposed to 2.0 ppm for 8 hours, less than 10 percent of the leaf area was killed. Oaks, exposed to 0.25 ppm for 30 days were not injured. When they were exposed to 0.75 ppm for 8 hours per day for 30 days, no injury occurred. Sycamore, exposed to 2.0 ppm for 3 hours, generally had leaves killed, and had leaf abscission according to Santamour (1969). There are no studies on sycamore at less severe concentrations.

Yellow pines, in general, are resistant to SO₂ injury. For example, exposure to 0.5 ppm for 1008 hours caused no injury, according to the National Research Council of Canada. From personal experience of Drs. Hendrix and Taylor (Hendrix, 1977 personal communication), in assaying damage in the Copper Hill, Tennessee, smelter area, these forest trees are resistant. When the Copper Hill smelter was first operated, no

attempt was made to control ambient air levels of SO_2 , and all vegetation was killed in the immediate vicinity of the smelter (5 to 10 mile circle). The first vegetation which one sees as he leaves the denuded area are forest trees. Currently, the smelter controls ambient air levels of SO_2 , and damage no longer occurs to vegetation in the area.

Table 6.2-2 presents the effect, as compiled from Daines (1968) on other vegetation. Generally, the National Secondary Ambient Air Standards for SO_2 protect forest and fruit trees and crops.

Table 6.2-1

Soil Sample Analysis
Jackson and Independence Counties
Summer 1977

Sample and Location (w/reference to plant site)	Crop	pH	Element ^a (in pounds/acre)							
			P	K	Ca	Mg	ZN	Mn	B	S
2 mi. NE in Independence Co.	Soybeans	6.6	24	55	1201	72	5	120	0.2	10
2 mi. N in Independence Co.	Pasture	5.0	17	290	1004	240	8	120	0.2	28
4 mi. N in Independence Co.	Forest	4.9	7	205	625	132	5	120	0.3	23
about 10 mi. NE in Jackson Co.	Forest	6.9	24	325	1201	268	10	120	0.8	10
about 10 mi. NE in Jackson Co.	Soybeans	6.6	18	140	552	39	3	84	0.1	10
about 8 mi. NE in Jackson Co.	Lawn	6.5	20	245	1080	168	26	120	0.1	10

^a Legend

P = Phosphorus	Zn = Zinc
K = Potassium	Mn = Manganese
Ca = Calcium	B = Boron
Mg = Magnesium	S = Sulfur

Effect of SO₂ on Selected Vegetation

Plant Species	Common Name	Exposure Intensity and Duration for Given Symptoms					
		No. Symptoms		Chronic Symptoms		Acute Symptoms	
		ppm	hrs.	ppm	hrs.	ppm	hrs.
<u>Castanea</u> sp.	Chinquapin			1000.0	2	1000.0	5.0
<u>Malus</u> sp.	Apple			0.5	4-8		
<u>Pinus virginia</u>	Virginia pine			20.0	9	10.0	49.0
<u>Prunus</u> sp.	Cherry			0.5	4-8		
<u>Quercus alba</u>	White oak			1000.0	3	100.0	2.0
<u>Q. velutina</u>	Black oak			20.0	29	20.0	100.0
<u>Avena sativa</u>	Oat	0.85	4	0.6	3	0.8	1.2
<u>Begonia</u> sp.	Begonia			1.0	6		
<u>B.</u> sp.	Begonia			1.0	6		
<u>B.</u> sp.	Begonia					0.25	1.0
<u>B.</u> sp.	Begonia					1.1	6.0
<u>Beta vulgaris</u>	Sugar beet	1.0	2hr/day 40 days	.98	1		
<u>Brassica</u> spp.	Mustard			.98	1		
<u>B. napobrassica</u>	Turnip	.2	117				
<u>B. oleracea</u>	Brussels sprout	1.0	2hr/day 40 days				
		.2	117				
<u>B. rapa</u>	Brussels sprout	.2	117	1.05	2		
<u>Cichorium endiva</u>	Endive			1.08	1		
<u>C.</u> spp.	Endive					0.5	4-8
<u>Coleus</u> spp.	Coleus			3-4	1-4	0.5	4-8
<u>Cucurbita pepo</u>	Pumpkin			3-4	1-4		
<u>C. sativa</u>	Cucumber					0.5	4-8

Exposure Intensity and Duration for Given Symptoms

Plant Species	Common Name	No. Symptoms		Chronic Symptoms		Acute Symptoms	
		ppm	hrs.	ppm	hrs.	ppm	hrs.
<u>Gardenia</u> sp.	Gardenia			8-10	4	8-10	4
<u>Gladiolus</u> sp.	Gladiolus					0.5	4-8
						1.5	7hr/day for 3 days
<u>Gossypium hirsutum</u>	Cotton			0.5	4-8	.5	4-8(slight)
<u>Hordeum vulgare</u>	Barley	0.26	210	0.3	31.5		
		0.26	210	0.5	8		
		0.3	72.5	0.6	8		
		0.8	22	0.9	4		
		1.2	15.4	1.2	2.5		
				1.2	1.75		
				0.66	4		
				0.8	2		
						1.0	43
						5.0	1
						8-10	0.5
<u>Ipomoea batatas</u>	Sweet potato	1.0	2hr/day 40 days			0.5	4-8
<u>Iris</u> spp.	Iris			0.5	4-8		
<u>Lactuca sativa</u>	Lettuce	1.0	2hr/day 40 days	1.05	2		
<u>Lycopersicon</u>	Tomato	0.85	4	0.66	5	0.5	4-8
<u>esculentum</u>		4.2	5				
				3-4	1-4		
				0.5	16		
						0.5	4-8
						3-4	1-4
						100	1.5 min.
						100	22.0 min.

Exposure Intensity and Duration for Given Symptoms

Plant Species	Common Name	No. Symptoms		Chronic Symptoms		Acute Symptoms	
		ppm	hrs.	ppm	hrs.	ppm	hrs.
<u>Medicago sativa</u>	Alfalfa	0.1	504	0.3	66.5		
				0.41	17		
		0.2	87.5				
		1.25	0.5				
		.85	4	.66	5	.8	1-2
				1.25	1	.4	7
						5.0	1
<u>Oxalis</u> sp.	Wood sorrel			3-4	1-4	3-4	1-4
<u>Pelargonium</u> sp.				3-4	1-4		
<u>Phaseolus vulgaris</u>	Kidney bean			0.5	4	0.5	4
						1.52	2
<u>Raphanus sativus</u>	Radish			0.98	2	0.5	4
<u>Rhododendron</u> sp.	Azalea			8-10	4		
<u>Rosa</u> sp.	Rose			3-4	1-4		
						0.5	4-8
						3-4	1-4
<u>Salvia splendens</u>	Sage			0.82	5		
				3-4	1-4		
<u>Secale cereale</u>	Rye	0.85	4	0.6	3	0.8	1.2
<u>Sorghum</u> sp.	Milo	0.5	4-8				
<u>Triticum</u> sp.	Wheat	0.2	69				
		0.2	576				
		0.3	72				
		0.18	672				
		0.28	144				
		1.35	2	0.8	1	1.35	2
<u>Tulipa</u> sp.				3-4	1-4		
<u>Zea mays</u>	Corn	0.5	4-8	.77	24		
<u>Cynodon dactylon</u>	Bermuda grass	0.75	6				
		1.8	6				

Exposure Intensity and Duration for Given Symptoms

Plant Species	Common Name	No Symptoms		Chronic Symptoms		Acute Symptoms	
		ppm	hrs.	ppm	hrs.	ppm	hrs.
<u>Poa pratensis</u>	Blue grass	.75	6			.85	6
<u>Festuca rubra</u>	Fescue			0.75	6	.85	6
<u>Zoysia japonica</u>	Zoysia	.75	6				
		1.8	6				
<u>Lolium</u> sp.	Rye grass	.85	6			.75	6
<u>Trifolium incarnatum</u>	Clover					.45	8 hr/day 6 days
<u>Allium cepa</u>	Onion					.9	4-8hr/day
							3-6 days
						1.0	2hr/day 40 days
<u>Glycine max</u>	Soybean					6.0	0.5
<u>Fragaria grandiflora</u>	Strawberry	1.0	2hr/day 40 days				
<u>Ulmus americana</u>	Elm					2.0	3
<u>U. parvifolia</u>	Elm					2.0	2-8
<u>Ginkgo biloba</u>	Ginko	2.0	8			.25-.5	30 days
<u>Corylus cornuta</u>	Hazel-nut	.53	7			.75	8hr/day 30 days
<u>Pyrus</u> sp.	Pear					.5	6
<u>Platanus</u> sp.	Sycamore					2.0	3

Note: Seeming contradictions in this table are due to different varieties, environmental conditions or plant ages. Even so, there is only one case (one species of Begonia) in which injury occurred at the level allowed by the National Standards.

Source: Daines, 1968
Altman and Dittmer, 1966

6.3 REFERENCES

- Altman, P. L., and Dittmer, D., 1966, Environmental biology. Federation of American Society for Experimental Biology, Bethesda, Maryland.
- Arkansas Department of Planning, 1974, Arkansas natural area plan. Arkansas Department of Planning, Little Rock, Arkansas, 248 p.
- Arkansas Game and Fish Commission, 1976, 1975-76 Annual deer harvest. mimeograph, 15 p.
- Barrett, W., and Benedict, H. M., 1970, Sulfur dioxide. Section C, in Recognition of air pollution injury to vegetation: a pictorial atlas.
- Braun, E. L., 1950, Deciduous forests of North America. The Blakiston Division, McGraw-Hill Publishing Company, New York.
- Brennan, Eileen, and Halisky, P. M., 1970, Response of turfgrass cultivars to ozone and sulfur dioxide in the atmosphere. *Phytopathology*, Vol. 60, p. 1544-1546.
- Conant, R., 1975, A field guide to reptiles and amphibians. Houghton Mifflin Company, Boston.
- Cottam, G., and Curtis, J. T., 1956, The use of distance measures in phytosociological sampling. *Ecology*, Vol. 37, p. 451-460.
- Daines, R. H., 1968, Sulfur dioxide and plant response, *Journal of Occupational Medicine*, Vol. 10, no. 9.
- Dreisinger, B. R., 1967, Sulfur dioxide levels and the effects of the gas on vegetation near Sudbury, Ontario. Ontario Department of Mines, Sudbury, Ontario.
- _____, 1970, Monitoring atmospheric sulfur dioxide and correlating its effect on crops and forests in the Sudbury area. Impact of Air Pollution on Vegetation Conference, Park Plaza Hotel, Toronto, Ontario, April 7-9.
- Federal Register, 1977, Endangered and threatened wildlife and plants. U. S. Department of the Interior. *Federal Register*, Vol. 42, no. 135, p. 36421-36431.
- Guderian, R., and Stratmann, H., 1968, Field experiments for determining effects of sulfur dioxide on vegetation. Part III: Threshold values of harmful SO₂ immissions for fruit and forest trees and for agricultural and garden plant species. Research Reports, State of North Rhine, Westphalia, no. 1920, West German Press, Cologne and Opladen.

- Hendrix, F. F., 1977, personal communication.
- Katz, Morris, 1949, Sulfur dioxide in the atmosphere and its relation to plant life. *Industrial and Engineering Chemistry*, Vol. 41, p. 2450-2464.
- Santamour, F. S., Jr., 1969, Air pollution studies on *Platanus* and American elm seedlings. *Plant Disease Reporter*, Vol. 53, p. 482-485.
- Swain, R. E., and Johnson, A. B., 1936, Effect of sulfur dioxide on wheat development. *Industrial and Engineering Chemistry*, Vol. 28, p. 42-47.
- Taniyama, T., and Arikado, H., 1969, Studies on the mechanism of injurious effects of toxic gases on crop plants: V. Effects of sulfur dioxide on photosynthesis of rice plants. *Crop Science Society of Japan, Proceedings*, Vol. 38, p. 598-602.
- Taniyama, T., Arikado, H., and Iwata, Y., 1971, Studies on the mechanism of injurious effects of toxic gases on crop plants: IX. Effect of sulfur dioxide treatment for long periods on dry matter production in rice plants. *Crop Science Society Japan, Proceedings*, Vol. 40, p. 455-461.
- Thomas, P. D., 1951, Gas damage to plants. *Annual Review of Plant Physiology*, Vol. 2, p. 293-322.
- Thomas, M. D., Hendricks, R. H., and Hill, G. R., 1950, Sulfur metabolism of plants. *Industrial and Engineering Chemistry*, Vol. 42, p. 2231-2235.
- Tingey, D. T., Reinert, R. A., Wickliff, C., and Heck, W. W., 1973, Chronic ozone or sulfur dioxide exposures or both, affect the early vegetative growth of soybean. *Canadian Journal Plant Science*, Vol. 53, p. 875-879.
- Zahn, R., 1970, Investigation into the significance of continuous and intermittent sulfur dioxide effects on plant reaction. *Staub* 230:343-352.
- Zimmerman, P. W., 1952, Effects on plants of impurities associated with air pollution, in *Air pollution*. U. S. Technical Conference, *Proceedings*, Chapter 13.

PART 7

ARCHEOLOGY

TECHNICAL SUPPORT DOCUMENT

PART 7

PRELIMINARY ARCHEOLOGICAL SURVEY OF
INDEPENDENCE STEAM ELECTRIC STATION SITE

Adapted from Report

by

Phyllis A. Morse

Arkansas Archeological Survey

August 1977

for

Arkansas Power & Light Company

PART 7
ARCHEOLOGY

RECORDS CHECK

Arkansas has been occupied for at least the last 11,500 years. Paleo-Indians and Archaic hunters, fishers, and gatherers effectively exploited the rich resources of both the uplands and river valleys. Bands of hunters with stable territories established villages, extrac-tion sites, and even cemeteries. Woodland and Mississippian Indians, with the advent of agriculture, amalgamated into larger tribal and chiefdom societies. Large towns with satellite villages and farmsteads, temple mounds, and large cemeteries emerged. Late occupation by French, Spanish, and other Euro-Americans can also be detected archeologically.

Since the creation of the Arkansas Archeological Survey in 1967, a program of mapping reported sites, doing problem-oriented site surveys and excavations, and publishing results of this data gathering and interpretation led to the recording of 170 sites in Independence County. Three publications deal with Independence County sites: Watershed Summary of Archeological and Historic Resources in the White River Basins by Carol Spears, Nancy Myer and Hester Davis, Arkansas Archeo-logical Survey, Research Report 5; Arkansas Eastman Archeological Pro-ject by Charles M. Baker, Arkansas Archeological Survey, Research Report 6; and an unpublished thesis, An Archeological Survey of a Portion of the Central White River Basin: Microenvironments and Their Exploita-tion, by Kay Simpson Adams.

The most common kind of site present in the area is a small scatter of lithic debitage. Diagnostic artifacts such as specific types of pro-jectile points or sherds are not often present at these sites on the surface. These could be either Archaic or Woodland sites. In other parts of northeast Arkansas, a pattern of effective exploitation by late Paleo-Indian and early Archaic hunters (11,500-9,000 B.C.) was followed by a much smaller occupation during late Archaic.

Woodland cultures are relatively unstudied in northeast Arkansas, particularly the Baytown occupation. The transition to horticulture and

the building of mounds, making of pottery and the expected increase in population are expected to have occurred in the site area. Cultural influences from the west following the White River may be one factor in creating tribal societies different from those in the eastern part of northeast Arkansas.

The establishment of Mississippian societies with intensive agriculture, large aggregates of population, chiefdom level of political organization, and varying sizes of settlement from dispersed farming households to large walled towns is the main focus of research now ongoing in northeast Arkansas archeology. The "Adams phase" located near Newport apparently represents the transition to intensive agriculture. It differs from the kind of transition seen near Blytheville, and it is important to understand why there is a different response in these two areas.

Several major late Mississippian sites are recorded in Independence County, two of which are less than 3 miles from the site. Both the Akron Cemetery sites and the Greenbriar site are probably major settlements of the Magness phase. Many other settlements relating to this phase are probably present on the site. It has been postulated that major Mississippian ceremonial centers are usually located near several differing ecological zones to better coordinate the extraction of resources and distribute these to tribal members. An engraved conch shell showing art motifs related to the Southeastern Ceremonial Complex was found at the Akron Cemetery site. It will be important to discover related villages and other Mississippian sites in the research areas to see if other traces of this religious complex are present. Both early and middle Mississippian sites are probably also present.

An examination of the General Land Office Survey of 1838 showed no early Euro-American sites in the site area, although one such site was located by field survey. The value of the GLOs depends often on the reliability of the surveyor. Other historic sites may be present.

SITE SURVEY

Within the site vicinity, two sections were selected to be partially field checked. The perimeter of the whole area and interior roads were previously surveyed by car and checked from the air. A selective sampling of two different parts of the White River bottoms floodplain was made, based on differing topography, ease of access from field roads, and the enthusiastic cooperation of the landowners.

A field road dividing Sections 10 and 9 was chosen, and a 1.5 mile area was walked for sites. Six sites were easily found within one-quarter mile of the road. Four of these (3IN173-3IN176) were on high knolls of an old river natural levee system within one 60-acre area. These were all in cultivated fields with sparse crops. A lack of rainfall decreased visibility of specimens on the surface, but lithic debitage, projectile points, and cobble tools were prevalent. Almost every high knoll with yellowish soil showed evidence of aboriginal occupation.

The northeast quarter of Section 21 was selected as the next area for survey. This borders a present double bend meander of the White River. Ten sites were located by the survey team within a three hour period (3IN177-3IN186). These included small Archaic lithic scatters, a Late Mississippian village site, and an early Euro-American occupation dating about 1820. Projectile points, scrapers, sherds, cobble tools, and much lithic debitage was collected from these sites (Table 7-1). The Euro-American occupation evidence included sherds of transfer printed pearlware, earthworm mocha and banded ware, shell edge pearlware, saltglazed stoneware, redware, and free blown bottle fragments. No one is shown as living there on the 1838 General Land Office map, and more research must be done on the historic records to interpret this occupation. A complex system of old stream terraces is present in this location, and at least one site is present on each terrace or knoll.

A possible Euro-American industry site was discovered in the southeast quarter of Section 12 (3IN187). This was debris from a shell button manufacturing site. Piles of mussel shells with many round perforations in them were present. This could be a redeposition of

materials. Field roads were checked in the rest of the site vicinity to decide accessibility and difficulty of survey. At the time of the survey, fields planted in cotton, rice, and milo were too thickly grown to check for artifacts easily; soybean growth was still sparse. A comprehensive survey would be much more successful in the late fall, winter, or early spring.

CONCLUSION

The purpose of the field survey and records check was to indicate what archeological resources may be present in the site area.

The plant site has a high potential for prehistoric and historic sites and an intensive investigation of the site must be undertaken prior to any construction activities.

Table 7-1

Archeological Sites Located Near the Independence Steam Electric Generating Station
Independence County, Arkansas

Page 1 of 2

Number	Topography	Artifacts	Remarks
3IN171	Small knoll	5 lithic debitage	Probably an Archaic camp site.
3IN172	Small knoll	2 lithic debitage	Probably an Archaic camp site.
3IN173	High knoll	15 cobble tools, projectile points, 50 lithic debitage	Large Archaic or Woodland site.
3IN174	High knoll	2 side notched points, 40+ lithic debitage	Archaic or Woodland camp site.
3IN175	Slight knoll	2 lithic debitage	Probably an Archaic camp site.
3IN176	Very high knoll	8 cobble tools, 20 lithic debitage, iron axe	Probably Archaic camp site and Euro-American
3IN177	Slight knoll	50+ ironstone, crockery glass	Late 19th century farmstead.
3IN178	Terrace	1 stemmed and notched projectile point, 30 lithic debitage	Probably Archaic camp site.
3IN179	High old terrace	100+ pearlware, salt glazed stoneware, Neeleys Ferry Plain pottery, 100+ lithic debitage	1820's Euro-American occupation plus Mississippian village site. Should be tested.

Number	Topography	Artifacts	Remarks
3IN180	Slight terrace	10 lithic debitage	Probably an Archaic camp site.
3IN181	High terrace	3 lithic debitage	Probably an Archaic camp site.
3IN182	Moderate terrace	1 scraper, 1 novaculite debitage, 20 lithic debitage	Probably an Archaic camp site.
3IN183	Moderate terrace	1 stemmed point, 20 lithic debitage	Probably an Archaic camp site.
3IN184	High terrace	Neeleys Ferry Plain sherds, Nodena points, 100+ lithic debitage, daub	Late Mississippian village. Should be tested.
3IN185	Small knoll	20 lithic debitage	Probably an Archaic camp site.
3IN186	Small knoll	6 lithic debitage	Probably an Archaic camp site.
3IN187	Flat field	50+ perforated mussel shells	Shell buttons reworked or possible manufacture site.

PART 8

SOCIOECONOMICS

POTENTIAL SOCIAL AND ECONOMIC IMPACTS OF THE CONSTRUCTION
AND OPERATION OF THE ARKANSAS POWER & LIGHT COMPANY'S
INDEPENDENCE STEAM ELECTRIC STATION

Prepared for

DAMES & MOORE
Consultants in the Environmental
and Applied Earth Sciences

and

ARKANSAS POWER AND LIGHT COMPANY

Prepared by

DR. JOHN S. KAMINARIDES

College of Business
Arkansas State University

August, 1977

TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
SUMMARY		xvi
PREFACE		xxx
1.0	SOCIOECONOMIC CHARACTERISTICS AND TRENDS	1
1.1	<u>Delineation of Study Area</u>	1
1.1.1	Primary Impact Area	1
1.1.2	Rest of Arkansas	5
1.1.3	State of Arkansas	8
1.2	<u>Population</u>	8
1.2.1	Population Growth	8
1.2.2	Population, Area and Density	10
1.2.3	Urban versus Rural Population	10
1.2.4	Households	10
1.2.5	Population by Race	10
1.2.6	Population by Sex and Age Distribution	16
1.3	<u>Employment and Economic Base</u>	16
1.3.1	Industrial Distribution of Employment	16
1.3.2	Unemployment Trends	28
1.3.3	Manufacturers by SIC and Employment	28
1.3.4	Distribution of Employment by Occupation	28
1.4	<u>Income and Spending</u>	43
1.4.1	Average Levels of Personal Income	44
1.4.2	Consumption Behavior - Retail Sales	48

TABLE OF CONTENTS (Continued)

1.5	<u>Housing</u>	50
1.5.1	Composition	50
1.5.2	Tenancy and Vacancy	54
1.6	<u>Public Service and Costs</u>	54
1.6.1	Adequacy of Public Utilities and Roads in Project Study Area	59
1.6.2	Adequacy of Public Safety Facilities	68
1.6.3	Adequacy of Public School Facilities	73
1.7	<u>Community Cohesion</u>	73
1.7.1	Ability and Willingness of Communities to Absorb New People	79
1.7.2	General Attitudes toward Industrial Develop- ment	79
1.7.3	Sense of Community Identity	81
1.8	<u>Projected Economic Development for the Study Area without Project Conditions</u>	81
1.8.1	Population Forecasts	82
1.8.2	Projected Population for the Study Area	83
1.8.3	Projected Population for Independence and Jackson Counties	83
1.8.4	Labor Force Trends in the Study Area	90
1.8.5	Projecting Employment in Agricultural and Non-Agricultural Industries	92
1.8.6	Analysis of Employment Changes in the Study Area	92
1.8.7	Projections of Total Personal Income and Per Capita Personal Income	95
1.8.8	Projected Total Personal Income	95
1.8.9	Projected Per Capita Personal Income	97

TABLE OF CONTENTS (Continued)

1.8.10	Projections of Total Earnings by Source for the Study Area	97
1.8.11	Analysis of Total Earnings	100
1.9	<u>Determination of Employment and Income Multiplier</u>	101
1.9.1	Index of Local Specialization (ILS)	102
1.9.2	Conversion of ILS into Basic and Nonbasic Shares of Employment	106
1.9.3	Basic and Nonbasic Employment in the Study Area	106
1.9.4	Basic-Nonbasic Ratios (Indirect Employment Multiplier) and Regional Employment Multiplier	106
1.9.5	Determination of Consumption Multiplier or Regional Income Multiplier	110
2.0	ENVIRONMENTAL IMPACT ACTION	111
2.1	<u>Construction Impacts</u>	111
2.1.1	Employment and Population Changes	111
2.1.1.1	Impact on Employment	111
2.1.1.2	Impact on Unemployment	117
2.1.1.3	Impact on Population	119
2.1.2	Income and Spending Changes	119
2.1.2.1	Direct Income Changes	119
2.1.2.2	Induced Income and Spending (Multiplier Effects)	123
2.1.2.3	Impact on Retail Sales	124
2.1.3	Housing Impacts	125

TABLE OF CONTENTS (Continued)

2.1.3.1	Projected Pattern of Construction Worker Relocation	125
2.1.3.2	Impact of New Housing	128
2.1.4	Public Service Impacts	129
2.1.4.1	Requirements for Additional Utility Services	129
2.1.4.2	Requirements for Road and Traffic Control Improvements	130
2.1.4.3	Requirements for Increased Public Safety Service	131
2.1.4.4	Requirements for Increased Public School Facilities	132
2.1.4.5	Impact on Financial Institutions	133
2.1.4.6	Impact on Minorities	134
2.1.5	Fiscal Impacts	136
2.1.5.1	Assessed Valuation Changes	136
2.1.5.2	Tax Revenue Changes	139
2.1.5.3	Sales and Use Tax Impacts	141
2.1.6	Community Cohesion Impacts	141
2.1.6.1	Estimate of Potential Impacts on Local Communities' Quality of Life Characteristics	141
2.1.7	Summary of the Overall Income Impact of the Construction Phase of AP&L Plant on the Study Area	143
2.2	<u>Operation Impacts</u>	145
2.2.1	Employment and Population Changes	145
2.2.1.1	Direct Employment	145

TABLE OF CONTENTS (Continued)

2.2.1.2	Induced Employment	151
2.2.1.3	Projected Population Changes	151
2.2.2	Income and Spending Changes	151
2.2.2.1	Direct Income and Spending Changes	151
2.2.2.2	Indirect (Induced) Income and Spending Changes	152
2.2.2.3	Impact on Retail Sales	154
2.2.3	Housing Impacts	155
2.2.3.1	Estimated New Housing Investments	155
2.2.4	Public Service Impacts	156
2.2.4.1	Utilities	156
2.2.4.2	Public Safety	157
2.2.4.3	Public Schools	157
2.2.4.4	Financial Institutions	157
2.2.5	Fiscal Impacts	159
2.2.5.1	Property Taxes	159
2.2.5.2	Sales and Use Tax and Other Taxes	159
2.2.5.3	Income Taxes on Additional Power Sales	161
2.2.6	Community Cohesion Impacts	162
	SUMMARY OF THE OVERALL INCOME IMPACT OF THE OPERATION PHASE OF THE AP&L PLANT ON THE STUDY AREA	164
	SUMMARY OF THE TOTAL INCOME IMPACT OF THE CONSTRUCTION AND OPERATION PHASES OF THE AP&L PLANT ON THE STUDY AREA	165
	APPENDIX A DELINEATION OF THE STUDY AREA	166
	APPENDIX B EMPLOYMENT	169
	APPENDIX C INCOME	173

TABLE OF CONTENTS (Continued)

APPENDIX D	RETAIL SALES	175
APPENDIX E	HOUSING	177
APPENDIX F	PUBLIC SERVICE AND COSTS	180
APPENDIX G	TAXES AND REVENUE	187
APPENDIX H	COMMUNITY COHESION	209
APPENDIX I	FOOTNOTES	221

LIST OF TABLES

<u>Table</u>	<u>Title</u>	<u>Page</u>
1	Population of Study Area, White River Planning and Development District and the State of Arkansas	9
2	Population, Area and Density Per Square Mile	11
3	Urban versus Rural Population Study Area, White River Planning and Development District, State of Arkansas	12
4	Households by Type of Household Head, 1970	13
5	Population in Households, Number of Households and Persons per Household, 1970 and 1960	14
6	Population by Race for Study Area, White River Planning and Development District and State of Arkansas	15
7	Population for Selected Age Groups by Sex, Median Age for Study Area - 1970	17
8	Population for Selected Age Groups by Sex, Median Age and Percent Distribution, White River Planning and Development District	18
9	Population for Selected Age Groups by Sex, Median Age and Percent Distribution, Arkansas, 1970	19
10	Dependency Ratio for Study Area, WRPDD, Arkansas and United States, 1970	20
11	Employment by Industry for White River Planning and Development District, 1960, 1965, 1970, 1975	21
12	Employment by Type and Broad Industrial Sources for Study Area (Independence and Jackson Counties), 1970-1974	24
13	Employment by Type and Broad Industrial Sources, Full and Part-time Wage and Salary Employment, Plus Number of Proprietors for Independence County	25
14	Employment by Type and Broad Industrial Sources, Full and Part-time Wage and Salary Employment, Plus Number of Proprietors, Jackson County	26
15	Civilian Labor Force, White River Planning and Development District, 1970-1974	27

<u>Table</u>	<u>Title</u>	<u>Page</u>
16	Manufacturers - Independence County, by Standard Industrial Classification, Name, Location and Number of Employees, 1976	29
17	Manufacturers - Jackson County, by Standard Industrial Classification, Name, Location and Number of Employees	31
18	Estimated 1975 Employment by Occupation for White River Planning and Development District	32
19	Total Personal Income, Arkansas and Study Area, 1970-1975	45
20	Personal Income by Major Sources for Independence and Jackson Counties, 1974	46
21	Per Capita Personal Income, Arkansas and Study Area, 1970-1975	47
22	Retail Sales, Batesville, Newport, Independence and Jackson Counties, Study Area and White River Planning and Development District, 1963-1967-1972	49
23	Estimated Retail Sales for the Study Area, 1970-1976	51
24	Year Round Housing Units, by Type of Structure, Independence, Jackson County, Study Area, White River Planning and Development District and Arkansas, 1970	52
25	Year Round Housing Structures by Number of Units, Batesville and Newport, 1970-1976	53
26	Total Occupied Housing Units - Owner Occupied Units and Renter Occupied Units - Independence County, Jackson County, Study Area, White River Planning and Development District and Arkansas, 1970	55
27	Vacancy Characteristics of Year Round Housing Units for Batesville, Newport, Independence and Jackson Counties, the Study Area and White River Planning and Development District, 1970	56
28	Transient Housing Facilities	57
29	Community Services for Impact Area	58
30	Source and Use of Water, 1970	60
31	Road and Street Mileages, Independence and Jackson Counties and Arkansas Totals	62

<u>Table</u>	<u>Title</u>	<u>Page</u>
32	Assets, Loans and Deposits of Financial Institutions in Independence and Jackson Counties, 1970-1977	69
33	Patient Utilization by Hospital, 1976	71
34	Selected Health Manpower by Area, 1976	72
35	Selected Ranking Data for Independence and Jackson County School Districts	74
36	Student/Teacher Ratios, Selected School Districts	75
37	Various School District Statistics in Independence County	76
38	Various School District Statistics in Jackson County and State	78
39	Opinions of Impact Area Respondents Concerning Attitudes of Community Residents	80
40	Projected Population by Sex for Independence and Jackson Counties and the Study Area for 1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010	84
41	Projected Population for Independence County by Age and Sex, 1975 to 2010	85
42	Projected Population for Jackson County by Age and Sex, 1975 to 2010	87
43	Projected Urban-Rural Population for Independence County, Jackson County and Study Area, 1970, 1975, 1980, 1985, 1990, 1995, 2000, 2005 and 2010	89
44	Total Employment and Labor Force Participation Rates for Study Area, 1960 and 1970, and Projected to 1975, 1980, 1985, 1990, 1995, 2000, 2005 and 2010	91
45	Projected Employment by Industry for Study Area from 1975 to 2010	93
46	Projected Total Personal Income for Study Area, 1980-2010	96
47	Projected Per Capita Personal Income for Study Area from 1980 to 2010	98
48	Projected Total Earnings by Source for the Study Area from 1970 to 2010	99

<u>Table</u>	<u>Title</u>	<u>Page</u>
49	Index of Local Specialization for White River Planning and Development District in 1960, 1965, 1970 and 1975	103
50	Results of the Survey Mailed to Sample Firms in Different Industries as to Their Productivity Relative to the National and Their Exports	104
51	Basic and Nonbasic Shares of Employment by Industrial Categories for White River Planning and Development District	107
52	Employment by Industrial Categories and by Basic and Nonbasic Employment for Study Area, 1970, 1972 and 1974	108
53	Basic-Nonbasic Employment Ratios and Employment Multiplier for Study Area	109
54	Estimated Quarterly Employment by Craft During Construction	112
55	Estimated Quarterly Employment During Construction	113
56	Estimated Employment Impact During Construction Phase	115
57	Effects of Constructing the AP&L Plant on the Employment and Unemployment of Study Area	118
58	Estimated Total Population Gains in the Study Area During the Construction Phase	120
59	Estimated Annual Payroll by AP&L During Construction	121
60	Estimated Quarterly Wage and Payroll During Construction	122
61	Estimated Retail Sales Gained Due to Increase in Income over Construction Phase	125
62	An Estimate of Income Generated by Financial Institutions During Construction Period	135
63	Revenues from Selected Sources for Batesville, Newport, Independence and Jackson Counties, and the Study Area for Years 1970 through 1976	137
64	Projected Gains from Selected Revenue Sources for Arkansas and the Study Area During the Construction Phase	138
65	Opinions of Impact Area Respondents Concerning Effect of Proposed Plant on Quality of Life Characteristics	142
66	Summary Table Showing the Total Income Impact of the Construction Phase of AP&L Plant on the Study Area	144

<u>Table</u>	<u>Title</u>	<u>Page</u>
67	Proposed Type of Employment by Independence Steam Electric Station During Its Operation Phase	146
68	Proposed Annual Payroll by AP&L to Its Employees During the Operation Phase, 1983 to 2012	147
69	Employment Projections by Occupation, White River Planning and Development District and AP&L Plant, 1975-1980	149
70	Arkansas Eastman Employee Vehicle Registration by Place and Number, July, 1977	150
71	Annual Payroll During the Operation Phase and Estimates of Multiplier Effect, 1983 to 2012	153
72	Estimated Retail Sales Gained Due to Incomes over Operation Phase	155
73	An Estimate of Income Generated by Financial Institutions During Operation Period	158
74	Projected Gains from Selected Revenue Sources for Arkansas and the Study Area During the Operation Phase	160
75	Summary of the Total Income Impact of the Operation Phase of the AP&L Plant on the Study Area	164
76	Summary of the Total Income Impact of the Construction and Operation Phases of the AP&L Plant on the Study Area	165
A-1	Acreage of Developed Area by Land Use Category for Independence, Jackson and Study Area	166
A-2	Population, by Town, Independence County	167
A-3	Population, by Town, Jackson County	168
B-1	Estimated Quarterly Employment by Craft During Construction	169
B-2	Proposed Type of Employment by Independence Steam Electric Station During Its Operating Phase	170
C-1	Personal Income by Major Sources for Independence County	173
C-2	Personal Income by Major Sources for Jackson County	174
D-1	Retail Sales for Counties and Major Towns within the White River Planning and Development District	175

<u>Table</u>	<u>Title</u>	<u>Page</u>
D-2	Sales Tax Receipts - Independence County, Jackson County and Study Area - 1970-1976	176
E-1	Housing Characteristics for Independence and Jackson Counties, Principal Towns, Study Area, and White River Planning and Development District, 1970	177
F-1	Road and Street Mileages, Independence County	180
F-2	Road and Street Mileages, Jackson County	181
F-3	Road and Street Mileages for State of Arkansas	182
F-4	Average Annual Traffic Volumes, Point Ferry	183
G-1	Selected Arkansas Taxes Collected in Independence and Jackson Counties, and the Study Area for Years 1970 through 1976	187
G-2	Property Tax Rates within the Study Area	188

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>	<u>Page</u>
1	Regional Location Map	3
2	State Location Map, White River Planning and Development District	4
3	Study Area, Independence and Jackson Counties	6
4	Air, Rail and Water Transportation in WRPDD	7
5	Rural State Highway Federal Aid Systems Map	61
6	1976 Traffic Count for the Study Area	64
7	Arkansas Transportation Official Map, 1975, Arkansas Railroads	65

LIST OF EXHIBITS

<u>Exhibit</u>	<u>Title</u>	<u>Page</u>
Appendix B		
I	Interview with Construction Supervisor of Arkansas Eastman Plant as to the Availability of Local Labor	171-172
Appendix E		
I	Interview Concerning Rental Housing Availability in the Study Area	178
II	Interview Concerning Rental Housing Availability in Newport	179
Appendix F		
I	Wastewater Treatment Facilities, 1974	184-186
Appendix G		
I	General Acts of the Sixty-Ninth General Assembly of the State of Arkansas, Volume II, Book 2	189-198
II	Arkansas Power and Light Company Letter Dated August 3, 1977	199-201
III	Arkansas Personal Income Tax Withholding Schedule	202-203
IV	Arkansas Power and Light Company Letter, Dated July 5, 1977	204-206
V	Arkansas Power and Light Company Letter, Dated August 18, 1977	207-208
Appendix H		
I	Arkansas State University Letter, Dated August 16, 1977	209
II	Questionnaire - Sample	210
III	Questionnaire - Newark	211
IV	Questionnaire - Batesville	212
V	Questionnaire - Oil Trough	213
VI	Questionnaire - Newport	214
VII	The "Tri-County Journal", Volume 2, Number 19	215

LIST OF EXHIBITS (Continued)

<u>Exhibit</u>	<u>Title</u>	<u>Page</u>
VIII	"Commercial Appeal" - Memphis, TN, August 24, 1977	216
IX	"Commercial Appeal" - Memphis, TN, August 24, 1977	217
X	"The Jonesboro Sun" - Jonesboro, AR, August 23, 1977	218
XI	"The Wall Street Journal" - Southwest Edition, August 23, 1977	219
XII	"Commercial Appeal" - Memphis, TN, August 22, 1977	220

SUMMARY

I. THE OBJECTIVE OF THIS STUDY

The main objective of this study was to determine the overall socioeconomic impact that the construction and operation of the Independence Steam Electric Station at Newark, Arkansas will have on the study area. Most parts of the two-county study area (Independence and Jackson) are located within a twenty-five mile radius of the proposed plant site. A more detailed objective of this study was to determine the direct and indirect effects that the construction and operation phases of the AP&L plant at Newark, Arkansas will have on various demographic and economic sectors of the study area. These sectors include population, employment, unemployment, income, retail sales, housing, taxes, education, financial institutions, transportation, minorities and community services and facilities.

II. THE SCOPE OF THE STUDY

- A. Describe and analyze the present level of development and economic conditions prevailing in the study area.
- B. Deal with projected economic development of the study area to 2010 without project conditions.
- C. Determine the regional employment multiplier and regional income multiplier for the study area.
- D. Estimate the economic impact of the construction and operation of the AP&L plant at Newark on the local economy and, more specifically, on economic sectors such as:
 - 1. Population
 - 2. Employment
 - 3. Unemployment
 - 4. Income
 - 5. Retail Sales
 - 6. Housing
 - 7. Taxes
 - 8. Education
 - 9. Medical Services
 - 10. Financial Institutions
 - 11. Minorities
 - 12. Community Services and Facilities
 - 13. Community Cohesion

- E. Estimate the gains in basic and nonbasic income in the impact area and determine the overall impact of constructing and operating the AP&L plant at Newark, Arkansas on the study area and other local areas.

III. STUDY AREA DEFINED

The study area is defined as that area subject to the direct and indirect economic influence of the AP&L plant at Newark. This study considers Independence and Jackson Counties as the primary impact area where most of the impact will be felt.

IV. METHODOLOGY

The methodological procedures of this report were as follows:

- A. An inventory of data was accumulated to describe the present level of development prevailing in the impact area for the various economic sectors listed above. Data were collected from various sources, including published data, internal records of the Arkansas Power and Light Company, business, government agencies and educational institutions.
- B. The economic base type of analysis was used to distinguish between basic (primary, non-local) industry and nonbasic (local, service) industry in the impact area and determine the regional employment multiplier. This study, in determining the basic and nonbasic employment in the study area, developed the Index of Local Specialization (ILS) for the study area. By deriving the basic or nonbasic employment by industrial classification in the study area, the study was able to estimate the local employment multiplier.
- C. The local employment multiplier was applied to determine the indirect effect that the construction and operation of the AP&L plant will have on local employment. In using the basic and nonbasic employment classification, the income by source was converted into basic and nonbasic income. These types of income were applied in a formula to determine the Local Consumption or Local Income Multiplier. The formula used for the income multiplier was the one developed by Charles Tiebout. It reads:

$$K = \frac{1}{1 - \frac{\text{Nonbasic Income}}{\text{Total Income}}}$$

- D. Several accepted methodologies were used to determine the effect of the AP&L plant at Newark on the other sectors of the local economy.

- E. The study estimated the impact that the AP&L plant would have on the basic activities and the effect that those basic activities would have on nonbasic (local) activities.
- F. The overall impact of the AP&L plant was estimated by multiplying the gains in income from basic activities by the local income multiplier (1.66) and adding to it the income gained from nonbasic activities.

V. INFORMATION OBTAINED

Economic and Demographic Characteristics

1. Population. The population in the study area declined from 49,400 in 1950 to 43,175 in 1970. But the population of the study area increased in 1975 to 45,300. The land area of the study area is estimated to be 1,381 square miles and the 1975 population density was 32.8 persons per square mile. The population of the study area is basically rural. Only 34.6 percent of the population lives in urban areas. A very small number of non-whites live in the study area. About 8.3 percent of the area's population is non-white. It was estimated that the number of persons per household was 2.97. The dependency ratio of youth and old age persons on working age persons for the study area was estimated to be .987.
2. Employment. Total employment in the study area increased from 18,898 in 1970 to 20,728 in 1974, with manufacturing increasing its share from 3,181 workers in 1970 to 5,384 in 1974. Farm employment declined from 2,247 in 1970 to 1,753 in 1974. There are about 64 manufacturing firms in the study area. About 22 of them employ less than 10 workers. Only one firm employs more than 500 workers. Arkansas Eastman Company is projected to reach this size in 1978. It is estimated that most of the labor during the construction phase will

come from local areas of about a 50-mile radius from the site.

Local workers proved themselves in the case of the Arkansas Eastman plant to be adaptable to new working conditions and experiences.

About 60 percent of the hardest-to-obtain craftsmen (pipe fitters, electricians) will be imported from other parts of the state or county.

3. Income. The total personal income of the study area increased from \$119.6 million in 1970 to \$219.0 million in 1975, an increase of about 83.2 percent. The State during the same period experienced an income growth of about 75.7 percent. Jackson County depends more heavily on agriculture as a source of income (25.5 percent) than does Independence County (10.6 percent). The per capita income of the study area increased from \$2,761 in 1970 to \$4,834 in 1975. The 1975 per capita income is above that of the State, \$4,617. The two-county area experienced a growth in per capita income of 75.1 percent from 1970 to 1975, while the White River Planning and Development District grew by 69.4 percent and the State of Arkansas by only 60.4 percent.
4. Retail Sales. It was estimated that the retail sales in the study area increased from about \$64.9 million in 1970 to about \$145.4 million in 1976. Batesville and Newport are the two major trade centers in the study area.
5. Housing. Most of the housing units available in the study area are single-family units. About 425 new housing units were built in Batesville during the 1970-1976 period (a 13.6 percent change net of 35 removals). Of these, 42 percent were multi-unit structures. During the same period there were 563 structures built in Newport (16.4 percent net increase), about 37.7 percent of which were multi-unit structures. About 66.1 percent of the total occupied units are

owner occupied. The vacancy rate for the study area was estimated to be 7 percent. This figure, however, must be tempered by the fact that 22 percent of the housing in the study area lacks some or all plumbing and is therefore sub-standard. The availability of rentals in either single units or multi-units is practically non-existent.

6. Public Utilities and Roads. There has been an ample supply of power within the study area for both residences and industry.

Natural gas is in short supply and all industrial users are treated as interruptible customers. Nearly 90 percent of the area's population is supplied by ground water. The larger towns in the study area utilize centralized waste treatment facilities.

The highway system is the most important transportation link in the area. There are 454 miles of state highways and 1,527 miles of local roads in the study area. Bus service is available to several towns in the study area. A privately owned port facility exists on the White River at Newport. The area is served by the Missouri Pacific Railroad. Amtrak provides passenger service daily from Newport to Chicago and Laredo, Texas. There is no commercial air service, but the Batesville airport is designed for commercial service.

Four newspapers (two daily and two weekly) are published in the area.

There are ten financial institutions in the study area. These institutions have done an adequate job of providing for the financial needs of the area. Their rate of growth has been remarkable. Total deposits of all institutions in the area grew by \$142.8 million from 1970 to June, 1977, a 152 percent increase.

Ten cities have police facilities. Batesville and Newport have paid fire fighters, whereas most of the remaining towns use volunteer forces.

In the study area there are four hospitals with 379 beds and 5 nursing homes with a total of 417 beds. There is about 1 physician per 1,542 people in the area.

There are 15 separate school districts in the impact area. These districts vary in size from 163 students in Sulphur Rock to 2,530 in Newport.

VI. PROJECTED ECONOMIC DEVELOPMENT WITHOUT PROJECT CONDITIONS

1. Population. It was projected that the population of the study area will increase from 43,175 in 1975 to about 47,500 in 1980. By 2010 the population of the study area is expected to increase to 64,500.
2. Labor Force. Total wage and salary employment projected for the study area will increase from 14,166 workers in 1970 to about 25,200 workers in 2010. The employment in the goods-producing industries (mining, construction and manufacturing) was projected to increase from 4,841 in 1970 to 11,700 workers in 2010, or by 141.9 percent. Employment in the service-producing industries (transportation, trade, finance, services and government) will grow from 7,330 workers in 1970 to 12,500 in 2010, or by 70.0 percent.
3. Income. The projected total personal income for the study area will increase to \$320.0 million in 1980; to \$492.0 million in 1990; to \$762.0 million in 2000; and to \$1,171.0 million in 2010.
4. Total Earnings. Manufacturing, government, trade and services will be the leading earnings-producing sectors.

VII. DETERMINATION OF EMPLOYMENT MULTIPLIER

The following procedures were used in determining the employment multiplier for the study area.

1. The Index of Local Specialization (ILS) for the White River Planning and Development District was developed for 1960, 1965, 1970 and 1975 by industrial classification.
2. The ILS was converted to show what share of employment in each industrial classification was basic or nonbasic.
3. These shares of basic or nonbasic employment by industrial classification were applied to the employment in the study area to estimate the basic and nonbasic employment by industrial classification for the study area.
4. The local employment multiplier was estimated to be for:

1970	1.16
1972	1.10
1974	1.10
3-year average	1.12

The local multiplier 1.12 indicates that for each basic employment created in the study area, another 1.12 nonbasic employment (such as in service and trade industries) will be gained in the study area.

VIII. TEMPORARY EFFECTS DURING CONSTRUCTION PHASE

1. Impact on Employment. It was estimated that on the average AP&L will employ annually about 535 workers during the construction phase. The construction phase will start with an average annual employment of about 185 workers, but during the third year of the project an average of 854 workers will be employed at the plant. Peak employment of over 950 persons occurs during the summers of 1981 and 1982. During the last year of construction (1984) about 315 workers will be employed. In addition to the direct effect, the construction of the plant will have an indirect effect on local employment. The indirect effect on employment is derived by applying the local employment multiplier of 1.12 to the new employment created by the construction of the plant. During the first three

years of construction, about 957 new supporting jobs will be generated. About 700 of the new supporting jobs generated in the area will be phased out when the construction nears completion and the number of construction related workers employed is reduced.

About 210 workers (mostly pipe fitters and electricians) will need to be imported into the area. It was estimated that the unemployment rate in the study area will drop to about 2.0 percent during the construction period.

2. Impact on Population. It was estimated that about 534 people will be likely to move into the study area during the construction phase.
3. Impact on Income. The direct income to be earned in the study area due to increased payrolls was estimated to be about \$64.5 million. The induced income, however, over the construction phase was estimated to be about 127.3 million. This amount was derived by applying the local income multiplier (1.66) to the increase in basic income. The total income impact was estimated to be \$127.3 million over the construction phase of the plant (basic income X multiplier).
4. Impact on Retail Sales. As a result of consumption expenditures by project construction personnel and recipients of income generated by construction activities, retail sales in the study area will be expanded over baseline levels by an estimated \$80.4 million during the construction years.
5. Impact on Public Services. The new housing to be built, the more people to move in, the more employment opportunities to be created as a result of the construction of the AP&L plant will not put undue pressures on water, electricity, gas, and waste treatment systems.

Road maintenance requirements during this time may increase due to commuting workers and heavy construction traffic. Highways

69 and 122 in the Newark area will be most severely affected. The intersection of Highways 67 and 14 near Newport is dangerous because of the angle of approach and slope, calling for improvement.

Batesville and Newport could handle the expected increase in population with no increase in the size of their police forces. Newark would possibly need at least one additional marshall.

Newark is the largest town in the area with only a volunteer fire department. Tuckerman, with twice the population as Newark, has one paid fire fighter. Newark will thus need to add a paid fireman.

The hospital occupancy rate in the area is low, averaging 53.7 percent in 1976. No new hospitals will be needed. Health manpower in the area is generally adequate because there is one practicing physician per 1,542 persons, which is below the critical 1:4000 ratio.

If the new students were evenly distributed throughout the various school districts, the impact on schools would be negligible. The three school districts (Batesville, Newport and Newark) will likely get most of the new students. But these three school districts have a student/teacher ratio below that of the State. Newark School District, moreover, would derive a great benefit from its 45 mill property tax.

6. Impact on Financial Institutions. It was estimated that the financial institutions over the construction phase will earn about \$668,772 of additional income from the new savings generated in the area.
7. Fiscal Impacts. The study area is expected to gain about \$27.2 million in tax revenues over the construction phase of the plant. About \$26.9 million will be derived from property taxes paid by AP&L to the Newark School District and Independence County.
8. Minorities. About 50 non-white persons will move into the area, and about 30 non-white workers will be employed. The amount of income to be earned by employed non-white workers over the six-year period was estimated to be \$2.2 million.

IX. SUMMARY OF THE OVERALL INCOME IMPACT-CONSTRUCTION PHASE

The following table summarizes the total income impact of the AP&L plant over the construction phase.

SUMMARY TABLE SHOWING THE TOTAL INCOME
IMPACT OF THE CONSTRUCTION PHASE OF
AP&L PLANT ON THE STUDY AREA

<u>Basic Income Gains</u>	
Payroll spent in study area	\$ 48,400,000
Locally purchased supplies	1,000,000
Increase in local tax revenues	<u>27,263,588</u>
	\$ 76,663,588
	x 1.66
Total Income Impact	<u>\$127,261,556</u>

Source: Computations by the author; see text

X. OPERATIONS IMPACT

1. Impact on Employment. The direct impact on employment will be at an annual constant number of 207. The induced employment was estimated to be about 232 workers.
2. Impact on Population. The operation phase of the plant will possibly add 300 people. Considering, however, the fact that upon completion of the construction most of the 534 persons who had moved temporarily into the area will move out seeking other employment opportunities, the impact of operation on population will be negligible, if not negative.

3. Impact on Income. The direct income was estimated to be about \$472.2 million and indirect (induced) income to be \$311.9 million. The total income impact was estimated to be about \$784.1 million over the life of the plant (basic income X multiplier). income X multiplier + nonbasic income).
4. Impact on Retail Sales. It was estimated that retail sales over the life of the plant will increase by about \$495.6 million.
5. Impact on Housing. The estimated investment in housing will be approximately \$3.8 million, i.e., 75 houses @ \$50,000 each.
6. Impact on Public Services. Over the operation phase of the plant, the impact on public services will be approximately the same as it would be during the construction phase.
7. Impact on Financial Institutions. The income of financial institutions in the study area will increase by about \$5.2 million over the operation of the plant due to the increase in their deposits generated from AP&L's spending in the local economy.
8. Fiscal Impacts. It was estimated that over the life of the plant the study area will receive in additional tax revenues about \$229.0 million. About \$226.9 million will go to the Newark School District and Independence County.

XI. SUMMARY OF THE OVERALL INCOME IMPACT OF THE OPERATION PHASE

The following table shows the overall income impact that the operation phase of the plant will have on the study area.

SUMMARY OF THE TOTAL INCOME IMPACT OF THE
OPERATION PHASE OF THE AP&L PLANT ON THE STUDY AREA

	Amount
<hr/>	
Basic Income Gains:	
Payroll	\$238,633,707
Increase in Local Tax Revenues	229,048,361
Locally Purchased Supplies	
(\$150,000 per year for 30 years)	4,500,000
	\$472,182,068
Local Income Multiplier	<u>x</u> <u>1.66</u>
Total Income Impact	<u>\$783,822,233</u>

Source: Computations by the author.

XII. SUMMARY OF THE TOTAL INCOME IMPACT OF THE CONSTRUCTION AND OPERATION PHASE OF THE AP&L PLANT ON THE STUDY AREA.

The following summary table shows the combined income impact of the construction and operation phases of the AP&L plant on the study area.

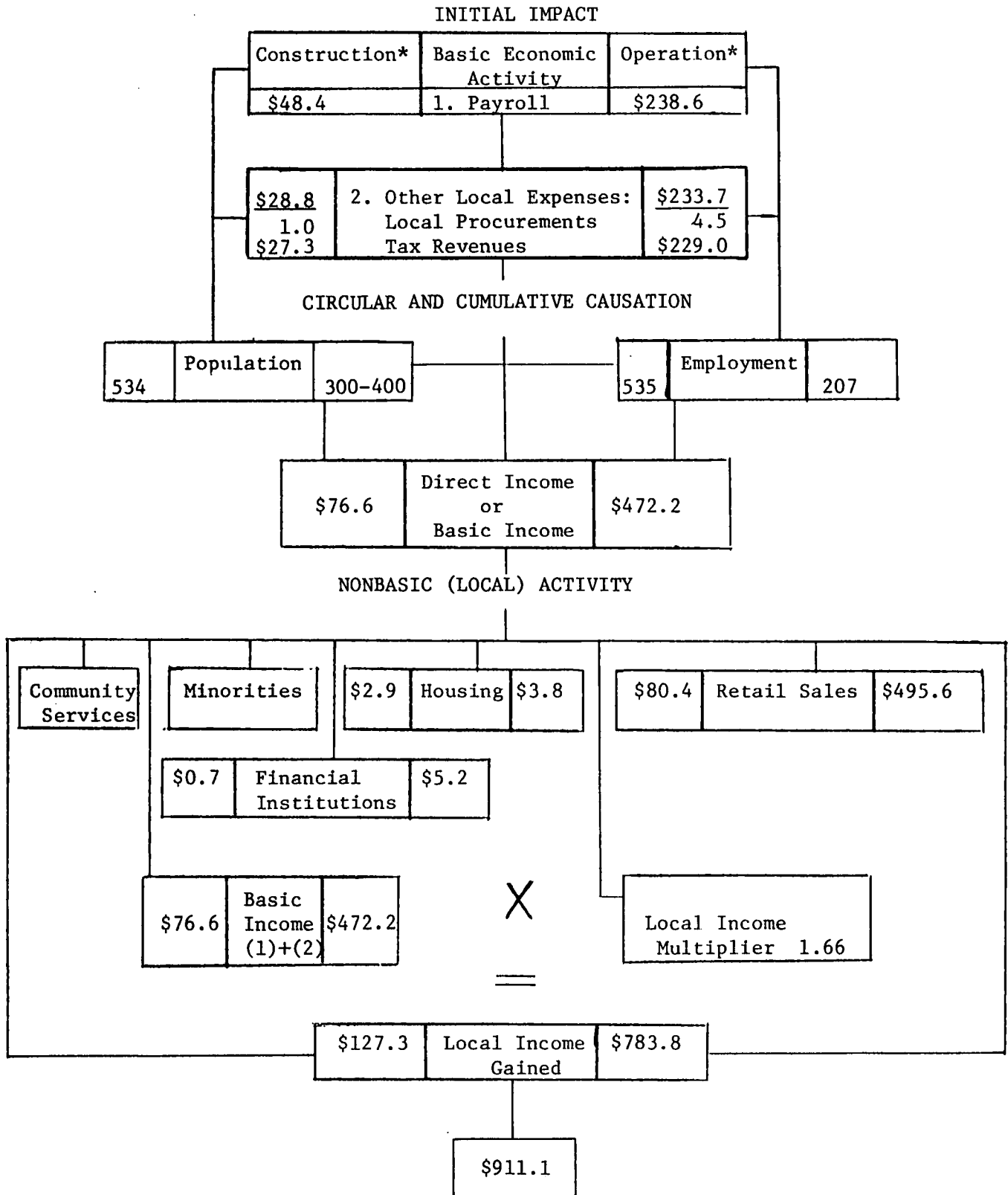
SUMMARY OF THE TOTAL INCOME IMPACT OF THE
CONSTRUCTION AND OPERATION PHASES OF THE
AP&L PLANT ON THE STUDY AREA

Basic Income Gains:	
Payroll	\$287,033,707
Increase in Local Tax Revenues	256,311,949
Locally Purchased Supplies	<u>5,500,000</u>
Total	\$548,845,656
Local Income Multiplier	<u>x 1.66</u>
Total Income Impact	<u>\$911,083,789</u>

Source: Computations by the author.

The figure on the following page depicts in flow chart fashion the origins and distribution of income flows within the two-county study area arising from the project.

FLOW CHART SHOWING THE IMPACT OF CONSTRUCTION AND
OPERATION PHASES OF AP&L PLANT ON STUDY AREA
(Dollar Amounts in Millions)



*Left Side of Box
Refers to Construction
Phase

*Right Side of Box
Refers to Operation
Phase

PREFACE

The main purpose of this study is to determine the overall socio-economic impact that the construction and operation of the Independence Steam Electric Station by the Arkansas Power and Light Company at Newark, Arkansas will have in a two-county study area (Independence and Jackson) and other local areas. It is the objective of this study to determine the direct and indirect effects of the construction and operation of the AP&L plant, at Newark, on various demographic and economic sectors of the impact area. These sectors include population, employment, income, retail sales, housing, minorities, education, financial institutions, medical services, tax base and tax revenue, community cohesion and community services and facilities.

The accepted techniques of regional analyses are used in determining the initial impact of the AP&L plant on major sectors of the economy, including population, income and employment. The results of these findings, together with additional information, are employed in determining the impact on other economic sectors included in the analyses. The techniques used in the study will assist in showing both the direct and indirect effects on the economy.

In this report an inventory of data was accumulated to describe the present level of development and economic conditions prevailing in the study area. Data were collected from various sources including published data, internal records of the Arkansas Power and Light Company, businesses, government agencies and educational institutions. Surveys were undertaken in order to obtain certain items of information.

This report also deals with the projected economic development of the study area without project conditions. A number of methodologies and techniques were used in projecting to 2010 the population, income, employment and earnings of the study area without the impact of the AP&L plant. Further, this report emphasizes in a rather detailed and methodological manner the direct and indirect effects of the AP&L plant on the study area over its construction and operation periods.

This final draft includes a very detailed presentation of techniques of analyses, as well as the findings of the investigation in determining and evaluating the effects of the AP&L plant on the study area.

In completing this report, the author was assisted by Dr. L. E. Talbert, Arkansas State University, Dr. Roland Mullins, Arkansas State University, Dr. Charles Ford, Arkansas State University, and Mr. W. R. Tarver. The typing was done by Jacquelyn Fowler.

1.0 SOCIOECONOMIC CHARACTERISTICS AND TRENDS

The maze of interdependencies of different variables which contributes to economic changes occurring in a region is in reality very formidable. The chore of identifying and evaluating these variables and their interdependencies is a very awesome and, at times, impossible task. This study focuses on population, income, employment, education, retail sales, taxes, housing, financial institutions and local services in an effort to establish and evaluate the overall economy of the study area.

1.1 Delineation of Study Area

1.1.1 Primary Impact Area. The study area consists of Independence and Jackson Counties in Arkansas. Most of the social and economic impact resulting from the construction and operation of the proposed Independence Steam Electric Station, at Newark, Arkansas will occur within twenty-five miles of the proposed site. Almost every part of the two counties included in the study area is located within a 25-mile radius of the proposed site. It is recognized that most of the direct and indirect socioeconomic impact of the proposed AP&L plant will be on these two counties because most of the labor will be drawn from within the two-county study area, and thus most of the payroll will end up in the hands of residents of the study area. Likewise, housing and public facilities of the study area are expected to be affected the most. The Arkansas Eastman Plant experience indicates that about 75 percent of the labor will be drawn from these two counties.

The two-county study area is located in North Central Arkansas and is a part of the White River Planning and Development District (see Figures 1 and 2). The District is composed of ten counties, most of which are a part of the Ozark Plateaus, and a portion, such as Jackson County, is within the Mississippi Delta. The district is divided into five areas. Each area and the counties comprising the district are:

WHITE RIVER PLANNING AND DEVELOPMENT DISTRICT

Areas and Counties

1. Hill
Fulton
Sharp
Izard
Stone
2. Lake
Van Buren
Cleburne
3. Independence
4. White
5. Delta
Woodruff
Jackson

The rationale for grouping counties stems from common characteristics exhibited by the counties within each area. Some of these characteristics are: economic activities, homogenous geographic characteristics, general population distribution and racial composition.

Independence County lies in the transition between the "bottoms" of the Mississippi Delta and the Ozark Mountains. Except for the bottom lands along the White River, the area is moderately rolling with enough slope to permit adequate drainage.

Jackson County lies in the flat alluvial plain of the Mississippi River. The White River runs diagonally from northwest to southeast through Izard, Stone, Independence, Jackson, White and Woodruff Counties.

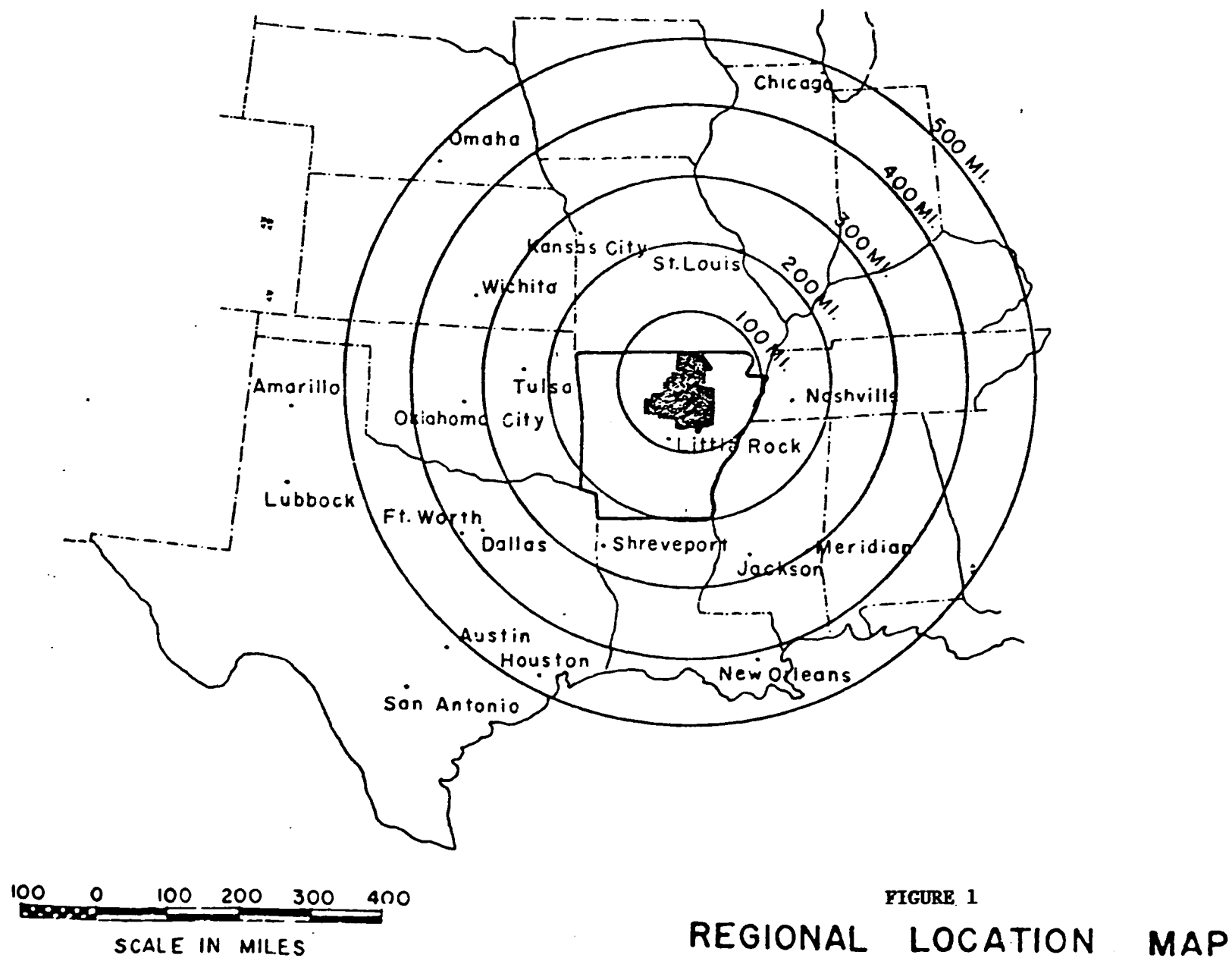




FIGURE 2

STATE LOCATION MAP

WHITE RIVER PLANNING AND DEVELOPMENT DISTRICT

The land in the study area is 1,381 square miles and there are about 32.8 persons per square mile versus 40.7 persons per square mile for the State. The acreage of developed area by land use category, such as residential, commercial, industrial, extractive, agricultural, institutional, transportation and utilities in Independence and Jackson Counties is shown in Appendix Table A-1.

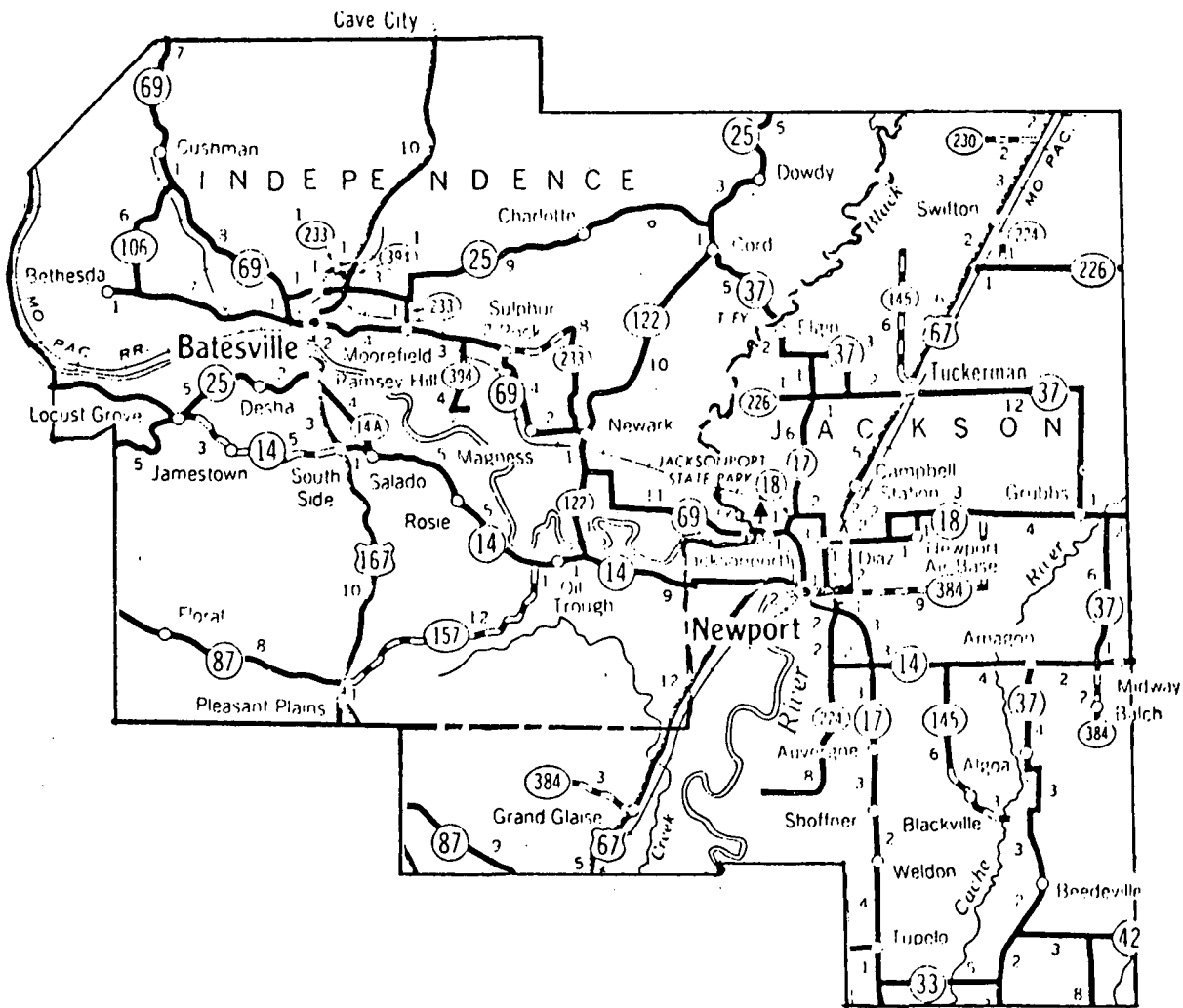
The study area is bordered on the East by Craighead and Poinsett Counties; on the South by Woodruff and White Counties; on the West by Cleburne and IZard Counties; and on the North by Sharp and Lawrence Counties.

There are two major cities in the study area--Batesville (Independence County) and Newport (Jackson County). There are several smaller towns in the two-county study area. These towns are shown in Appendix Tables A-2 and A-3.

The study area is served by U. S. State Highway 67 and U. S. State Highway 167. Other state highways serving the area are: 14, 69, 122, 394, 25, 17 and 37 (shown in Figure 3). The State provides a free ferry (Point Ferry) which crosses Black River at Jacksonport. The ferry provides a year-round service from 7 a.m. to 7 p.m. unless the river is exceptionally high. The Missouri Pacific Railroad connects the study area with such larger cities as Little Rock, St. Louis, Memphis and Kansas City (see Figure 4). Two major rivers cross the study area--Black River and White River. The latter is navigable with a private port at Newport.

1.1.2 Rest of Arkansas. Other counties in the White River Planning and Development District and in Arkansas will receive a secondary or a "spill-over" economic effect from the construction and operation of the proposed

FIGURE 3
STUDY AREA
INDEPENDENCE AND JACKSON COUNTIES



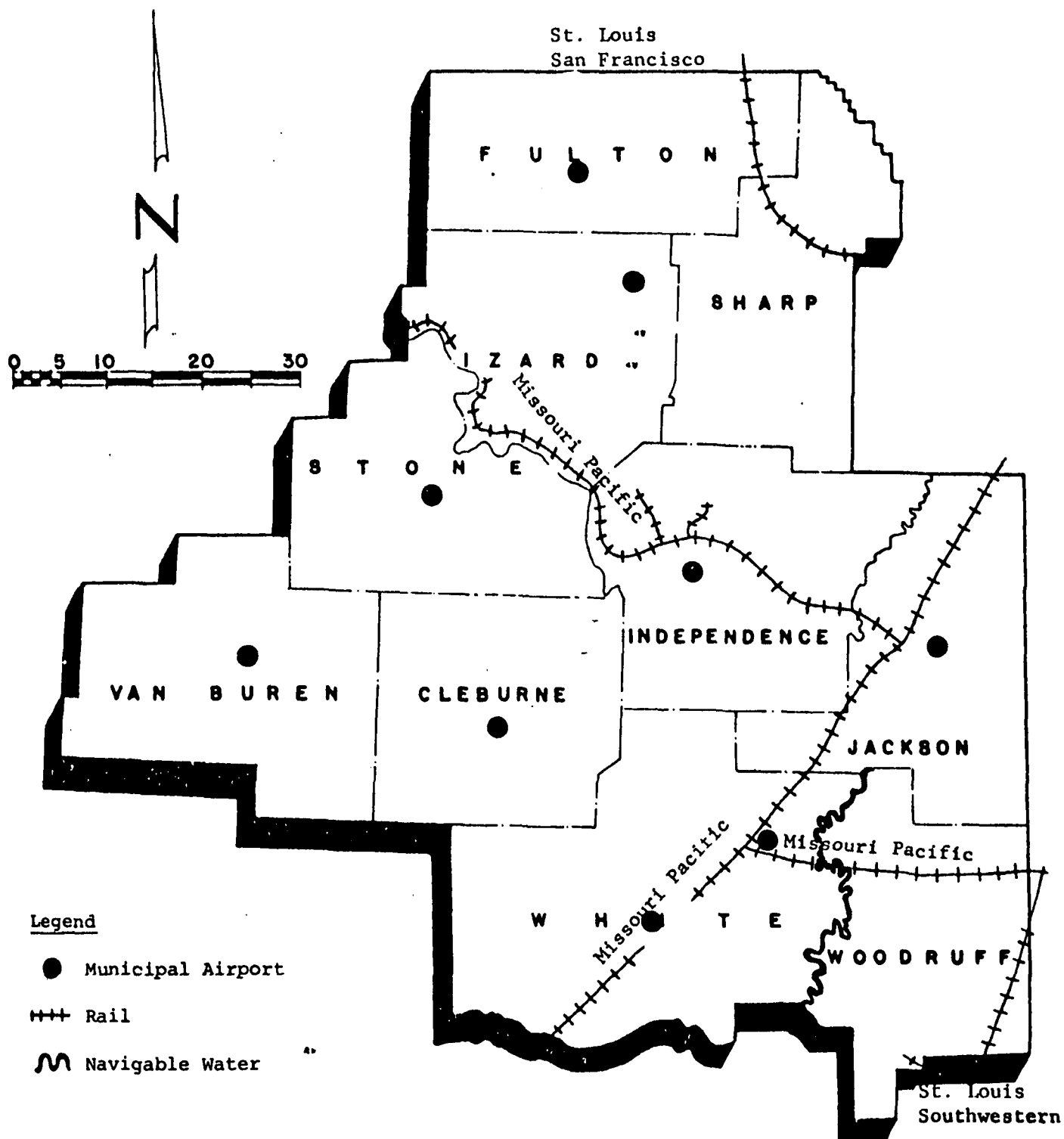


FIGURE 4

AIR, RAIL AND WATER TRANSPORTATION

IN WRPDD

AP&L steam generating power station. These counties will be White, Woodruff, Stone, Izard, Sharp, Cleburne, Van Buren and Craighead. Because the economic effects on these counties will be rather negligible, the analysis in this study will be concentrated on the primary impact area of Independence and Jackson Counties.

1.1.3 State of Arkansas. The State of Arkansas consists of 75 counties and is divided into eight planning and development districts. The population of the State of Arkansas was estimated in 1975 to be 2,116,000. It has a land area of 51,945 square miles with 40.7 persons per square mile. About 7.6 percent of the Arkansas population, or 160,600 persons, live in the White River Planning and Development District.

Based on the latest data available from the U. S. Department of Commerce, the per capita income in Arkansas in 1976 was \$5,073, placing it 48th among the 50 states. Only South Dakota, with a per capita income of \$4,796, and Mississippi, with \$4,575, were below the Arkansas figure. The Arkansas per capita income was \$1,368 below the national average of \$6,441.

1.2 Population

1.2.1 Population Growth. The population in the study area declined from 49,400 in 1950 to 43,175 in 1970, or by 12.6 percent. During the same period the State experienced an increase in population of 1.0 percent. The population decline that the study area experienced in the 1950's and in the early 1960's ended in the late 1960's. The population of the study area then increased from 43,175 in 1970 to 45,300 in 1975, or by 4.9 percent. As Table 1 shows, White River Planning and Development District followed basically the same population changes as did the study area. The population of the WRPDD increased from 142,769 in 1970 to 160,600 in 1975, or by 12.5 percent.

TABLE 1

POPULATION OF STUDY AREA, WHITE RIVER PLANNING
AND DEVELOPMENT DISTRICT AND THE STATE OF ARKANSAS

Area	1950	1960	1970	1972	1974	1975	% Change	
							1950-1970	1970-1975
Independence	23,488	20,048	22,723	24,400	24,400	23,600	(3.3)	(3.9)
Jackson	25,912	22,843	20,452	21,600	21,600	21,700	(21.1)	6.1
Study Area	49,400	42,891	43,175	45,800	46,000	45,300	(12.6)	4.9
White River P & DD	163,372	131,913	142,769	153,900	162,200	160,600	(12.6)	12.5
Arkansas	1,909,511	1,786,272	1,923,295	2,007,800	2,068,000	2,116,000	1.0	10.0

Source: U. S. Department of Commerce, Bureau of the Census, General Population Characteristics, Arkansas, 1950 and 1970, State and County Economic Data for Arkansas, Industrial Research and Extension Center, Little Rock, May, 1974, U. S. Department of Commerce, Federal State Cooperative Program for Population Estimates, Series P-26, No. 75-4, May, 1976.

1.2.2 Population, Area and Density. The land area of the study area is estimated to be 1,381 square miles. Dividing the 1975 population of the study area by its land area, a population density of 32.8 persons per square mile is established. The study area is more populated than the WRPDD, which shows a population density ratio of 24.19 persons per square mile. The State shows a 1975 population density ratio of about 40.73 persons per square mile. The information on population, area and density per square mile is shown in Table 2.

1.2.3 Urban Versus Rural Population. The population of the study area is basically rural, as shown in Table 3. Only 34.6 percent of the population of the study area lives in urban areas. The White River District is even less urbanized than the study area because the two largest cities of the district (Newport and Batesville) are located in the study area. In the State, one-half of the population resides in urban areas.

1.2.4 Households. In 1970 there were about 14,349 households in the study area. As Table 4 shows, about 11,819 of the households were of the family type while the other 2,530 were listed as primary individuals. About 10,447 of the families were headed by husband and wife; 282 had a male head, and 1,090 had a female head of household. Table 5 shows the number of persons per household. In 1970 there were 2.97 persons per household in the study area, 2.94 persons per household in the District, and 3.05 persons per household in the State.

1.2.5 Population by Race. A very small number of non-white people live in the study area. Table 6 shows that only 8.3 percent of the area's population is non-white. The largest percent of non-white population lives in

TABLE 2

POPULATION, AREA AND DENSITY PER SQUARE MILE

Area	Population 1975	Land Area in Square Miles	Population per Square Mile
Independence	23,600	752	31.38
Jackson	21,700	629	34.49
Study Area	45,300	1,381	32.80
WRPDD	160,600	6,637	24.19
Arkansas	2,116,000	51,945	40.73

Source: U.S. Department of Commerce, Bureau of the Census; Census of Population, 1970, General Population Characteristics, Arkansas.

TABLE 3

URBAN VERSUS RURAL POPULATION STUDY AREA,
WHITE RIVER PLANNING AND DEVELOPMENT DISTRICT, STATE OF ARKANSAS

AREA	1970				1960		Percent Urban Increase 1960-1970
	Urban		Rural		Urban	Rural	
	Number	Percent	Number	Percent	Number	Number	
Independence	7,209	31.7	15,514	68.3	6,207	13,841	16.1
Jackson	7,725	37.8	12,727	62.2	7,007	15,836	10.2
12 Study Area	14,934	34.6	28,241	65.4	13,214	29,677	13.0
WRPDD	29,556	20.7	113,213	79.3	20,486	111,427	44.3
Arkansas	960,865	50.0	962,430	50.0	765,303	1,020,969	25.6

Source: U. S. Department of Commerce Bureau of the Census, Census of Population, 1960 and 1970, General Population Characteristics, Arkansas.

TABLE 4

HOUSEHOLDS BY TYPE OF HOUSEHOLD HEAD
1970

Area	Total Number of Households	Families				Primary Individuals		
		Total	Husband Wife	Other Male Head	Female Head	Total	Male Head	Female Head
Independence	7,740	6,384	5,717	138	529	1,356	399	957
Jackson	6,609	5,435	4,730	144	561	1,174	375	799
Study Area	14,349	11,819	10,447	282	1,090	2,530	774	1,756
W.R. Plan & D.D.	47,618	39,483	35,279	1,027	3,177	8,135	2,612	5,523
Arkansas	615,424	502,107	437,740	13,259	51,108	113,317	37,507	75,810

Source: U.S. Department of Commerce, Bureau of the Census, Census of Population 1970, General Population Characteristic Arkansas.

TABLE 5

POPULATION IN HOUSEHOLDS, NUMBER OF HOUSEHOLDS,
AND PERSONS PER HOUSEHOLD

1970 and 1960

Area	1970			1960		
	Population in Households	Number of Households	Persons per Household	Population in Households	Number of Households	Persons per Household
Independence	22,408	7,740	2.90	19,828	6,312	3.14
Jackson	20,278	6,609	3.07	22,775	6,446	3.53
Study Area	42,686	14,349	2.97	42,603	12,758	3.33
1 W.R. Plan. & D.D.	140,235	47,618	2.94	130,677	39,863	3.28
Arkansas	1,877,595	615,424	3.05	1,752,144	523,552	3.35

Source: U.S. Department of Commerce, Bureau of the Census, Census of Population 1960 and 1970, General Population Characteristics, Arkansas.

TABLE 6

POPULATION BY RACE FOR STUDY AREA, WHITE RIVER
PLANNING AND DEVELOPMENT DISTRICT AND STATE OF ARKANSAS

1970

Region	Total Population	Race		Percent Distribution	
		White	Non-White	White	Non-White
Independence	22,723	22,189	534	97.7	2.3
Jackson	20,452	17,392	3,060	85.1	14.9
Study Area	43,175	39,581	3,594	91.7	8.3
WRPDD	142,769	133,600	9,169	93.6	6.4
Arkansas	1,923,295	1,565,915	357,380	81.4	18.6

Source: U. S. Department of Commerce, Bureau of the Census, Census of Population, 1970, General Population Characteristics, Arkansas.

Jackson County (14.9 percent). Independence County has only 2.3 percent of the population that is non-white. In the State about 18.6 percent of the population is non-white.

1.2.6 Population by Sex and Age Distribution. Tables 7, 8 and 9 show the distribution of population by sex and age in 1970 for Independence and Jackson Counties, the study area, White River Planning and Development District and the State of Arkansas.

As it is shown in Table 10, the dependency ratio of youth and old-age persons on the working-age persons for the study area is 0.99. This ratio is below that of the District (1.03) and the State (1.06).

1.3 Employment and Economic Base

Agriculture, government, manufacturing, service industries and retail trade have been the primary factors contributing to the economic growth of the study area during the last ten years. These industries were not only the income-creating factors, but also the employment-producing sectors. Most of these sectors provided expanding employment opportunities to labor that was displaced from industries which experienced declining employment, such as agriculture. Employment is of vital importance to the economic growth of a region. This section of the study will discuss the industrial and occupational distribution of employment, as well as the unemployment trends experienced by the area.

1.3.1 Industrial Distribution of Employment. Total employment in the District, study area, Independence and Jackson Counties increased since 1970, as the following four tables indicate.

Table 11 shows that total employment in the District increased from 34,700 workers in 1960 to 37,350 in 1965; 47,625 in 1970; and 53,500 in 1975, or an increase of about 54.2 percent from 1960 to 1975, and 12.3 percent from 1970 to 1975.

TABLE 7

POPULATION FOR SELECTED AGE GROUPS BY SEX,
 MEDIAN AGE, FOR STUDY AREA
 1970

	Independence			Jackson			Study Area		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
All Ages	22,723	10,989	11,734	20,452	9,946	10,506	43,175	20,935	22,240
0-5	2,006	995	1,011	1,975	1,033	942	3,981	2,028	1,953
6-15	4,101	2,072	2,029	4,085	2,089	1,996	8,186	4,161	4,025
16-21	2,110	1,058	1,052	2,012	1,035	977	4,122	2,093	2,029
22-44	5,999	2,896	3,103	5,183	2,418	2,765	11,182	5,314	5,868
45-54	2,648	1,319	1,329	2,347	1,133	1,214	4,995	2,452	3,872
55-64	2,630	1,210	1,420	2,342	1,089	1,253	4,972	2,299	2,673
65 & over	3,229	1,439	1,790	2,508	1,149	1,359	5,737	2,588	3,149
Median Age	33.9	32.5	35.2	30.8	28.8	32.7	38.1	39.2	37.1

Source: US. Department of Commerce, Bureau of the Census, Census of Population, 1970,
General Population Characteristics, Arkansas.

TABLE 8

POPULATION FOR SELECTED AGE GROUPS
BY SEX, MEDIAN AGE, AND PERCENT DISTRIBUTION
WHITE RIVER P.& D.D. 1970

	Population			% Distribution		
	Total	Male	Female	Total	Male	Female
All Ages	142,769	69,537	73,232	100.0	100.0	100.0
0-5	12,650	6,491	6,159	8.9	9.3	8.4
6-15	26,596	13,389	13,207	18.6	19.3	18.0
16-21	14,194	7,096	7,098	9.9	10.2	9.7
22-44	34,728	16,585	18,143	24.3	23.8	24.8
45-54	16,333	7,925	8,408	11.4	11.4	11.5
55-64	17,341	8,209	9,132	12.2	11.8	12.5
65 & over	20,927	9,842	11,085	14.7	14.2	15.1
Median Age	33.6	32.2	34.8			

Source: U.S. Department of Commerce, Bureau of the Census, Census of Population, 1970, General Population Characteristics, Arkansas, 1970.

TABLE 9

POPULATION FOR SELECTED AGE GROUPS
BY SEX, MEDIAN AGE, & PERCENT DISTRIBUTION
ARKANSAS - 1970

	Population			% Distribution		
	Total	Male	Female	Total	Male	Female
All Ages	1,923,295	932,310	990,985	100.0	100.0	100.0
0-5	194,168	98,902	95,266	10.1	10.6	9.6
6-15	385,944	196,344	189,600	20.1	21.1	19.1
16-21	202,295	99,510	102,785	10.5	10.7	10.4
22-44	496,132	238,729	257,403	25.8	25.6	26.0
45-54	208,012	99,035	108,977	10.8	10.6	11.0
55-64	198,984	93,650	105,334	10.3	10.0	10.6
65 & over	237,760	106,140	131,620	12.4	11.4	13.3
Median Age	29.1	27.7	30.5			

Source: US.Department of Commerce, Bureau of the Census, Census of Population, 1970,
General Population Characteristics, Arkansas, 1970.

TABLE 10

DEPENDENCY RATIO FOR STUDY AREA, WRPDD,
ARKANSAS AND UNITED STATES
1970

<u>Area</u>	<u>Total</u>	<u>Youth</u> (0-20)	Population Working <u>Age</u> (21-64)	<u>Old Age</u> (65 and over)	Dependency Ratio Total
Independence	22,723	7,915	11,579	3,229	.96
Jackson	20,452	7,794	10,150	2,508	1.02
Study Area	43,175	15,709	21,729	5,737	.99
WRPDD	142,769	51,545	70,297	20,927	1.03
Arkansas	1,923,295	753,797	931,738	237,760	1.06

Source: U. S. Department of Commerce, Bureau of the Census, General Population Characteristics, Arkansas, 1970.

TABLE 11

EMPLOYMENT BY INDUSTRY FOR
WHITE RIVER PLANNING AND DEVELOPMENT DISTRICT
1960, 1965, 1970, 1975

	<u>1960 Employment</u>		<u>1965 Employment</u>		<u>1970 Employment</u>		<u>Estimated 1975 Employment</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
TOTAL, ALL INDUSTRIES <u>4/</u>	34,700	100.0	37,350	100.0	47,625	100.0	53,500	100.0
AGRICULTURE, FORESTRY, AND FISHERIES	10,200	29.4	7,275	19.5	7,400	15.5	6,750	12.6
MANUFACTURING	4,575	13.2	6,400	17.2	9,550	20.0	11,350	21.2
Durable Goods					4,875	10.2	5,700	10.7
Lumber and Wood Products	1,425	31.2	1,125		1,100	2.3	1,050	2.0
Furniture and Fixtures	n.a.		n.a.		200	0.4	275	0.5
Stone, Clay and Glass Products	n.a.		n.a.		200	0.4	275	0.5
Primary Metal Industries	100		1,800		425	0.9	550	1.0
Fabricated Metal Industries					575	1.2	775	1.5
Electrical Equipment and Supplies					450	0.9	650	1.2
Transportation Equipment					175	0.4	250	0.5
Other Durable Goods <u>2/</u>					1,725	3.6	1,900	3.6
Nondurable Goods					4,675	9.8	5,650	10.6
Food and Kindred Products	879		900		1,300	2.7	1,475	2.8
Apparel and Other Textile Products	(D)		825		1,875	3.9	2,300	4.3
Printing and Publishing	100		100		125	0.3	175	0.3
Other Nondurable Goods <u>3/</u>					1,375	2.9	1,725	3.2
MINING	200	0.6	225	0.6	175	0.4	200	0.4
CONSTRUCTION	1,200	3.5	1,225	3.3	2,925	6.1	3,650	6.8
TRANSPORTATION AND PUBLIC UTILITIES	1,275	3.7	1,350	3.6	1,925	4.0	2,150	4.0
TRADE, TOTAL	4,050	11.7	4,975	13.3	7,400	15.5	9,125	17.1
Wholesale Trade	n.a.		n.a.		925	1.9	1,150	2.2
Retail Trade	n.a.		n.a.		6,475	13.6	7,975	14.9
FINANCE, INSURANCE, AND REAL ESTATE	525	1.5	975	2.6	1,625	3.4	2,225	4.2

TABLE 11 (Continued)

Industry Title	<u>1960 Employment</u>		<u>1965 Employment</u>		<u>1970 Employment</u>		<u>Estimated 1975 Employment</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
SERVICES	11,514	33.2	13,755	36.8	15,550	32.7	16,850	31.5
PUBLIC ADMINISTRATION TOTAL	1,161	3.3	1,170	3.1	1,100	2.3	1,175	2.2
Federal Public Administration	n.a.		n.a.		576	1.2	626	1.2
State Public Administration	n.a.		n.a.		160	0.3	160	0.3
Local Public Administration	n.a.		n.a.		376	0.8	400	0.8
Other Non-agriculture								

1. Primary metal industries in 1960 and 1965 include: fabricated metal products; machinery, except electrical; electrical machinery, equipment and supplies; transportation equipment; and instruments and related products.
2. Includes ordnance machinery, except electrical, instruments and related products; and miscellaneous manufacturing.
3. Includes petroleum and coal products; paper and allied products; chemicals and allied products; rubber and plastic products; leather and leather products.
4. Adjusted to place of work.

Source: Arkansas Employment Security Division, Annual Manpower Planning Report North Central Arkansas District and Interim Manpower Projections North Central Arkansas Manpower Planning Area, Little Rock, Arkansas, 1975.

While agriculture's share of employment for the District declined from 29.4 percent in 1960 to 12.6 in 1975, manufacturing's employment share increased from 13.2 percent in 1960 to 21.2 percent in 1975. With the exception of mining, all other industries, such as construction, transportation and public utilities, trade, finance, insurance and real estate and services, experienced a substantial employment growth from 1960 to 1975.

In 1975 the services sector employed more workers than any other industry in the District. There were 16,850 service workers, or 31.5 percent of total employment. Trade and finance, insurance and real estate were two sectors in which employment more than doubled from 1960 to 1975.

The study area experienced basically the same overall employment growth as described above for the District. As data in Table 12 indicates, total employment in the study area increased from 18,898 in 1970 to 20,728 in 1974, with manufacturing increasing its share from 3,818 workers in 1970 to 5,384 workers in 1974. Farm employment declined from 2,247 in 1970 to 1,753 in 1974.

Tables 13 and 14 show that employment in Independence County increased from 9,990 in 1970 to 11,178 in 1974 and in Jackson County from 8,908 to 9,550 during the same period.

The total civilian labor force for White River Planning and Development District from 1970 to 1974 is shown in Table 15. The civilian labor force for the District increased from 52,200 in 1970 to 59,500 in 1974, an increase of about 14 percent. Total employment for the same period increased from 48,200 to 55,000, a rise of about 14.1 percent. Employment in agriculture remained basically the same, ranging between 6,400 to 7,300

TABLE 12

EMPLOYMENT BY TYPE & BROAD INDUSTRIAL SOURCES
FOR STUDY AREA - (INDEPENDENCE & JACKSON COUNTIES)
1970 - 1974

	1970	1971	1972	1973	1974
Total Employment	18,898	19,406	20,189	20,732	20,728
Unemployment	1,125	1,100	1,025	975	1,200
Unemployment rate	6.8	6.4	5.6	5.3	6.5
Number of Proprietors	4,732	4,783	4,842	4,802	4,808
Farm Proprietors	2,572	2,538	2,504	2,470	2,469
Non-Farm Proprietors	2,160	2,245	2,337	2,332	2,339
Wage and Salary Employment	14,166	14,623	15,347	15,930	15,920
Farm	2,247	2,087	1,982	1,941	1,753
Non - Farm	11,919	12,536	13,365	13,989	14,167
Government	1,722	1,785	1,805	1,829	1,925
Total Federal	211	213	210	215	218
Federal Civilian	206	208	204	209	214
Military	5	5	6	6	4
State and Local	1,511	1,572	1,596	1,614	1,707
Private Non Farm	10,197	10,751	11,559	12,160	12,242
Manufacturing	3,818	4,166	4,717	5,370	5,384
Mining	39	43	45	39	29
Construction	475	521	509	473	498
Transport, Comm. & Public Utilities	591	592	607	587	596
Trade	2,490	2,568	2,661	2,661	2,665
Finance, Insurance, and Real Estate	299	306	333	312	318
Services	2,272	2,338	2,472	2,514	2,574
Other	213	217	215	204	178

Source: Employment By Type and Broad Industrial Sources - Full and Part-Time wage and salary Employment Plus Number of Proprietors. Arkansas Employment Security Division, Regional Economic Information System, Bureau of Economic Analysis. Un-dated.

TABLE 13

EMPLOYMENT BY TYPE AND BROAD INDUSTRIAL SOURCES
FULL AND PART-TIME WAGE AND SALARY EMPLOYMENT PLUS NUMBER OF PROPRIETORS
FOR INDEPENDENCE COUNTY

	1970	1971	1972	1973	1974
Total Employment	9,990	10,287	10,823	11,296	11,178
Unemployment	575	650	525	525	775
Unemployment Rate	6.4	7.0	5.4	3.2	7.8
Number of Proprietors	2,602	2,631	2,666	2,645	2,648
Farm Proprietors	1,380	1,362	1,344	1,326	1,325
Non-Farm Proprietors	1,222	1,269	1,322	1,319	1,323
Wage and Salary Employment	7,388	7,656	8,157	8,651	8,530
Farm	626	581	552	541	489
Non-Farm	6,762	7,075	7,605	8,110	8,041
Government	922	957	965	976	1,034
Total Federal	136	142	140	143	152
Federal Civilian	134	140	137	140	150
Military	2	2	3	3	2
State and Local	786	815	825	833	882
Private Non-Farm ¹	5,840	6,118	6,639	7,134	7,007
Manufacturing	2,577	2,661	2,965	3,472	3,571
Mining	39	43	45	39	29
Construction	163	211	207	206	195
Transport., Comm., and Public Utilities	257	267	288	259	240
Trade	1,288	1,375	1,464	1,465	1,337
Finance, Insurance, and Real Estate	134	144	151	145	130
Services	1,191	1,223	1,336	1,376	1,359
Other	191	194	183	172	146

¹Primary source for private non-farm employment: ES-202 Covered Employment - Arkansas Employment Security Division

Source: Regional Economic Information System, Bureau of Economic Analysis

TABLE 14

EMPLOYMENT BY TYPE AND BROAD INDUSTRIAL SOURCES
FULL AND PART-TIME WAGE AND SALARY EMPLOYMENT PLUS NUMBER OF PROPRIETORS
FOR JACKSON COUNTY

	1970	1971	1972	1973	1974
Total Employment	8,908	9,119	9,365	9,436	9,550
Unemployment	550	450	500	450	425
Unemployment Rate	7.1	5.7	6.0	5.4	5.1
Number of Proprietors	2,130	2,152	2,176	2,157	2,160
Farm Proprietors	1,192	1,176	1,160	1,144	1,144
Non-Farm Proprietors	938	976	1,015	1,013	1,016
Wage and Salary Employment	6,778	6,967	7,190	7,279	7,390
Farm	1,621	1,506	1,430	1,400	1,264
Non-Farm	5,157	5,461	5,760	5,879	6,126
Government	800	828	840	853	891
Total Federal	75	71	70	72	66
Federal Civilian	72	68	67	69	64
Military	3	3	3	3	2
State and Local	725	757	770	781	825
Private Non-Farm ¹	4,357	4,633	4,920	5,026	5,235
Manufacturing	1,241	1,505	1,752	1,898	1,813
Mining	--	--	--	--	--
Construction	312	310	302	267	303
Transport., Comm., and Public Utilities	334	325	319	328	356
Trade	1,202	1,193	1,197	1,196	1,328
Finance, Insurance, and Real Estate	165	162	182	167	188
Services	1,081	1,115	1,136	1,138	1,215
Other	22	23	32	32	32

¹Primary source for private non-farm employment: ES-202 Covered Employment - Arkansas Employment Security Division
Source: Regional Economic Information System, Bureau of Economic Analysis

TABLE 15

CIVILIAN LABOR FORCE
WHITE RIVER PLANNING & DEVELOPEMENT DISTRICT
1970 - 1974

ANNUAL AVERAGE, 1970-1974
(In Thousands)

Item	1970	1971	1972	1973	1974
Total Civilian Labor Force	52.2	54.2	57.6	59.4	59.5
Unemployment	4.0	4.2	4.0	3.6	4.5
Unemployment Rate (Percent)	7.7	7.7	6.9	6.0	7.5
Employment, Total <u>1/</u>	48.2	50.1	53.6	55.9	55.0
Agriculture	6.6	6.8	7.1	7.3	6.4
Nonagriculture	37.2	38.5	41.6	43.3	42.9
Domestic Service, Self-Employed and Unpaid Family Workers	8.0	8.4	8.8	8.8	8.5
Wage and Salary <u>2/</u>	29.2	30.2	32.8	34.5	34.4
Manufacturing	9.0	9.3	10.6	11.2	10.9
Nonmanufacturing	20.2	20.9	22.2	23.3	23.5

1/ Adjusted to a place of residence basis.

2/ Place of work basis.

Source: Arkansas Employment Security Division, Manpower Projection North Central Arkansas Manpower Planning Area, Little Rock, Arkansas, 1975.

workers from 1970 to 1974. Non-agriculture employment, however, increased from 37,200 in 1970 to 42,900 in 1974.

1.3.2 Unemployment Trends. The unemployment rate for the District, as it is shown in Table 15, was not exceptionally high for the 1970-74 period. It ranged from 6.0 to 7.7 percent. Both counties, Independence and Jackson, generally experienced a lower unemployment rate than did the District, as evidenced in Tables 13 and 14.

1.3.3 Manufacturers by SIC and Employment. The lists of manufacturing firms operating in Independence County, Table 16, and Jackson County, Table 17, were developed to show the diversity of manufacturing firms in the study area.

As Tables 16 and 17 show, in 1976 there were 35 manufacturing firms in Independence County and about 29 firms in Jackson County. There was only one firm employing more than 500 workers. Arkansas Eastman Company is projected to reach this size in 1978. About 34.4 percent of the firms operating in the study area employ less than 10 workers.

The manufacturing firms are producing diversified products ranging from shoes and foods to heavy equipment and chemical products. Most of the firms are concentrated in the food and wood-related industries.

1.3.4 Distribution of Employment by Occupation. The occupational distribution of employment in the District is shown in Table 18. This very detailed table shows the availability of workers in numerous occupations. Comparing the kinds of workers that the AP&L plant will need during its construction and operation phases (see Appendix Tables B-1 and B-2) to the 1975 estimated employment by occupation for the District, it can be concluded that most of the skilled and unskilled workers can be obtained from

TABLE 16

MANUFACTURERS - INDEPENDENCE COUNTY
BY STANDARD INDUSTRIAL CLASSIFICATION, NAME, LOCATION AND NUMBER OF EMPLOYEES
1976

S.I.C.	Name	Location	Number of Employees						
			1- 10	11- 49	50- 99	100- 199	200- 299	300- 499	500- 999
2011	Milligan Packing Co.	Batesville	x						
2016	Arkansas Poultry Co.	Batesville				x			
2022	Hills Valley Foods, Inc.	Batesville		x					
2026	Mack Farm Dairy Co.	Batesville		x					
2038	Banquet Foods Corp.	Batesville						x	
2048	Banquet Foods Corp. (Feed)	Batesville			x				
2048	Banquet Foods Corp. (So.Div.)	Batesville			x				
2048	Lanier, Inc.	Batesville					x		
2048	Thompson Feed Co.	Floral	x						
2051	Ideal Baking Co.	Batesville				x			
2086	Coca-Cola Bottling Co.	Batesville		x					
2086	Royal Crown Bottling Co.	Batesville	x						
2337	Westport Casuals, Inc.	Batesville				x			
2421,	Trotter Lumber Co.	Batesville	x						
2429									
2499	Bowman Handles, Inc.	Batesville		x					
2512	Riverview Furniture and Manufacturing Co.	Batesville	-----n.a.-----						
2711	Batesville Guard Record Co.	Batesville		x					
2752	Riverside Graphic	Batesville	x						
2865	Arkansas Eastman						x		
2951	White River Bituminous, Inc.	Batesville			x				
3069	General Tire and Rubber Co.	Batesville			x				
3143,	International Shoe Co.	Batesville						x	
3144,									
3149									

TABLE 16 (Continued)

S.I.C.	Name	Location	Number of Employees						
			1- 10	11- 49	50- 99	100- 199	200- 299	300- 499	500- 999
3271, 3273	Smith Conerete Products, Inc.	Batesville	x						
3272	Arkansas Concrete Tank, Co.	Batesville	x						
3273	Concrete Products Co.	Batesville	x						
3274	Arkansas Lime Co. (Rangair Corp.)	Batesville			x				
3294, 3295	Midwest Lime Co.	Batesville		x					
3281, 3295	McBride Stone Quarries	Batesville	x						
3295	Galloway Sand & Gravel Co.	Batesville		x					
3295	White River Materials, Inc.	Batesville		x					
3541, 3599	Precision Tool Co.	Batesville	x						
3662	DAVCO Electronics Corp.	Batesville	x						
3713	White River Distribution, Inc.	Batesville		x					
3822	White Rogers Co. (Emerson Elect.)	Batesville							x
3851	La Croix Optical Co.	Batesville	x						
Total (One not reporting) by Size			12	9	5	3	2	2	1
Total Number of Firms			35						

Source: Directory of Arkansas Manufacturers, 1976, Arkansas Industrial Development Foundation (Little Rock, Arkansas)

TABLE 17

MANUFACTURERS - JACKSON COUNTY
BY STANDARD INDUSTRIAL CLASSIFICATION, NAME, LOCATION, AND NUMBER OF EMPLOYEES
1976

S.I.C.	Name	Location	Number of Employees						
			1- 10	11- 49	50- 99	100- 199	200- 299	300- 499	500- 999
2011	Middleton & Sons Packing Co.	Newport	x						
2074									
2075	Southern Cotton Oil Co., Inc.	Newport			x				
2075	Jackson County Rice Dryer	Newport		x					
2421	Curtner Lumber Co.	Newport		x					
2441	Associated Wood Products Co.	Newport		x					
2451	Countryside Industries, Inc.	Newport				x			
2499	C & D Corporation	Tuckerman	x						
2541	Campbell Station Cabinet Shop	Newport	x						
2645	Evans Box Factory	Newport	x						
2711	Newport Daily Independent	Newport		x					
2711	Tuckerman Record	Tuckerman	x						
2751	Stevens Printing Service	Newport	x						
2752	Craig Printing Co.	Newport		x					
2899	Diaz Refining Co.	Diaz	x						
3271	Smith Concrete Products	Newport	x						
3273	Mobly Construction Co.	Newport		x					
3353	Revere Copper and Brass	Newport					x		
3361	Brown Jordon Co.	Newport						x	
3369	Camp Casting Company	Newport		x					
3429	Tennessee Forging Steel Corp.	Newport					x		
3443	Cee-Gee, Inc.	Diaz		x					
3448	Fulline Building Corp.	Newport		x					
3523	Bowman Manufacturing Co.	Newport	x						
3599	Victor Metal Products	Newport					x		
3645	American Lantern Co.	Newport					x		
3679	J. E. Messenger Co.	Newport						x	
3715	Delta Trailer Co.	Newport		x					
3811	Aero Sonic Corp.	Newport		x					
3993	Newport Neon Sign Co.	Newport							
	Total by Size		<u>x</u> 10	<u>11</u>	<u>1</u>	<u>1</u>	<u>4</u>	<u>2</u>	
	Total Number of Firms		29						

Source: Directory of Arkansas Manufacturers, 1976, Arkansas Industrial Development Foundation, (Little Rock, Ark.)

TABLE 18

ESTIMATED 1975 EMPLOYMENT BY OCCUPATION
FOR WHITE RIVER PLANNING AND DEVELOPMENT DISTRICT

Occupational Title	Number	Percent
TOTAL ALL OCCUPATIONS	46,025	100.00
PROFESSIONAL, TECHNICAL, KINDRED	4,025	8.74
Engineers, Technical	150	0.33
Engineers, Civil	*	-
Engineers, Electrical	*	-
Engineers, Industrial	50	0.11
Engineers, Mechanical	*	-
Engineers, Metallurgical	*	-
Engineers, Petroleum	*	-
Engineers, Sales	*	-
Engineers, Other	50	0.11
Life and Physical Scientists	50	0.11
Agricultural Scientists	*	-
Atmospheric, Space Scientists	*	-
Biological Scientists	*	-
Chemists	*	-
Physicists and Astronomers	*	-
Mathematical Specialists	*	-
Statisticians	*	-
Engineers, Science Technicians	250	0.54
Agricultural, Biological Technicians, Except Health	50	0.11
Chemical Technicians	*	-
Draftsmen	75	0.16
Electrical, Electronic Technicians	*	-
Industrial Engineering Technicians	*	-
Mechanical Engineering Technicians	*	-
Surveyors	50	0.11
Engineering, Science Technicians, NEC	50	0.11
Medical Workers, Except Technicians	625	1.36
Chiropractors	*	-
Dentists	25	0.05
Dietitians	*	-
Optometrists	*	-
Pharmacists	50	0.11
Physicians, MD and Osteopaths	75	0.16

TABLE 18 (Continued)

Occupational Title	Number	Percent
Podiatrists	*	-
Registered Nurses	400	0.87
Therapists	*	-
Veterinarians	*	-
Health Technologists and Technicians	150	0.33
Clinical Laboratory Technologists and Technicians	50	0.11
Dental Hygienists	*	-
Health Record Technologists and Technicians	*	-
Radiologic Technologists and Technicians	25	0.05
Other Health Technologists and Technicians	50	0.11
Technicians, Except Health	50	0.11
Airplane Pilots	*	-
Air Traffic Controllers	*	-
Embalmers	*	-
Radio Operators	*	-
Other Technicians, Except Health	*	-
Computer Specialists	25	0.05
Computer Programmers	*	-
Computer Systems Analysts	*	-
Other Computer Specialists	*	-
Social Scientists	*	-
Urban and Regional Planners	*	-
Teachers	1,800	3.91
Adult Education Teachers	*	-
Agriculture Teachers	*	-
Art, Drama, Music Teachers	25	0.05
Atmospheric, Earth, Marine and Space Teachers	*	-
Biology Teachers	*	-
Business Commerce Teachers	*	-
Chemistry Teachers	*	-
Coaches, Physical Education Teachers	*	-
Economics Teachers	*	-
Education Teachers	*	-
Elementary School Teachers	775	1.61
Engineering Teachers	*	-
English Teachers	*	-
Foreign Language Teachers	*	-

TABLE 18 (Continued)

Occupational Title	Number	Percent
Health Specialties Teachers	*	-
History Teachers	*	-
Home Economics Teachers	*	-
Law Teachers	*	-
Mathematics Teachers	*	-
Physics Teachers	*	-
Preschool, Kindergarten Teachers	25	0.05
Psychology Teachers	*	-
Secondary School Teachers	550	1.20
Sociology Teachers	*	-
Social Science Teachers, NEC	*	-
Miscellaneous Teachers, College and University	*	-
Teachers, College and University, NEC	100	0.22
Teachers, Except College and University, NEC	50	0.11
Theology Teachers	*	-
Trade, Industrial Teachers	*	-
Writers, Artists and Entertainers	175	0.38
Actors	*	-
Athletes, Kindred Workers	*	-
Authors	*	-
Dancers	*	-
Designers	*	-
Editors, Reporters	50	0.11
Musicians, Composers	*	-
Painters, Sculptors	*	-
Photographers	*	-
Public Relations Men, Publicity Writers	*	-
Radio, Television Announcers	*	-
Writers, Artists, Entertainers, NEC	*	-
Other Professional, Technical and Kindred	750	1.63
Accountants	125	0.27
Architects	*	-
Clergymen	175	0.38
Religious Workers, Except Clergymen	*	-
Farm Management Advisors	*	-
Foresters, Conservationists	50	0.11
Home Management Advisors	*	-

TABLE 18(Continued)

Occupational Titles	Number	Percent
Judges	*	-
Lawyers	75	0.16
Librarians	50	0.11
Operations and Systems Researchers and Analysts	*	-
Personnel, Labor Relations Workers	75	0.16
Research Workers, NEC	50	0.11
Recreation Workers	*	-
Social Workers	50	0.11
Vocational, Educational Counselors	50	0.11
MANAGERS, OFFICIALS, PROPRIETORS	4,325	9.40
Buyers, Sales, Loan Managers	350	1.20
Bank Officials, Financial Managers	150	0.33
Creditmen	25	0.05
Buyers, Shippers, Farm Products	*	-
Buyers, Wholesale, Retail Trade	100	0.22
Purchasing Agents, Buyers, NEC	75	0.16
Sales Managers, Retail Trade	100	0.22
Sales Managers, Except Retail Trade	50	0.11
Administrators, Public Inspectors	475	1.03
Assessors, Controllers, and Treasurers; Local Public Administration	25	0.05
Construction Inspectors, Public Administration	*	-
Health Administrators	50	0.11
Inspectors, Except Construction, Public Administration	50	0.11
Officials and Administrators, Public Administration, NEC	75	0.16
Postmasters, Mail Superintendents	100	0.22
School Administrators, College	25	0.05
School Administrators, Elementary and Secondary	125	0.27
Other Managers, Officials and Proprietors	3,300	7.17
Funeral Directors	50	0.11
Managers and Superintendents, Building	25	0.05
Office Managers, NEC	100	0.22
Officers, Pilots, Purser; Ship	*	-
Officials of Lodges, Societies and Unions	*	-

TABLE 18 (Continued)

Occupational Title	Number	Percent
Railroad Conductors	*	-
Restaurant, Cafeteria, and Bar Managers	200	0.43
Other Managers and Administrators	2,900	6.30
SALES WORKERS	2,975	6.46
Advertising Agents and Salesmen	*	-
Auctioneers	*	-
Demonstrators	*	-
Hucksters, Peddlers	125	0.27
Insurance Agents, Brokers, and Underwriters	200	0.43
Newsboys	25	0.05
Real Estate Agents and Brokers	200	0.43
Stock and Bond Salesmen	*	-
Sales Representatives, Manufacturing	150	0.33
Sales Representatives, Wholesale	300	0.65
Sales Clerks, Retail Trade	1,475	3.20
Salesmen, Retail Trade	375	0.81
Salesmen, Services and Construction	75	0.16
CLERICAL WORKERS	4,625	10.05
Stenographers, Typists, Secretaries	1,025	2.23
Secretaries, Legal	*	-
Secretaries, Medical	*	-
Secretaries, Other	800	1.74
Stenographers	25	0.05
Typists	175	0.38
Office Machine Operators	75	0.16
Bookkeeping, Billing Machine Operators	*	-
Calculating Machine Operators	*	-
Computer, Peripheral Equipment Operators	*	-
Duplicating Machine Operators	*	-
Key Punch Operators	50	0.11
Tabulating Machine Operators	*	-
Other Office Machine Operators	*	-
Other Clerical Workers	3,525	7.66
Bank Tellers	175	0.38
Billing Clerks	*	-
Bookkeepers	1,050	2.28
Cashiers	400	0.87
Clerical Supervisors, NEC	.*	-

TABLE 18 (Continued)

Occupational Title	Number	Percent
Collectors, Bill and Account	*	-
Counter Clerks, Except Food	75	0.16
Dispatchers, Starters, Vehicle	25	0.05
Enumerators, Interviewers	50	0.11
Estimators, Investigators, NEC	100	0.22
Expeditors, Production Controllers	50	0.11
File Clerks	75	0.16
Insurance Adjustors, Examiners and Investigators	*	-
Library Attendants and Assistants	75	0.16
Mail Carriers, Post Office	150	0.33
Mail Handlers, Except Post Office	50	0.11
Messengers, Office Boys	*	-
Meter Readers, Utilities	25	0.05
Payroll, Timekeeping Clerks	25	0.05
Postal Clerks	100	0.22
Proofreaders	*	-
Real Estate Appraisers	*	-
Receptionists	150	0.33
Shipping, Receiving Clerks	150	0.33
Statistical Clerks	75	0.16
Stock Clerks, Storekeepers	175	0.38
Teachers' Aides, Except School Monitors	75	0.16
Telegraph Messengers	*	-
Telegraph Operators	*	-
Telephone Operators	150	0.33
Ticket, Station, Express Agents	*	-
Weighers	50	0.11
Miscellaneous Clerical Workers, NEC	175	0.38
CRAFTSMEN, FOREMEN, KINDRED	7,050	15.32
Construction Craftsmen	2,900	6.30
Carpenters	1,350	2.93
Brickmasons, Stonemasons	225	0.49
Bulldozer Operators	200	0.43
Cement, Concrete Finishers	75	0.16
Electricians	225	0.49
Excavating, Grading, and Road Machine Operators, Except Bulldozer	325	0.71

TABLE 18 (Continued)

Occupational Title	Number	Percent
Floor Layers, Except Tile Setters	*	-
Painters, Construction and Maintenance	150	0.33
Paperhangers	*	-
Plasterers	*	-
Plumbers, Pipefitters	175	0.38
Plumber, Pipefitter, Apprentices	*	-
Roofers and Slaters	50	0.11
Structural Metal Craftsmen	25	0.05
Tile Setters	25	0.05
Foremen, NEC	1,025	2.23
Metalworking Craftsmen, Except Mechanics	525	1.14
Blacksmiths	*	-
Boilermakers	*	-
Forgemen, Hammermen	*	-
Job and Die Setters, Metal	100	0.22
Machinists	175	0.38
Millwrights	*	-
Molders, Metal	25	0.05
Pattern, Model Makers, Except Paper	*	-
Rollers and Finishers, Metal	*	-
Sheetmetal Workers and Tinsmiths	50	0.11
Tool and Die Makers	125	0.27
Tool and Die Maker Apprentices	*	-
Mechanics, Repairmen, Installers	1,600	3.48
Air Conditioning, Heating, and Refrigeration	100	0.22
Aircraft	*	-
Auto Body Repairmen	125	0.27
Auto Mechanics	650	1.41
Farm Implement	50	0.11
Heavy Equipment Mechanics, Including Diesel	400	0.87
Household Appliance and Accessory Installers and Mechanics	75	0.16
Office Machine Repairmen	*	-
Radio and Television Repairmen	50	0.11
Railroad, Car Shop Repairmen	*	-
Other Mechanics and Repairmen	100	0.22
Printing Trades Craftsmen	125	0.27

TABLE 18 (Continued)

Occupational Title	Number	Percent
Bookbinders	*	-
Compositors, Typesetters	75	0.16
Photoengravers and Lithographers	*	-
Pressmen and Plate Printers	50	0.11
Printing Apprentices, Except Pressmen	*	-
Transportation and Public Utilities	300	0.65
Electric Power Linemen and Cablemen	150	0.33
Telephone Installers and Repairmen	75	0.16
Telephone Linemen and Splicers	50	0.11
Other Craftsmen and Kindred Workers	575	1.25
Bakers	25	0.05
Cabinetmakers	75	0.16
Carpet Installers	50	0.11
Cranemen, Derrickmen, and Hoistmen	*	-
Decorators and Window Dressers	25	0.05
Furniture and Wood Finishers	25	0.05
Glaziers	*	-
Inspectors, Log and Lumber	*	-
Inspectors, Other	50	0.11
Jewelers and Watchmakers	*	-
Motion Picture Projectionists	*	-
Shoe Repairmen	*	-
Sign Painters and Letterers	*	-
Stationary Engineers	50	0.11
Tailors	25	0.05
Upholsterers	50	0.11
Craftsmen and Kindred Workers, NEC	25	0.05
OPERATIVES	10,850	23.57
Operatives, Except Transport	8,375	18.19
Semiskilled Metal Working	625	1.36
Drill Press Operatives	25	0.05
Furnacemen, Smeltermen, and Pourers	*	-
Grinding Machine Operatives	100	0.22
Lathe, Milling Machine Operatives	25	0.05
Other Precision Machine Operatives	*	-
Punch, Stamping Press Operatives	100	0.22
Solderers	*	-
Welders and Flame Cutters	300	0.65

TABLE 18 (Continued)

Occupational Title	Number	Percent
Semiskilled Textile	75	0.16
Other Textile Operatives	50	0.11
Semiskilled Packing and Inspecting Operatives	1,400	3.04
Checkers, Examiners, and Inspectors; Manufacturing	675	1.47
Graders and Sorters, Manufacturing	75	0.16
Meat Wrappers, Retail	25	0.05
Packers and Wrappers, Except Meat and Produce	575	1.25
Produce Graders and Packers, Except Factory and Farm	50	0.11
Other Operatives, Except Transport Assemblers	6,275	13.63
Bottling, Canning Operatives	925	2.01
Chainmen, Rodmen, and Axmen; Surveying	125	0.27
Clothing Ironers and Pressers	*	-
Cutting Operatives, NEC	175	0.38
Dressmakers, Except Factory	125	0.27
Drillers, Earth	50	0.11
Dry Wall Installers and Lathers	75	0.16
Dyers	75	0.16
Filers, Polishers, Sanders, and Buffers	*	-
Garage Workers, Gas Station Attendants	75	0.16
Laundry and Dry Cleaning Operatives, NEC	425	0.92
Meat Cutters and Butchers, Except Manufacturing	100	0.22
Meat Cutters and Butchers, Manufacturing	125	0.27
Mine Operatives, NEC	225	0.49
Mixing Operatives	25	0.05
Oilers, Greasers, Except Auto	75	0.16
Painters, Manufactured Articles	*	-
Photographic Process Workers	50	0.11
Riveters and Fasteners	*	-
Sailors and Deckhands	*	-
Sawyers	300	0.65
Sewers and Stitchers	1,425	3.10
Shoemaking Machine Operatives	125	0.27

TABLE 18 (Continued)

Occupational Title	Number	Percent
Stationary Firemen	25	0.05
Winding Operatives, NEC	50	0.11
Machine Operatives, Miscellaneous Specified	975	2.12
Operatives, NEC	700	1.52
Transport Equipment Operatives	2,475	5.38
Bus Drivers	275	0.60
Deliverymen and Routemen	500	1.09
Fork Lift and Tow Motor Operatives	175	0.38
Motormen; Mine, Factory, Logging	*	-
Railroad Brakemen	*	-
Taxicab Drivers and Chauffeurs	50	0.11
Truck Drivers	1,450	3.15
SERVICE WORKERS	5,250	11.41
Cleaning Service Workers	1,100	2.39
Chambermaids and Maids, Except Private Households	100	0.22
Cleaners and Charwomen	175	0.38
Janitors and Sextons	825	1.79
Food Service Workers	1,550	3.37
Bartenders	*	-
Bus Boys	*	-
Cooks, Except Private Household	725	1.58
Dishwashers	75	0.16
Food Counter and Fountain Workers	50	0.11
Waiters	550	1.20
Food Service Workers, NEC, Except Private Household	150	0.33
Health Service Workers	700	1.52
Dental Assistants	50	0.11
Health Aides, Except Nursing	50	0.11
Nurses' Aides, Orderlies	425	0.92
Practical Nurses	175	0.38
Personal Service Workers	875	1.90
Attendants, Recreation and Amusement	25	0.05
Attendants, Personal Service, NEC	50	0.11
Barbers	175	0.38
Bootblacks	*	-
Child Care Workers, Except Private Household	125	0.27

TABLE 18 (Continued)

Occupational Title	Number	Percent
Hairdressers and Cosmetologists	375	0.81
Housekeepers, Except Private Household	75	0.16
Welfare Service Aides	*	-
Protective Service Workers	200	0.43
Firemen, Fire Protection	25	0.05
Guards and Watchmen	75	0.16
Marshalls and Constables	*	-
Policemen and Detectives	75	0.16
Sheriffs and Bailiffs	25	0.05
Private Household Workers	825	1.79
Child Care Workers, Private Household	250	0.54
Cooks, Private Household	25	0.05
Housekeepers, Private Household	100	0.22
Maids and Servants, Private Household	450	0.98
LABORERS, EXCEPT FARM	2,525	5.49
Animal Caretakers, Except Farm	175	0.38
Carpenters' Helpers	50	0.11
Construction Laborers, Except Carpenters' Helpers	700	1.52
Fishermen and Oystermen	*	-
Freight and Material Handlers	375	0.81
Garbage Collectors	25	0.05
Gardeners and Groundskeepers, Except Farm	250	0.54
Lumbermen, Raftsmen, and Woodchoppers	275	0.60
Stock Handlers	325	0.71
Vehicle Washers and Equipment Cleaners	50	0.11
Warehousemen, NEC	50	0.11
Other Laborers	175	0.38
FARMERS AND FARM WORKERS	4,400	9.56
Farmers and Farm Managers	2,725	5.92
Farmers (Owners, Tenants)	2,525	5.49
Farm Managers	200	0.43
Farm Laborers and Farm Foremen	1,675	3.64
Farm Foremen	50	0.11
Farm Laborers, Wage Workers	1,475	3.20
Farm Laborers, Unpaid Family	125	0.27

*Less than 25.

Source: Arkansas Employment Security Division, Manpower Projections, North Central Arkansas Manpower Planning Area, 1975.

within the District or the study area. The table shows that 4,025, or 8.7 percent, of those employees are classified as professional and technical, and about 9.4 percent of the employment, or 4,325 persons, are holding managerial positions. In the District there are about 10,850 operatives representing 23.6 percent of total employment. It is from these occupational categories that the plant expects to draw most of its workers.

It is estimated that most of the labor during the construction phase will come from the study area and other local areas as far as 50 miles from the site. The craftsmen most difficult to obtain locally will be pipe fitters and electricians. About 60 percent of these two types of crafts have to be imported from other parts of the state or country. Local workers proved themselves in the case of the Arkansas Eastman Plant to be adaptable to new working conditions and experiences. Verification of the availability and quality of local workers is shown in Exhibit I of Appendix B, which is a statement made by A. C. Roden, Daniels International, contractor of the Arkansas Eastman Plant, Batesville.

1.4 Income and Spending

Income is perhaps the most important measure of the economic vitality and change of an area. Income measures the level of economic prosperity and reflects the outcome of the overall performance of the economic conditions prevailing in the economy of the area being studied. Changes in total income express economic growth and the level of per capita income reflects the economic welfare of the individuals in the area. Therefore, income becomes a yardstick for measuring economic growth, economic changes and standards of living.

1.4.1 Average Levels of Personal Income. The overall growth of income in the two-county study area is shown in Table 19. The growth rates of the area are contrasted with those of the White River Planning and Development District and the State of Arkansas. It is apparent from these data that the two counties have experienced significant growth in income during recent years, having grown approximately \$100 million, or 83.2 percent, from 1970 to 1975. This growth rate is considerably above that of the State, 75.7 percent, but somewhat below that of WRPDD, 92.0 percent. This seems to say that the two-county area has experienced economic growth in its own right, while at the same time it is a part of an even larger and very viable growth area.

Table 20 shows total personal income for Independence and Jackson Counties by source for 1974. These data show that Jackson County still depends more heavily on agriculture as a source of income (25.5 percent) than does Independence County (10.6 percent). Conversely, Independence County derives a larger portion of its income from manufacturing (28.0 percent) than does Jackson County (18.7 percent). Both counties derive a significant portion of their incomes from wholesale and retail trade, services and the government sector, especially state and local government. Similar income distributions by major sources for several previous years are given in Appendix Tables C-1 and C-2.

Per capita personal income serves to measure the economic well-being of individuals in an area. These data are shown in Table 21 for the study area, WRPDD and the State of Arkansas for 1970 to 1975. The picture presented here is somewhat different from that observed in Table 19, dealing with total personal income. The difference is that the growth rate of per capita income has been greater during this period for each of the two

TABLE 19

TOTAL PERSONAL INCOME, ARKANSAS

AND STUDY AREA, 1970-1975
(In Thousands of Dollars)

	1970	1971	1972	1973	1974	1975	Percent Change 1970-75
Jackson County	\$ 58,639	\$ 58,558	\$ 64,562	\$ 81,997	\$ 91,141	\$ 109,000	85.9
Independence County	60,924	66,323	75,474	91,218	95,923	110,000	80.6
Study Area	119,563	124,881	140,036	173,215	187,064	219,000	83.2
White River Planning and Development District	357,365	385,890	437,775	546,899	586,309	686,000	92.0
Arkansas	5,560,001	5,972,950	6,712,811	7,900,253	8,659,036	9,770,000	75.7

Source: Bureau of Economic Analysis, Regional Economics Information System, Computer Printout, March, 1976; and Survey of Current Business, April, 1977.

TABLE 20

PERSONAL INCOME BY MAJOR SOURCES
FOR INDEPENDENCE AND JACKSON COUNTIES
1974

(In Thousands of Dollars)

	Total Income		Percent of Total Income	
	Independence County	Jackson County	Independence County	Jackson County
By Type				
Wage & Salary Disbursements	\$50,237	\$42,532	52.4	46.7
Other Labor Income	4,312	3,459	4.5	3.8
Proprietors Income	16,603	26,213	17.3	28.7
Farm	9,143	20,694	9.5	22.7
NonFarm	7,460	5,519	7.8	6.1
By Industry				
Farm	10,123	23,259	10.6	25.5
NonFarm	61,209	48,945	63.8	53.7
Private	53,940	43,315	56.2	47.5
Manufacturing	26,842	17,030	28.0	18.7
Contract Construction	1,938	3,212	2.0	3.5
Wholesale & Retail Trade	10,977	9,268	11.4	10.2
Fin., Ins., & Real Estate	1,543	1,940	1.6	2.1
Transp., Comm., & Pub. Util.	3,096	4,032	3.2	4.4
Services	8,384	7,486	8.7	8.2
Other Industries	1,160	347	1.2	0.4
Government	7,089	5,630	7.4	6.2
Federal, Civilian	1,800	767	1.9	0.8
Federal, Military	445	396	0.5	0.4
State & Local	4,844	4,467	5.0	4.9
Total Population	24,500	21,700		
Per Capita Income	3,915	4,206		
Total Labor & Proprietors Income (by place of work)	71,152	72,204	74.2	79.2
Less: Personal Contr. to SS	3,664	3,012	3.8	3.3
Net Labor & Proprietors Income (by place of work)	67,488	69,192	70.4	75.9
Residence Adjustment	-731	-1,989	(0.8)	(2.2)
Net Labor & Proprietors Income (by Place of res.)	66,757	67,203	69.6	73.7
+Dividends	11,599	9,491	12.1	10.4
+Transfer Payments	17,567	14,477	18.3	15.9
Pers. Inc. by Place of Res.	95,923	91,141		

Source: Bureau of Economic Analysis, Regional Economics Information Systems.

TABLE 21
PER CAPITA PERSONAL INCOME, ARKANSAS
AND STUDY AREA, 1970-1975

	1970	1971	1972	1973	1974	1975	Percent Change 1970-75
Jackson County	\$2,854	\$2,743	\$2,989	\$3,808	\$4,206	\$5,036	76.5
Independence County	2,669	2,802	3,093	3,747	3,915	4,647	74.1
Study Area	2,761	2,769	3,044	3,782	4,049	4,834	75.1
47 White River Planning and Development District	2,494	2,581	2,845	3,472	3,626	4,229	69.6
Arkansas	2,878	3,040	3,343	3,883	4,200	4,617	60.4

Source: Bureau of Economic Analysis, Regional Economics Information System, Computer Printout, March, 1976; and Survey of Current Business, April, 1977.

counties than for either the WRPDD or the State as a whole. The two-county area experienced a growth in per capita income of 75.1 percent from 1970 to 1975, while the WRPDD grew by 69.6 percent and the State of Arkansas by only 60.4 percent. Simply stated, while total income in the two counties did not grow as rapidly as for the WRPDD, the population growth was less, which resulted in a somewhat larger rate of growth in income per capita. The study area has enjoyed a very respectable rate of economic growth and a significant improvement in the economic welfare of the people in recent years.

1.4.2 Consumption Behavior - Retail Sales. Retail sales for the State of Arkansas have shown a consistently strong pattern of growth. The data shown in Table 22 indicate that sales at the state level increased 27.7 percent from 1963 to 1967. This compares with a 16.1 percent increase in the study area for the same period of time. Independence County exceeded the state growth rate with a 29.6 percent increase. However, Jackson County was far below the state rate with a 6.6 percent growth.

During the period of time from 1967 to 1972, Arkansas showed a 54.5 percent increase in retail sales, while the study area showed a 43.9 percent increase. The area growth lagged behind the state, but to a much less extent than during the 1963-67 time period. Again, Independence County exceeded the state growth rate with a 66.0 percent increase, and Jackson County growth continued to be below the state rate at 24.9 percent. The growth rate in retail sales for Batesville during the 1967-72 time period was a phenomenal 78.2 percent, well above the state, study area and county rates. Newport also showed marked progress during this time, recovering from declining sales in the 1963-67 period to a healthy 35.2 percent growth.

TABLE 22
RETAIL SALES
BATESVILLE, NEWPORT, INDEPENDENCE AND JACKSON COUNTIES, STUDY AREA
AND WHITE RIVER PLANNING AND DEVELOPMENT DISTRICT
1963-1967-1972

Area	1963 Sales (000)	1967 Sales (000)	1972 Sales (000)	Percent Change	
				1963-67	1967-72
Independence	\$ 21,882	\$ 28,368	\$ 47,105	29.6	66.0
Batesville	19,281	23,416	41,718	21.4	78.2
Jackson	31,107	33,159	41,420	6.6	24.9
Newport	25,401	24,650	33,334	(3.0)	35.2
Study Area	52,989	61,527	88,525	16.1	43.9
WRPDD	130,381	166,398	250,784	27.6	50.7
Arkansas	1,984,375	2,534,619	3,912,255	27.7	54.5

Source: U. S. Department of Commerce, Bureau of Census, 1963 Census of Business, Vol. II, Part I, Section 5, Table 3.
U. S. Department of Commerce, Bureau of Census, 1967 Census of Business, Vol. II, Part I, Section 5, Table 3.
U. S. Department of Commerce, Bureau of Census, 1972 Census of Business, Vol. II, Part I, Section 4, Table 6.

The estimated retail sales for the study area given in Table 23 show a yearly breakdown from 1970 through 1976. The data used for the computation of Table 23 are shown in Appendix Tables D-1 and D-2. These data clearly illustrate a positive growth in both retail sales and the retailing industry serving the needs of local and area consumers.

1.5 Housing

1.5.1 Composition. As shown by Table 24, the year-round housing within the study area in 1970 was primarily single family units. This category comprises 90.1 percent of the year-round housing, with multiple occupancy units accounting for 6.2 percent, and mobile homes or trailers accounting for the remaining 3.6 percent. The percentage of single family units in the study area exceeded that of the State, which is 85.8 percent. There is a larger proportion of multi-family units in Jackson County than in Independence County, with Jackson County having 7.8 percent of total year-round housing as two or more units per structure, while Independence County has only 4.8 percent.

The record of new construction for the study area during the time period 1970 to 1976 is not complete as only the larger urban areas issue permits for construction and thus maintain records. Of note, however, is the amount and type of construction in the two major towns, Batesville and Newport, within the study area. Data for these two towns are shown in Table 25. There were 425 new housing units built in Batesville, Independence County, during the 1970-76 period, a 13.6 percent net increase (35 units were removed during the period). Of the new housing units built, 42 percent were multi-unit structures. During the same time period, there were 563 structures built in Newport, Jackson County, a 16.4 percent net increase. About 37.7 percent of the new housing units built in Newport were multi-unit structures.

TABLE 23

ESTIMATED RETAIL SALES FOR THE STUDY AREA, 1970-76

Year	Study Area	Percent Change
1970	\$ 64,934,819	--
1971	78,222,391	17.0
1972	88,525,000	11.6
1973	101,363,949	12.7
1974	112,689,420	10.1
1975	122,774,601	8.2
1976	145,410,326	15.6

Source: Retail sales determined using the following methodology:

$$\frac{\text{Study Area Sales Tax 1972}}{\text{Study Area Retail Sales 1972}} = \text{Tax Rate}$$

$$\frac{\text{Study Area Sales Tax (Year N)}}{\text{Tax Rate}} = \text{Retail Sales}$$

Sample Calculation

$$\begin{aligned} &\frac{\$ 2,445,706^a}{\$88,525,000^b} = .0276 \\ &\frac{\$4,013,325}{.0276} = \$145,410,326 = 1976 \text{ Retail Sales for the Study Area} \end{aligned}$$

Note: The Arkansas sales tax is 3 percent of the gross receipts from the sales of tangible personal property and certain selected services. The tax is paid by the consumer at the point of final sale and is computed on the total consideration received without any deductions for the cost of labor. A basic explanation for the .0276 rate calculation above is the exemption of gasoline, cigarettes, beer, etc., from the basic rate of 3 percent.

^aAll sales tax data furnished by Department of Finance and Administration, State of Arkansas, Little Rock, Arkansas.

^b1972 Retail Sales from: U. S. Department of Commerce, Bureau of the Census, 1972 Census of Retail Trade: Area Statistics: Arkansas, January, 1975, p. 4-42.

TABLE 24

YEAR ROUND HOUSING UNITS, BY TYPE OF STRUCTURE
 INDEPENDENCE, JACKSON COUNTY, STUDY AREA,
 WHITE RIVER PLANNING & DEVELOPMENT DISTRICT AND ARKANSAS--1970

Area	Total Units	YEAR AROUND HOUSING UNITS					
		<u>One Unit</u>		<u>Two or More Units</u>		<u>Mobile Home or Trailer</u>	
		Number	%	Number	%	Number	%
Independence	8,367	7,628	91.2	400	4.8	339	4.0
Jackson	7,061	6,284	89.0	559	7.8	218	3.1
Study Area	15,428	13,912	90.1	959	6.2	557	3.6
W.R. P. & D.D	54,013	49,216	91.1	2,710	5.0	2,087	3.9
Arkansas	672,795	577,436	85.8	70,379	10.5	24,980	3.7

Source: U.S. Department of Commerce, Bureau of Census, 1970 Second Count Summary Tape (Washington: Central User's Service); U.S. Dept. of Commerce, Bureau of Census Census of Housing, 1970: General Housing Characteristics, United States, Advanced Report HC(VI)-1, Feb., 1971. Table 2, p.5. (Washington: GPO)

TABLE 25

YEAR ROUND HOUSING STRUCTURES BY NUMBER OF UNITS
BATESVILLE AND NEWPORT
1970-1976

City and number of units within structure	<u>All Units 1970</u>		<u>Constructed</u>	<u>Removed</u>	<u>All Units 1976</u>	
	Number	Percent	1970-1976	1970-1976	Number	Percent
<u>Batesville</u>						
All sizes combined	2,875	100.0	425	35*	3,265	100.0
Single family	2,496	86.8	245	35*	2,706	82.9
Two units	139	4.8	92		231	7.1
Three and four units	68	2.4	8		76	2.3
Five or more	113	4.0	80		193	5.9
Mobile Home or Trailer	59	2.0	n.a.		59	1.8
<u>Newport</u>						
All sizes combined	2,700	100.0	563	121	3,142	100.0
Single family	2,168	80.3	351	121	2,398	76.3
Two units	311	11.5	16		327	10.4
Three and four units	96	3.6			96	3.1
Five or more	64	2.4	196		260	8.3
Mobile Home or Trailer	61	2.2	n.a.		61	1.9

*Estimated by WRPDD. No records maintained. No active condemnation program exists in Batesville.

Source: U. S. Department of Commerce, Bureau of Census, 1970 Census of Housing, Housing Characteristics for States, Cities, and Counties; Vol. I, Part 5, Table 58. U. S. Department of Commerce, Bureau of Census, Construction Report, Housing Authorized by Building Permits and Public Contracts, 1970, 1971, 1972, 1973, 1974, 1975, Table 5; 1976, Table 4.

White River Planning and Development District, Housing Policy Plan for the White River Region, Survey data.

1.5.2 Tenancy and Vacancy. The number of owner-occupied units within the study area is 66.1 percent of the total occupied units, as shown in Table 26. This compares with 66.7 percent for Arkansas. Independence County has a much higher rate of owner occupancy, 72.8 percent, than Jackson County, which has 58.2 percent.

The vacancy rate, shown in Table 27, for the study area is 7 percent of the year-round housing units, or slightly over 1,000 units. The vacancy rate for Independence County is 8 percent, and is 6 percent for Jackson County. These figures must be tempered, however, by the fact that 22 percent of the housing in the study area lacks some or all plumbing and is therefore sub-standard. These data are shown in Appendix Table E-1. Correction or removal of this type of structure is being actively pursued by the Town of Newport in Jackson County, as shown in the same appendix. However, no such program exists in Batesville, Independence County. The availability of adequate rentals in either single units or multi-units is practically non-existent. This analysis of the study area is shown in Exhibits I and II of Appendix E.

Transient housing is shown on Table 28. There is a total of 512 motel rooms within the study area.

1.6 Public Service and Costs

This section provides an inventory of details concerning the type and extent of public services available in the impact area. It further evaluates the ability of public services to accommodate the anticipated expansion in population over the next several years. Table 29 summarizes data on public services available in the area.

TABLE 26

TOTAL OCCUPIED HOUSING UNITS - OWNER OCCUPIED UNITS AND
 RENTER OCCUPIED UNITS - INDEPENDENCE COUNTY, JACKSON COUNTY,
 STUDY AREA, WHITE RIVER PLANNING AND DEVELOPMENT DISTRICT, AND ARKANSAS
 1970

Area	Total Occupied Units	Owner Occupied Units		Renter Occupied Units	
		Number	Percent of Total Units	Number	Percent of Total Units
Independence	7,740	5,631	72.8	2,109	27.7
Jackson	6,609	3,849	58.2	2,760	41.8
Study Area	14,349	9,480	66.1	4,869	33.9
W.R. P. & D.D	47,618	33,989	71.4	13,629	28.6
Arkansas	615,424	410,438	66.7	204,986	33.3

Source: U.S. Dept. of Commerce, Bureau of Census. Census of Housing, 1970,
 General Housing Characteristics, Arkansas, Final Report HC(1)-A5, Table 29, p.62.

TABLE 27.

VACANCY CHARACTERISTICS OF YEAR ROUND HOUSING UNITS
FOR BATESVILLE, NEWPORT, INDEPENDENCE AND JACKSON COUNTIES,
THE STUDY AREA, AND WHITE RIVER PLANNING AND DEVELOPMENT DISTRICT
1970

Area	Total Year - Round Housing Units	Year-Round Occupied Housing Units		Year-Round Vacant Housing Units	
		Number	Percent	Number	Percent
Independence	8,367	7,740	92	627	8
Batesville	2,879	2,669	93	210	7
Jackson	7,061	6,609	94	452	6
Newport	2,720	2,614	96	106	4
Tuckerman	608	587	97	21	3
Study Area	15,428	14,349	93	1,079	7
W.R. P. & D.D.	54,013	47,618	88	6,395	12

Source: U.S. Department of Commerce, Bureau of Census, 1970 Census of Housing.
Housing Characteristics for States, Cities, and Counties, Arkansas; Table A-3

TABLE 28
TRANSIENT HOUSING FACILITIES

Location	Number of Facilities	Total Number of Rooms
Independence County	6	330
Batesville	4	250
Cave City	2	80
Jackson County	5	182
Newport	4	152
Tuckerman	1	30
Study Area	11	512

Source: Newport Area Chamber of Commerce.
Batesville Area Chamber of Commerce.

TABLE 29

COMMUNITY SERVICES FOR
IMPACT AREA

	Population* 1977	Junior High & High School	Elementary	Police Department	Fire Department	Commercial Bank	Savings & Loan	Hospital	Newspaper ^{xx}	Radio Station	Industrial Park	Municipal Airport	Nursing Home	County Seat	Railroad Service	Bus Service
<u>Independence</u>																
Batesville	7,209	x	x(3)	x		x(2)	x(2)	x(2)		x		x	x(2)	x	x	x
Newark	849	x	x	x	x	x			(W)							
Desha	600	x	x		x											x
Oil Trough	524	x	x		x											
Salado	449 ^T															
Cushman	427	x	x		x											x
Locust Grove	300															x
Sulphur Rock	290	x	x													
Rosie	256 ^T															
Pleasant Plains	162	x	x													x
Magness	139															
Moorefield	127															
<u>Jackson</u>																
Newport	7,854	x	x(2)	x	x	x(2)	x	x(2)		x	x	x	x(3)	x	x	x
Tuckerman	1,731	x	x	x	x	x(2)			(W)							x
Swifton	703	x	x	x	x											x
Diaz	674				x											
Grubbs	442	x	x	x	x											
Jacksonport	306				x											
Tupelo	246				x											
Campbell Station	218				x											
Beedeville	144	x	x		x											
Amagon	136				x											x
Weldon	133			x	x											

*Latest available data, largely represents 1970 census.

^TTownship
^{xx}W = Weekly

Figures in parentheses indicate number of facilities.

1.6.1 Adequacy of Public Utilities and Roads in Project Study Area.

Energy: Electricity is supplied by Arkansas Power and Light. There has been an ample supply of power within the area for both residences and industry.¹

Natural gas is supplied by Arkansas-Louisiana Gas Company. It is in limited supply and all industrial users are treated as interruptible customers. The cities of Batesville and Newport are served, plus many customers along the transmission line between the two cities. Most of the remaining area is served by LP gas.²

Water Systems: Nearly 90 percent of the area's population is supplied by ground water. Water resources are located near demand areas and there is no need to transport water over long distances. Water is plentiful in the area, with the major problem being the lack of distribution facilities to furnish rural residents with a suitable supply.³ Table 30 shows the source and use of water by county.

Wastewater Treatment Facilities: The larger towns in the impact area utilize centralized sewage treatment facilities. Smaller towns and rural residences make use of individualized septic systems.⁴ For details see Exhibit I of Appendix F.

Transportation: The highway system is the most important transportation link in the area. Figure 5 shows the various routes through the two counties. There are 454 miles of state highways and 1,527 miles of local roads within the area.⁵ Table 31 shows details of these roads by type of construction. For details of road types, see Appendix F, Tables F-1, F-2 and F-3.

Footnotes are shown in Appendix I.

TABLE 30
SOURCE AND USE OF WATER, 1970
(MILLION GALLONS PER DAY)

Type of Supply	Water Source	Independence County	Jackson County
Public	Ground	.10	.89
	Surface	2.02	0
	Total	2.12	.89
Industry	Ground	.03	.41
	Surface	.33	0
	Total	.36	.41
Agriculture	Ground	5.85	58.73
	Surface	2.07	.89
	Total	7.92	59.62
County Totals	Ground	5.98	60.03
	Surface	4.42	.89
	Total	10.40	60.92

Source: Overall Economic Development Program 1977, White River Planning and Development District, Batesville, 1977. (Data provided by U. S. Geological Survey)

RURAL STATE HIGHWAY FEDERAL AID SYSTEMS MAP

TABLE 31
ROAD AND STREET MILEAGES, INDEPENDENCE AND
JACKSON COUNTIES AND ARKANSAS TOTALS

Classification	Independence County	Jackson County	Two-County Total	Arkansas Total
Rural	205	198	403	13,886
Municipal	10	14	24	1,054
Urban	12	15	27	985
Total State Highways	227	227	454	15,925
County roads	708	618	1,326	46,960
City Streets	102	99	201	8,347
Total Local Roads	810	717	1,527	55,307

Source: Arkansas State Highway Department, Division of Planning and Research, 1977.

Figure 6 shows traffic counts for each highway in the impact area. Traffic levels on Highways 14 and 122 are presently much higher than on Highway 69 between Newport and Newark. Highway 69 from Batesville to Newark is heavily traveled. Point Ferry (see Appendix F, Table F-4) is the bottleneck for Highway 69 between Newport and Newark. In 1976 it averaged only 129 vehicles per day.

Bus service through Jackson County includes five daily stops at Newport, Tuckerman and Swifton, served by Continental Trailways and Great Southern. Amagon has two stops daily. Independence County bus service includes three round trips daily by Wells Bus Line from Batesville to Little Rock. Desha, Cushman, Locust Grove and Pleasant Plains are served twice daily.⁶

There is a private port facility on the White River at Newport owned by Mobley Concrete Company. The company dredges sand and gravel from the river bed and barges it to the port for land shipment. River shipment in the study area is almost non-existent.⁷

Figure 7 shows the Missouri Pacific Railroad lines through the area. Service is provided to industrial areas in Batesville and Newport. Amtrak provides passenger service daily from Newport to Chicago, Illinois and to Laredo, Texas.⁸

There is no commercial air service in the impact area, although the Batesville airport was designed for commercial service. It can accommodate single wheel aircraft to 35,000 lbs., dual wheels to 50,000 lbs., and dual tandem wheels to 80,000 lbs. Runway length is 6,000 ft. The Newport airport will handle 30,000 lb. single wheel aircraft and has a runway length of 5,000 ft.

Footnotes are shown in Appendix I.

This is a detailed road map of the Jackson, Mississippi area. The map shows a network of roads, including major highways like US-167, US-67, and US-17. Key cities and towns labeled include Independence, Lawrence, Jackson, Woodruff, Batesville, Searcy, and various smaller locations like Cushman, Charlotte, Newark, Jackson, and Tilton. The map is heavily annotated with elevation points, often enclosed in circles, indicating the height of specific locations. The terrain is depicted with contour lines and shaded areas. The map is oriented with North at the top.

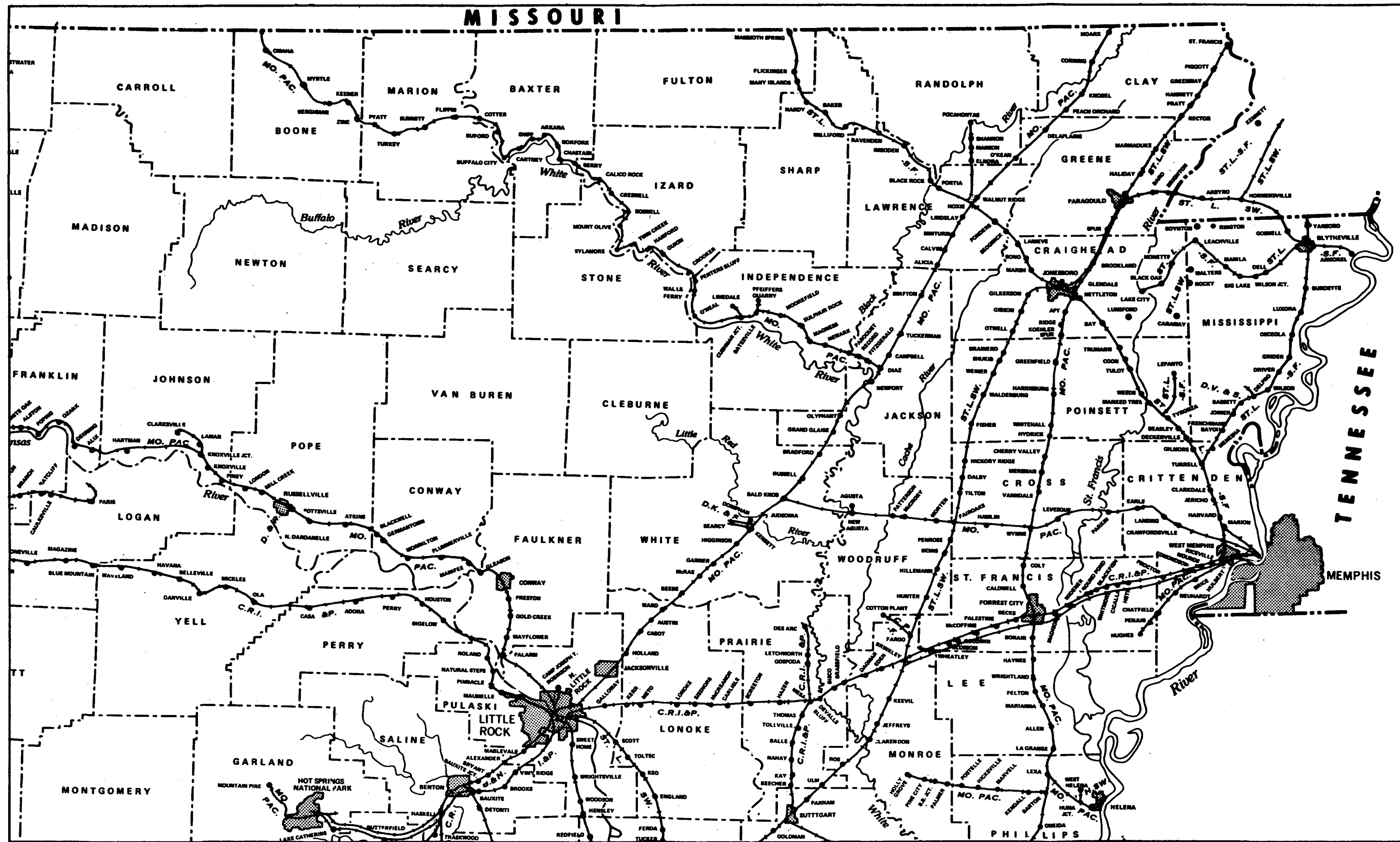


FIGURE 7
ARKANSAS TRANSPORTATION OFFICIAL MAP, 1975, ARKANSAS RAILROADS

Adams Field Municipal Airport in Little Rock provides the nearest major commercial air service.⁹ Jonesboro also provides daily air service to St. Louis and Memphis.

Communications: There are four newspapers published in the impact area, as follows:¹⁰

<u>Location</u>	<u>Name</u>	<u>When Published</u>	<u>Paid Circulation</u>
Batesville	Daily Guard	M-F evening	7,417
Newport	Daily Independent	TMWThS evening	3,837
Tuckerman	Tuckerman Record	Weekly on Wednesday	1,400
Newark	Tri-County Journal	Weekly on Thursday	4,000

The Batesville area is served by AM radio station KBTA with 1,000 watts of power, sunrise to sunset. License permits night broadcast at 250 watts. The Newport area is served by KNBY-AM with 1,000 watts, sunrise to sunset, and KNBY-FM, having 3,000 watts, continuing into the nighttime hours.¹¹

Telephone service within the study area is provided by Southwestern Bell.

Financial Institutions: Total capital resources in an area, plus adequate and capable financial institutions, are among the most important elements which determine the economic base and vitality of a region. Capital resources are necessary to fund the economic growth process and adequate facilities insure the proper flow of these resources.

There are ten very capable financial institutions with home offices located within the study area. These financial institutions are as follows:

Batesville:

- (1) First National Bank
- (2) The Citizens Bank
- (3) Batesville Federal Savings & Loan
- (4) Independence Savings & Loan

Footnotes are shown in Appendix I.

Newark:

The Bank of Newark

Newport:

- (1) First National Bank
- (2) Merchants and Planters Bank
- (3) Newport Federal Savings and Loan

Tuckerman:

- (1) The Bank of Tuckerman
- (2) Jackson County National Bank

These institutions have done an adequate job of providing for the financial needs of the area. The historical growth in assets, loans and deposits for these institutions is shown in Table 32. The rate of growth has been remarkable, especially in recent years. Total deposits of all institutions in the area grew by \$142.8 million from 1970 to June, 1977, or 152 percent. This represented an annual growth in deposits of almost \$22 million per year. Since 1974 this growth has been almost \$28 million per year.

While deposit growth has been significant, loan demand has increased even faster--195.6 percent from 1970 to June, 1977. Again, the growth in loan demand has been more rapid in recent years, resulting in an increase in the loan-to-deposit ratio from 63.5 in December, 1975, to 75.7 in June, 1977. This signifies that the area has come alive in the past three to four years and is better able to support and to cope with changing forces than in previous decades.

1.6.2 Adequacy of Public Safety Facilities.

Police: The Independence County Sheriff has three deputies and four patrol cars working out of the Batesville office, plus resident deputies located at Sulphur Rock, Newark, Cushman, Pleasant Plains and Oil Trough.

TABLE 32

ASSETS, LOANS AND DEPOSITS OF FINANCIAL INSTITUTIONS
IN INDEPENDENCE AND JACKSON COUNTIES
1970-1977

City	1970	1971	1972	1973	1974	1975	1976	1977	Percent Change 1970-77
Jackson County									
Assets	\$ 49,391	\$ 56,065	\$ 64,489	\$ 75,183	\$ 84,063	\$ 93,844	\$101,256	\$105,064	112.7
Loans	25,921	28,503	33,398	37,094	43,594	48,489	54,802	61,217	136.2
Deposits	44,591	50,928	58,561	68,534	73,732	85,555	89,261	94,001	110.8
L/D Ratio	58.1	56.0	57.1	54.1	59.1	56.7	61.4	65.1	
Independence County									
Assets	54,302	62,759	76,651	88,563	103,500	125,163	147,954	159,456	193.6
Loans	34,686	40,152	47,784	58,129	65,681	78,337	103,643	117,922	240.0
Deposits	49,322	56,920	69,526	80,583	93,823	114,259	132,813	142,670	189.3
L/D Ratio	70.3	71.0	68.7	72.1	70.0	68.6	78.0	82.7	
Study Area									
Assets	103,693	118,824	141,140	163,746	187,563	219,007	249,210	264,520	155.1
Loans	60,607	68,655	81,182	95,223	109,275	126,826	158,445	179,139	195.6
Deposits	93,913	107,848	128,087	149,117	167,155	199,814	222,074	236,671	152.0
L/D Ratio	64.5	63.7	63.4	63.9	65.4	63.5	71.3	75.7	

Source: Published call statements for each institution for December 31 of each year, except June 30, 1977.

In addition, Newark has a city marshall. The Batesville police department has 11 men and two meter maids. There are three patrol cars and an investigator's car.

The Jackson County Sheriff has six deputies working out of the Newport office, plus resident deputies located at Tuckerman, Swifton, Grubbs and Weldon. In addition, Tuckerman has four policemen. Swifton, Grubbs and Beedeville have one policeman each. The Newport police department has 11 policemen with six patrol cars.¹²

Fire Protection: The cities of Batesville and Newport have paid fire fighters; whereas, most of the remaining towns use volunteer forces. Batesville has a force of three paid and 18 volunteer firemen, while Newport has 11 paid, plus 12 volunteers. Tuckerman has one paid fire fighter, plus a volunteer force. The following towns have volunteer forces:¹³

Amagon	Jacksonport
Beedeville	Newark
Campbell Station	Oil Trough
Cushman	Swifton
Diaz	Tupelo
Desha	Weldon
Grubbs	

Medical Facilities: Table 33 shows the number of hospital beds in the area. The occupancy rates of the four hospitals vary from 42.8 to 83.7, with an average of 53.7. Table 34 presents data on health manpower for the area and makes comparisons with state averages. The study area averages one physician per 1,542 people. There are 5 nursing homes in the area with a total of 417 beds.¹⁴

Footnotes are shown in Appendix I.

TABLE 33
PATIENT UTILIZATION BY HOSPITAL, 1976

County Institution	Location	Number of Licensed Beds	Occupancy Rate (Percent)
Independence			
Dr. Gray's	Batesville	55	83.7
White River Medical Center	Batesville	106	42.8
Jackson			
Harris	Newport	132	44.7
Newport	Newport	86	60.1
Total		379	53.7

Source: Area Data Supplement to Application for Funding, Delta-Hills Health Systems Agency, Newport, 1977.

TABLE 34

SELECTED HEALTH MANPOWER, BY AREA, 1976*

Region	Popula- tion	Physicians	Dentists	Optom- etrists	Registered Nurses	Practical Nurses	Phar- macists	Physical Therapists	Inhala- tion Thera- pists	Medical Technol- ogists	Popu- lation per Physi- cian
Arkansas	1,923,295	2,280	748	202	6,080	6,838	1,445	53	59	185	844
Independence County	22,723	16	9	4	47	69	19	0	0	2	1,420
72 Jackson County	20,452	12	7	2	33	78	15	0	2	0	1,704
Two-County Total	43,175	28	16	6	80	147	34	0	2	2	1,542

*State figures are for those residing in the state; county figures include only those actually practicing.

Sources: Delta-Hills Health Systems Agency, Area Data Supplement to Application for Funding (Newport, 1977), and Arkansas State Health Department.

1.6.3 Adequacy of Public School Facilities. There are 15 separate school districts in the impact area. Tables 35, 36, 37 and 38 offer information with which to evaluate these districts. Table 35 shows the size of each school, as measured by average daily attendance. This varies from 163 for Sulphur Rock to 2,530 for Newport. Expenditure per pupil, an often used gauge of educational quality, varies from \$665 to \$1,087; whereas, the state average is \$856. Student/teacher ratios are shown in Table 36. The impact area average ratio of 18.55 is well under the 20.60 state average. Tables 37 and 38 point up high school ratings and various tax data, including borrowing power of each district. School tax millage for the impact area is approximately the same as the state average.

Other educational institutions in the impact area include White River Vo-Tech School in Newport, Gateway Vo-Tech in Batesville, and Arkansas College in Batesville, which is a four-year church-sponsored institution.

1.7 Community Cohesion

In an attempt to determine the attitudes and opinions of the residents of the area surrounding the proposed building site, a questionnaire was mailed to 155 households (see Exhibits I and II, Appendix H). The methodology entailed the use of a structured mail questionnaire sent to each household selected, using a random number generator applied to area telephone directories. This procedure allowed each household the same probability of being included in the sample and, therefore, increased the validity of the sample returns.

The total returns received by the cut-off date amounted to 41.3 percent, or a total of 64 questionnaires. (An enumeration of responses tabulated by communities may be seen in Exhibits III, IV, V and VI in Appendix H.) According to well-recognized sources in the field of marketing

TABLE 35

SELECTED RANKING DATA FOR INDEPENDENCE AND JACKSON COUNTY SCHOOL DISTRICTS

School District	Per Pupil Expenditure	State Ranking*	Average Daily Attendance ^{xx}	Number of Teachers	Average Teacher Salaries	Number of Certified Personnel	Average Salary of Certified Personnel
Independence County							
Batesville	\$ 812	205	1,823	98	\$ 9,549	107.5	\$10,015
Cord/Charlotte	843	159	231	12.5	9,623	13.5	9,940
Cushman	806	217	254	12.5	10,190	14.5	10,658
Desha	788	239	263	15.9	9,862	16.9	10,084
Floral	976	74	183	13	9,288	14	9,593
Newark	1,087	37	260	18.5	10,047	20.5	10,238
Oil Trough	820	192	319	17	9,524	19	9,890
74 Pleasant Plains	732	322	351	18.3	9,301	19.3	9,484
Southside	665	378	525	31	9,659	34	10,002
Sulphur Rock	900	122	163	11	9,315	12	9,678
Jackson County							
Beedeville	934	95	204	11	8,941	12	9,186
Grubbs	807	216	349	17	9,387	19	9,779
Newport	834	168	2,530	121.2	10,525	127.2	10,786
Swifton	976	75	287	20	8,943	21	9,136
Tuckerman	735	319	743	37	9,129	40	9,495

*Ranking is from 1 to 384 for Arkansas School Districts, 1976, expenditure per pupil

^{xx}1975-76 school year.

Source: Rankings of Arkansas School Districts on Selected Items, Department of Education, Little Rock, January, 1977.

TABLE 36
STUDENT/TEACHER RATIOS, SELECTED SCHOOL DISTRICTS
1975-76 DATA

School Districts	Number of Students	Number of Teachers	Student/Teacher Ratio
State of Arkansas	436,576	21,194	20.60
Independence County	4,372	244	17.9
Batesville	1,823	95	19.19
Cord/Charlotte	231	13	17.77
Cushman	254	13	19.24
Desha	263	15	17.19
Floral	183	13	14.08
Newark	260	18	14.44
Oil Trough	319	17	18.76
Pleasant Plains	351	19	18.67
Southside	525	31	16.94
Sulphur Rock	163	10	16.3
Jackson County	4,113	213	19.3
Beedeville	204	11	18.55
Grubbs	349	19	18.37
Newport	2,530	123	20.57
Swifton	287	19	15.11
Tuckerman	743	41	18.12
Independence and Jackson Counties			
Total	8,485	457.3	18.55

Sources: Rankings of Arkansas School Districts on Selected Items, Department of Education, Little Rock, January, 1977.
Annual Statistical Report of the Public Schools of Arkansas, Department of Education, Little Rock, January, 1977.

TABLE 37

VARIOUS SCHOOL DISTRICT STATISTICS IN INDEPENDENCE COUNTY

	Batesville	Cord- Charlotte	Cushman	Desha	Floral	Newark
Rating of High Schools	NCA	B	A	A	B	A
Area Square Miles	69	115	77	37	74	76
Average Daily Attendance						
Grades 1-12 1975-76	1,823	231	254	263	183	260
Kindergarten 1975-76	138	16	24	19	15	21
Average Number Belonging						
Grades 1-12 1975-76	1,930	244	270	273	201	272
Kindergarten 1975-76	155	18	30	21	16	23
Enumeration 1976	1,955	243	284	289	261	277
Assessed Valuation 1975	\$15,162,720	\$1,510,380	\$1,044,774	\$1,059,295	\$833,930	\$2,612,045
Assessment Ratio 1975	19.60	19.74	20.75	19.07	19.30	19.09
1976 Mills Voted						
M. & O.	22.00	31.00	25.00	35.00	30.50	37.00
Debt Service	34.00	19.00	30.00	24.50	32.50	8.00
Total	56.00	50.00	55.00	59.50	63.00	45.00
District Debt 7-1-76	\$1,756,000	\$94,700	\$140,969	\$137,679	\$127,071	\$25,261
Borrowing Power 7-1-76	\$518,408	\$131,857	\$15,747	\$21,215	\$1,980	\$366,546
Local Receipts 1975-76	\$771,738	\$78,652	\$52,225	\$49,863	\$45,264	\$119,392
1976-77 (EST)	\$864,511	\$72,668	\$51,500	\$55,314	\$48,219	\$113,014

TABLE 37 (Continued)

	Oil Trough	Pleasant Plains	Southside	Sulphur Rock	--Total--
Rating of High Schools	A	A	A	B	
Area Square Miles	87	87	36	34	692
Average Daily Attendance					
Grades 1-12 1975-76	319	351	625	163	4,472
Kindergarten 1975-76	25	24	61	15	358
Average Number Belonging					
Grades 1-12	331	388	659	173	4,741
Kindergarten 1975-76	47	29	66	17	422
Enumeration 1976	360	404	636	195	4,904
Assessed Valuation 1975	\$2,158,829	\$1,419,440	\$2,726,850	\$878,065	\$29,406,328
Assessment Ratio 1975	19.84	18.72	20.30	19.17	
1976 Mills Voted					
M. & O.	26.00	19.00	24.00	52.00	30.15
Debt Service	22.00	26.00	27.00	8.00	23.10
Total	48.00	45.00	51.00	60.00	53.25
District Debt 7-1-76	\$135,835	\$91,856	\$343,131	\$87,019	\$2,939,521
Borrowing Power 7-1-76	\$187,989	\$121,060	\$65,897	\$44,692	\$1,473,411
Local Receipts 1975-76	\$96,112	\$65,771	\$125,334	\$50,465	\$1,454,816
1976-77 (EST)	\$99,220	\$68,125	\$127,235	\$52,528	\$1,552,334

Source: Annual Statistical Report of the Public Schools of Arkansas, Department of Education, Little Rock, January, 1977.

TABLE 38

VARIOUS SCHOOL DISTRICT STATISTICS IN JACKSON COUNTY AND STATE

	Beedeville	Grubbs	Newport	Swifton	Tuckerman	Total	State Total
Rating of High Schools	0	A	NCA	A	A		
Area Square Miles	73	80	284	72	103	612	53,553
Average Daily Attendance							
Grades 1-12 1975-76	204	349	2,530	287	743	4,113	408,055
Kindergarten 1975-76	11	26	61	19	40	157	18,521
Average Number Belonging							
Grades 1-12 1975-76	173	369	2,662	300	784	4,288	429,878
Kindergarten 1975-76	12	29	133	22	44	240	33,050
Enumeration 1976	218	271	2,765	291	755	4,300	449,712
Assessed Valuation 1975	\$1,985,920	\$2,271,810	\$22,372,110	\$3,246,480	\$6,404,300	\$36,280,620	\$3,301,868,665
Assessment Ratio 1975	20.39	19.96	20.55	19.83	19.77		
1976 Mills Voted							
M. & O.	25.00	24.00	15.00	20.00	22.00	21.20	27.92
Debt Service	21.00	26.00	34.00	25.00	23.00	25.80	22.87
Total	46.00	50.00	49.00	45.00	45.00	47.00	50.79
District Debt 7-1-76	\$98,512	\$262,000	\$1,921,000	\$333,026	\$680,240	\$3,294,778	\$274,555,427
Borrowing Power 7-1-76	\$199,376	\$78,772	\$1,434,817	\$153,946	\$280,405	\$2,147,316	\$224,002,195
Local Receipts 1975-76	\$76,473	\$104,092	\$1,013,015	\$134,502	\$264,777	\$1,592,859	\$157,428,034
1976-77 (EST)	\$84,844	\$105,411	\$1,048,482	\$137,428	\$283,684	\$1,659,849	\$167,489,544

Source: Annual Statistical Report of the Public Schools of Arkansas, Department of Education, Little Rock, January, 1977.

research, this figure is exceptionally good, and further indicates the validity of this section of the report (see: Walter B. Wentz, Marketing Research: Management and Methods, New York: Harper and Row, 1972, p. 83).

1.7.1 Ability and Willingness of Communities to Absorb New People. The first two questions examined in Table 39 indicate that the vast majority of the respondents held favorable attitudes toward new residents. Over 95 percent of the respondents indicated that new residents had been well accepted in the past. In addition, over 90 percent of the respondents thought that the new residents associated with the construction and operation of the proposed AP&L facility would be accepted by the members of their community.

1.7.2 General Attitudes Toward Industrial Development. When questioned concerning this factor, there was a favorable response. In fact, 93.8 percent of the respondents stated that they believed that the residents of the area favored industrial development. And even more to the point, when asked specifically about the construction of the proposed AP&L facility, 90.6 percent stated that they believed that the residents of their communities would welcome such an action.

In addition to the survey being discussed, another survey was conducted by the Tri County Journal, the weekly paper published in Newark, Arkansas. In the June 30, 1977 issue of the Journal, the following statement was made:

"Are you in favor of the proposed AP&L electric generating plant being built in this area?"

Of the 200 persons contacted by phone, this was the finding: 142 were in favor of the plant being built, 32 were opposed, and 26 did not have an opinion.

TABLE 39

OPINIONS OF IMPACT AREA RESPONDENTS
CONCERNING ATTITUDES OF COMMUNITY RESIDENTS

Questions to Respondent	Response		Response		Opinion	Response		Total	%
	Yes	% of Response	No	% of Response		% of Response			
Have new residents in your community been generally well accepted in the past?	61	95.3	1	1.6	2	3.1		64	100.0
Do you think that the relatively large number of new residents associated with the construction and operation of the proposed AP&L facility will be accepted by the members of your community:	58	90.6	3	4.7	3	4.7		64	100.0
Do you believe that the population of your area favors industrial development?	60	93.8	4	6.2	-	-		64	100.0
In your opinion, will your community welcome the construction of the AP&L generating plant at the proposed location in your area?	58	90.6	6	9.4	-	-		64	100.0

Source: Survey conducted by the author.

According to the results of this survey, only 13 percent of the respondents did not favor building the AP&L plant at its proposed location. This differs by only 3.6 percent from the results of the study currently being discussed (see Exhibit VII, Appendix H).

1.7.3 Sense of Community Identity. The area respondents were asked to rate their communities on local pride and their support of civic activities that lead to community improvement. Each respondent was asked to check one of the following statements they thought best described their communities. The responses given are as follows:

<u>Statement</u>	<u>Number Responding</u>
a. Generally not interested in any improvements.	1
b. Some effort is given to improvements in the community.	5
c. Some people or groups are generally seeking improvements in the community.	33
d. Extremely active in seeking any improvement for the community.	25

It is evident that the vast majority of those responding believed their community had a great deal of public support for civic activities and improvement. Local interest groups are evidently active in seeking community betterment projects.

1.8 Projected Economic Development for the Study Area without Project Conditions

A number of methodologies and techniques were used in projecting the different economic variables for the study area. These variables were population, income, employment and earnings. The results derived from projecting the economic variables were compared in most cases to the trends shown by OBERS projections for the water resource subareas 1101 and 802, in which the study area belongs.

The following sections describe briefly the techniques employed in projecting the economic variables. Also, this section depicts the projected changes and identifies the trends and the overall economic development of the study area.

1.8.1 Population Forecasts. The methodology used to project the population for the study area may be described as a simplified "Cohort Survival" technique. The projected population from 1980 to 2010 was derived by using the natural increase and migration rates of population changes. The natural increase of population is the number of births over a period of time less the number of deaths. Migration can be either net immigration, if people are moving into the area faster than they are moving out, or net outmigration, if people are moving out of the area faster than they are moving in.

Projections of population levels in the two-county study area involved the following steps:

1. The past death and birth rates of the study area were close to the rates used by the Bureau of the Census in its projection of Series D.¹⁵
2. Projections of population by age and sex for Independence and Jackson Counties were made by Industrial Research and Extension Center from 1975 to 1990 using the above-described assumptions.
3. Using the same methodology the author projected the population for the years 1995, 2000, 2005 and 2010.
4. In the case of Jackson County, the IREC projections showed the population of the county for 1975 as declining to 20,194 from 20,452 in 1970. Since recent estimates show the population of Jackson County to be 21,700, all IREC projections from 1975 to 1990 were adjusted to incorporate the estimated population increase in the county.

Footnotes are shown in Appendix I.

1.8.2 Projected Population for the Study Area. Based on the methodology described and source mentioned above, the population for the study area was projected to 1980, 1985, 1990, 1995, 2000, 2005 and 2010. The population projections prepared by the White River Planning and Development District were not accepted by this study because all available evidence and trends indicated that their projections were overly optimistic.

A summary of the population projections by sex for the study area, Independence and Jackson Counties, is shown in Table 40. It was projected that the population of the study area will increase from 43,175 in 1975 to 47,564 in 1980. By 2010 the population of the study area is expected to increase to 64,537. This increase in population represents an average annual rate of about 1.2 percent.

1.8.3 Projected Population for Independence and Jackson Counties. Tables 41 and 42 show the projected population by age and sex for Independence and Jackson Counties from 1975 to 2010. The population of Independence County is expected to increase from 22,723 in 1970 to 24,564 in 1980 and 31,437 in 2010. The population of Jackson County will increase from 20,452 in 1970 to 23,000 in 1980 to 33,100 in 2010. These two tables contain a lot of detailed information on the distribution of population by age and sex to be used for different analytical purposes.

The projected urban-rural population for Independence and Jackson Counties and the study area is shown in Table 43. These projections were based on estimates made by White River Planning and Development District. By 2010 the urban population of the study area (35,725) is expected to be greater than that of the rural population (28,812). In 1970, however, the rural population of the study area exceeded the urban population of the area by 13,307.

TABLE 40

PROJECTED POPULATION BY SEX FOR
INDEPENDENCE AND JACKSON COUNTIES, AND THE STUDY
AREA FOR 1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010

Year	Projected Population								
	Independence			Jackson			Study Area		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1970 Census	10,989	11,734	22,723	9,946	10,506	20,452	20,935	22,240	43,175
1975	11,369	12,198	23,567	10,451	11,197	21,700	21,820	23,395	45,215
1980	11,837	12,727	24,564	10,481	12,519	23,000	22,318	25,246	47,564
1985	12,374	13,281	25,655	11,734	12,666	24,400	24,108	25,947	50,055
1990	12,920	13,836	26,756	12,412	13,388	25,800	25,332	27,224	52,556
1995	13,358	14,342	27,700	13,215	14,285	27,500	26,573	28,627	55,200
2000	13,923	14,925	28,848	14,127	15,173	29,300	28,050	30,098	58,148
2005	14,545	15,515	30,060	14,991	16,209	31,200	29,536	31,724	61,260
2010	15,243	16,194	31,437	15,889	17,211	33,100	31,132	33,405	64,537

Source: Tables 41 and 42.

TABLE 41

PROJECTED POPULATION FOR INDEPENDENCE COUNTY
BY AGE AND SEX
1975 TO 2010

Sex and Age Group	1970 Census	1975	Projections		1990	1995	2000	2005	2010
			1980	1985					
Both Sexes, All Ages	22,723	23,567	24,564	25,655	26,756	27,700	28,848	30,060	31,437
Under 5 years	1,636	1,818	1,987	2,057	2,039	1,910	2,055	2,195	2,312
5 - 9 years	1,928	1,717	1,909	2,087	2,160	2,141	2,100	2,240	2,381
10 -14 years	2,101	2,013	1,793	1,993	2,179	2,248	2,236	2,203	2,343
15 -19 years	1,941	1,959	1,878	1,673	1,860	2,042	2,111	2,099	2,080
20 -24 years	1,512	1,685	1,702	1,631	1,455	1,635	1,822	1,886	1,879
25 -29 years	1,281	1,454	1,620	1,638	1,570	1,423	1,568	1,765	1,819
30 -34 years	1,232	1,419	1,610	1,795	1,815	1,740	1,598	1,743	1,935
35 -39 years	1,272	1,352	1,559	1,768	1,972	1,975	1,913	1,788	1,923
40 -44 years	1,313	1,317	1,400	1,616	1,833	2,027	2,030	1,968	1,843
45 -49 years	1,336	1,335	1,339	1,424	1,645	1,863	2,054	2,057	1,995
50 -54 years	1,312	1,357	1,357	1,362	1,450	1,672	1,891	2,082	2,086
55 -59 years	1,310	1,331	1,379	1,382	1,387	1,477	1,699	1,919	2,110
60 -64 years	1,320	1,296	1,319	1,368	1,374	1,385	1,476	1,696	1,917
65 -69 years	1,118	1,236	1,216	1,240	1,290	1,298	1,312	1,406	1,625
70 -74 years	870	967	1,076	1,059	1,081	1,120	1,137	1,153	1,238
75 years and over	1,241	1,311	1,420	1,562	1,646	1,744	1,846	1,860	1,951
Male, All Ages	10,989	11,369	11,837	12,374	12,920	13,358	13,923	14,545	15,243
Under 5 years	801	915	1,000	1,035	1,026	989	1,044	1,100	1,160
5 - 9 years	980	840	960	1,050	1,086	1,077	1,128	1,179	1,235
10 -14 years	1,062	1,020	874	999	1,093	1,129	1,127	1,178	1,229
15 -19 years	984	972	934	800	915	1,008	1,044	1,042	1,093

TABLE 41 (Continued)

	20 -24 years	739	829	819	787	674	790	883	919	917
	25 -29 years	638	696	781	772	742	624	740	833	869
	30 -34 years	583	715	780	876	866	827	709	825	918
	35 -39 years	628	654	802	875	983	961	930	819	935
	40 -44 years	606	656	684	839	916	1,018	996	965	854
	45 -49 years	656	616	667	696	854	931	1,033	1,011	980
	50 -54 years	663	659	619	671	701	860	937	1,039	1,017
	55 -59 years	618	666	663	624	677	707	866	942	1,045
	60 -64 years	592	609	658	656	619	673	704	862	939
	65 -69 years	535	547	565	612	612	574	628	659	817
	70 -74 years	387	442	454	470	511	509	475	527	558
	75 years and over	517	533	577	612	645	681	679	645	677
98	Female, All Ages	11,734	12,198	12,727	13,281	13,836	14,342	14,925	15,515	16,194
	Under 5 years	835	903	987	1,022	1,013	921	1,011	1,095	1,152
	5 - 9 years	948	877	949	1,037	1,074	1,064	972	1,061	1,146
	10 -14 years	1,039	993	919	994	1,086	1,119	1,109	1,025	1,114
	15 -19 years	957	987	944	873	945	1,034	1,067	1,057	987
	20 -24 years	773	856	883	844	781	845	939	967	962
	25 -29 years	643	758	839	866	828	799	828	932	950
	30 -34 years	649	704	830	919	949	913	889	918	1,017
	35 -39 years	644	698	757	893	989	1,014	983	969	988
	40 -44 years	707	661	716	777	917	1,009	1,034	1,003	989
	45 -49 years	680	719	672	728	791	932	1,021	1,046	1,015
	50 -54 years	649	698	738	691	749	812	954	1,043	1,069
	55 -59 years	692	665	716	758	710	770	833	977	1,065
	60 -64 years	728	687	661	712	755	712	772	834	978
	65 -69 years	583	689	651	628	678	724	684	747	808
	70 -74 years	483	525	622	589	570	611	662	626	680
	75 years and over	724	778	843	950	1,001	1,063	1,167	1,215	1,274

Source: Industrial Research and Extension Center, Little Rock, Arkansas. Projections from 1995 to 2010 by the author.

TABLE 42

PROJECTED POPULATION FOR JACKSON COUNTY
BY AGE AND SEX
1975 TO 2010

Sex and Age Group	1970 Census	1975	Projections						
			1980	1985	1990	1995	2000	2005	2010
Both Sexes, All Ages	20,452	21,700	23,000	24,400	25,800	27,500	29,300	31,200	33,100
Under 5 years	1,573	1,845	2,024	2,074	2,193	2,338	2,491	2,652	2,814
5 - 9 years	1,999	1,605	1,886	2,077	2,229	2,397	2,535	2,710	2,910
10 -14 years	2,057	2,040	1,656	1,927	2,038	2,173	2,315	2,440	2,610
15 -19 years	1,898	1,975	1,960	1,587	1,677	1,788	1,880	2,028	2,151
20 -24 years	1,392	1,758	1,850	1,853	1,935	2,063	2,198	2,340	2,453
25 -29 years	1,142	1,367	1,732	1,806	1,909	2,035	2,173	2,309	2,450
30 -34 years	1,029	1,893	1,403	1,781	1,883	2,008	2,144	2,276	2,416
35 -39 years	1,057	1,063	1,242	1,464	1,548	1,654	1,758	1,872	1,986
40 -44 years	1,108	1,085	1,104	1,293	1,367	1,458	1,557	1,654	1,754
45 -49 years	1,194	1,128	1,106	1,147	1,212	1,293	1,377	1,474	1,556
50 -54 years	1,153	1,215	1,127	1,123	1,186	1,265	1,347	1,451	1,523
55 -59 years	1,190	1,171	1,242	1,172	1,242	1,320	1,406	1,503	1,589
60 -64 years	1,152	1,219	1,196	1,269	1,344	1,430	1,524	1,623	1,721
65 -69 years	967	1,107	1,172	1,201	1,251	1,308	1,410	1,498	1,592
70 -74 years	629	868	1,012	1,074	1,135	1,210	1,289	1,373	1,457
75 years and over	912	1,041	1,288	1,562	1,651	1,760	1,876	1,997	2,118
Male, All Ages	9,946	10,451	10,481	11,734	12,412	13,215	14,127	14,991	15,889
Under 5 years	828	955	1,035	1,073	1,135	1,210	1,290	1,373	1,456
5 - 9 years	1,051	846	966	1,079	1,175	1,245	1,312	1,395	1,472
10 -14 years	1,029	1,063	874	1,001	1,057	1,128	1,201	1,280	1,357
15 -19 years	1,001	976	1,033	854	903	963	1,026	1,092	1,158
20 -24 years	647	911	897	952	1,007	1,072	1,143	1,217	1,290
25 -29 years	542	629	874	878	929	991	1,055	1,124	1,191
30 -34 years	488	564	644	903	955	1,018	1,084	1,155	1,224
35 -39 years	478	520	575	683	722	770	820	874	927
40 -44 years	511	499	529	610	645	691	733	780	827

TABLE 42 (Continued)

45 -49 years	574	521	506	537	568	605	645	687	728
50 -54 years	559	564	519	512	542	578	616	656	695
55 -59 years	560	540	552	522	525	562	628	642	682
60 -64 years	529	542	545	561	593	632	674	718	761
65 -69 years	469	497	529	520	547	568	638	656	697
70 -74 years	294	390	414	439	464	495	527	562	596
75 years and over	386	434	534	610	645	687	735	780	828
Female, All Ages	10,506	11,197	12,519	12,666	13,388	14,285	15,173	16,209	17,211
Under 5 years	745	890	989	1,001	1,058	1,128	1,201	1,279	1,358
5 - 9 years	948	759	920	998	1,054	1,152	1,223	1,315	1,438
10 -14 years	1,028	952	782	926	981	1,045	1,114	1,160	1,253
15 -19 years	897	999	932	733	774	825	854	936	993
20 -24 years	745	847	943	901	928	991	1,055	1,123	1,163
25 -29 years	600	738	858	928	980	1,044	1,118	1,185	1,259
30 -34 years	541	607	759	878	928	990	1,060	1,121	1,192
35 -39 years	579	569	667	781	826	884	938	998	1,059
40 -44 years	597	286	575	683	722	767	824	874	828
45 -49 years	620	507	600	610	644	688	732	787	828
50 -54 years	594	651	608	611	644	687	731	795	828
55 -59 years	630	631	690	650	717	758	778	861	907
60 -64 years	623	677	651	708	751	798	850	905	960
65 -69 years	498	610	643	681	704	740	772	842	895
70 -74 years	335	478	598	635	671	715	762	811	861
75 years and over	526	607	574	952	1,006	1,073	1,141	1,217	1,290

Source: Industrial Research and Extension Center, Little Rock, Arkansas. Projections from 1995 to 2010 by the author.

TABLE 43

PROJECTED URBAN-RURAL POPULATION FOR INDEPENDENCE COUNTY,
JACKSON COUNTY, AND STUDY AREA FOR
1970, 1975, 1980, 1985, 1990, 1995, 2000, 2005 AND 2010

Year	Independence County		Jackson		Study Area	
	Urban	Rural	Urban	Rural	Urban	Rural
1970	7,209	15,514	7,725	12,727	14,934	28,241
1975	7,871	15,696	8,658	13,042	16,529	28,738
1980	8,794	15,770	12,006	10,994	20,800	26,764
1985	9,621	16,034	13,420	10,980	23,041	27,014
1990	10,516	16,240	14,964	10,836	25,480	27,076
1995	11,302	16,398	16,500	11,000	27,802	27,398
2000	12,174	16,674	18,166	11,134	30,340	27,808
2005	13,166	16,894	19,968	11,232	33,134	28,126
2010	14,210	17,227	21,515	11,585	35,725	28,812

Source: Table 40. White River Planning and Development District. Population and Economics, December, 1971.

In short, the population growth of the study area will be rather small. However, the findings of the study indicate a reversal of the population decline experienced in the study area during the last decade.

1.8.4 Labor Force Trends in Study Area. This section of the report was constrained by the lack of a labor market information study for the area. Therefore, the study had to use the demand for labor by industry, for which data were available. This demand for labor reflected the area's economic growth and the changes in the composition of employment among the various industries. Future employment requirements were projected to 2010 on the basis of past trends and expected growth potentials.

The high rate of outmigration that occurred in the study area during the 1950's and the low rate in the 1960's was reflected in the changes of the total labor force. The size of the labor force from 1960 to 1970 increased by 849 workers. This increase in the labor force during the 1960's was basically due to the low rate of outmigration. The decline of outmigration in the 1960's was one of the relevant factors that was considered in projecting the area's labor force participation rates, i.e., the percent of population that is in the labor force. This ratio was estimated for 1960 and 1970 to be 31.1 percent and 32.8 respectively. Table 44 shows the labor force participation rates and projected total employment for the study area. The labor force participation rates were projected to increase because of the anticipated potential growth of the area and the expected decline of outmigration or the possible immigration.

Total wage and salary employment projected for the study area will increase from 14,161 workers in 1970 to 25,169 workers in 2010, or by about 77.7 percent.

TABLE 44

TOTAL EMPLOYMENT AND LABOR FORCE PARTICIPATION
 RATES FOR STUDY AREA 1960 AND 1970 AND
 PROJECTED TO 1975, 1980, 1985, 1990, 1995, 2000, 2005
 AND 2010

Year	Labor Force Participation Rates	Wage and Salary Employment
1960	31.1	13,339
1970	32.8	14,161
1975	34.5	15,628
1980	35.0	16,647
1985	35.6	17,819
1990	36.2	19,025
1995	37.0	20,424
2000	37.8	21,980
2005	38.4	23,524
2010	39.0	25,169

Source: Table 40. Calculations by the author.

1.8.5 Projecting Employment in Agricultural and Non-Agricultural Industries.

This section discusses the distribution of employment by industry based on census data. The steps used to estimate the distribution of employment by industry for the years 1980, 1985, 1990, 1995, 2000, 2005 and 2010 are described below:

1. Show census employment distribution by industry for 1960 and 1970.
2. Compute percent change of employment distribution for all industries from 1960-1970.
3. To obtain the 1980 distribution, the 1960-1970 change (step 2) is applied to 1970 base in the following manner. Each industry's 1970 employment share was multiplied by the sum of 100.0, plus the percent change of the distribution from 1960 to 1970 of this industry, and the result was posted as end of step 3. For example, if manufacturing represented 20 percent of total employment in 1960 and 30 percent in 1970, the percent change from 1960 to 1970 is 50 percent. Multiply the 1970 share of manufacturing, 30 percent by the sum of 100.00 + 50. Thus, the distribution of manufacturing employment for 1980 will be 45 percent. Finally, add the employment distribution of the individual industries to obtain the total for all industries.
4. The 1980 employment distribution was adjusted to make the items in the distribution sum to 100.00. The adjustments of the individual distribution were made on a proportional basis. The purpose of these adjustments was to make the estimates representative of the past trends and reflective of any foreseeable future changes in employment. The same approach was used to estimate the employment distributions for the other years. The future employment by industry was derived by applying the estimated distribution of employment by industry to the projected total employment.

1.8.6 Analysis of Employment Changes in the Study Area. Despite the projected overall increase in total employment requirements, manpower needs in agriculture are expected to continue their decline at least until 1980. As Table 45 shows, agricultural employment by 1980 will be about 998 workers. Agricultural employment after 1980 will be expected to stabilize at a level of about 1,000 workers.

TABLE 45
PROJECTED EMPLOYMENT BY INDUSTRY FOR
STUDY AREA FROM 1975 TO 2010

Industry	Census	Projection:							
	1970	1975	1980	1985	1990	1995	2000	2005	2010
Total Employment	14,135	15,628	16,647	17,819	19,025	20,424	21,980	23,524	25,169
Agriculture, forestry and fisheries	1,964	1,406	998	1,000	1,000	1,000	1,000	1,000	1,000
Goods-Producing Industries	4,841	6,438	7,507	8,295	8,922	9,356	10,141	10,913	11,710
Mining	102	93	83	76	71	65	60	58	55
Construction	1,099	1,188	1,331	1,454	1,546	1,670	1,780	1,905	2,037
Manufacturing	3,640	5,157	6,093	6,765	7,305	7,621	8,301	8,950	9,618
Service-Producing Industries	7,330	7,784	8,142	8,524	9,103	10,068	10,839	11,611	12,459
Transportation, Communications and Public Utilities	792	879	956	1,044	1,110	1,196	1,305	1,416	1,536
Wholesale and Retail Trade	2,779	2,859	3,023	5,196	3,394	3,715	3,846	3,966	4,196
Finance, Insurance and Real Estate	334	390	416	446	476	531	594	658	730
Services	3,066	3,293	3,381	3,464	3,743	4,238	4,698	5,171	5,594
Government	359	363	366	374	380	388	396	400	403

Source: Projections by the author.

The employment in the goods-producing industries (mining, construction and manufacturing) was projected to increase from 4,841 workers in 1970 to 11,710 workers in 2010, or by 141.9 percent. Employment in the service-producing industries (transportation, trade, finance, services and government) will grow from 7,330 workers in 1970 to 12,459 in 2010, or by 70.0 percent. These projections indicate that the rate of job growth in the study area will be faster in the goods-producing industries than in the service-producing industries. Mining will show no significant employment changes from 1970 to 2010. Manpower requirements in manufacturing, however, will increase from 3,640 workers in 1970 to 9,618 workers by 2010, or by 164.2 percent. Thus, manufacturing will show a substantial growth, a needed impetus to boost the area's economic growth. Transportation, communication and public utilities will increase their manpower requirements by 93.9 percent or from 792 workers in 1970 to 1,536 workers in 2010. Employment in wholesale and retail trade will increase for the same period from 2,779 to 4,196 or by about 51.0 percent. Finance, insurance and real estate will expand and thus increase their employment from 334 employees in 1970 to about 730 employees in 2010. Services, which is the second largest employer in the area, will increase their manpower requirements from 3,066 workers in 1970 to 5,594 in 2010, or by 82.5 percent.

The employment composition in the study area will change as a result of different rates of growth among industries. Employment in services and manufacturing will increase significantly in proportion to total non-agricultural employment. Slight declines are anticipated in the employment share of mining industries and service-producing industries. The share of goods-producing industries, however, will increase from 34.3 percent in 1970 to about 46.5 percent in 2010.

1.8.7 Projections of Total Personal Income and Per Capita Personal Income.

Certain considerations were necessary in the development of the income projections because no forecasts of future income for the study area were available in the source materials reviewed.

1. Past trends in the area as developed from local base data were used to provide a satisfactory measure of future income growth.
2. The rates of change of total and per capita personal income projections by OBERS for the water resource subareas 1101 and 802 were used to estimate changes in income levels for the study area.

1.8.8 Projected Total Personal Income. The projections of total personal income in the study area were based on the assumption that the total personal income of the study area will increase at about the same rate as indicated in the OBERS projections for the water resource subareas related to the study area. The total personal income levels for 1980, 1985, 1990, 1995, 2000, 2005 and 2010 were estimated by using the 1960 and 1970 percent relationship of the area's income to the water resource subareas.

Table 46 shows the projected total personal income for the study area from 1980 to 2010. It will increase to \$320.0 million in 1980; to \$492.0 million in 1990; to \$762.0 million in 2000; and to \$1,171.0 million in 2010. The rate of increase of personal income for the study area will approximate the rates projected for the water resource subareas 1101 and 802. The projected personal income assumes a minimal annual rate of inflation.

In short, the analysis of total personal income of the study area indicates a sizable rate of growth. During the thirty-five year span, the total personal income of the area is expected to increase by at least five times the 1975 level.

TABLE 46
 PROJECTED TOTAL PERSONAL INCOME FOR STUDY AREA
 1980-2010

(In Thousands of Dollars)

Year	Personal Income	Percent Change
1970	\$119,563	
1975	219,000	83.2
1980	320,000	46.1
1985	400,000	25.0
1990	492,000	23.0
1995	614,000	24.8
2000	762,000	24.1
2005	945,000	24.0
2010	1,171,000	23.9

Source: Projections by the author.

1.8.9 Projected Per Capita Personal Income. The per capita personal income for the study area was estimated by dividing the projected total personal income by the projected population. According to Table 47, the per capita income of the study area will increase from \$2,761 in 1970 to about \$18,145 in 2010. The per capita income for the study area in 2010 will be more than six times greater than the 1970 per capita income. The projected per capita income for the study area reflects an improvement in the area's living standards.

The above income projections for the study area were developed from forecasts prepared for the related water resource subareas. However, these income figures indicate only a moderate rate of growth and a less than average living standard for the area and do not consider an unusual economic development growth.

1.8.10 Projections of Total Earnings by Source for the Study Area. Total earnings is an important component of personal income and thus it deserves special mention even though it has been covered implicitly in the preceding discussion of personal income. Earnings is the sum of wages and salaries, other labor income, and proprietor's incomes in each industry.

In determining the future earnings for the study area, it was assumed that the prevailing shares of earnings to personal income for the water resource subareas 1101 and 802 will be approximately equal to those of the study area. The range of the share of earnings to personal income for the subareas from 1970 to 2010 was between 76.2 percent and 78.3 percent. In applying these shares to projected personal income, the total earnings for the study area were derived and are shown in Table 48. A similar share analysis process was used in determining the earnings for the study area by

TABLE 47
PROJECTED PER CAPITA PERSONAL INCOME FOR
STUDY AREA FROM 1980 TO 2010

Year	Per Capita Personal Income	Percent Change
1970	\$ 2,761	
1975	4,834	75.1
1980	6,728	39.2
1985	7,990	18.8
1990	9,361	17.2
1995	11,123	18.8
2000	13,105	17.8
2005	15,426	17.7
2010	18,145	17.6

Source: Projections by the author.

TABLE 48

PROJECTED TOTAL EARNINGS BY SOURCE FOR THE
STUDY AREA FROM 1970 TO 2010

(In Thousands of Dollars)

Industry	1970	1975	1980	1985	1990	1995	2000	2005	2010
Total Personal Income	\$ 119,563	\$ 219,000	\$ 320,000	\$ 400,000	\$ 492,000	\$ 614,000	\$ 762,000	\$ 945,000	\$ 1,171,000
Total Earnings	91,135	166,878	247,040	308,800	380,800	475,236	593,598	739,935	916,893
Agri., Forestry & Fisheries	22,953	38,382	56,820	68,245	84,157	102,175	127,624	151,687	187,963
Contract Construction	3,892	8,177	11,858	15,749	19,422	24,238	30,274	37,737	46,762
Manufacturing	23,886	48,394	71,641	90,478	111,574	140,194	175,110	218,281	270,483
Transp., Comm. & Public Utilities	4,848	8,177	12,352	15,749	19,420	24,712	30,867	38,477	47,678
Wholesale & Retail Trade	13,941	22,362	33,103	41,997	51,789	65,107	81,323	101,370	125,614
Fin., Ins. & Real Estate	2,449	5,840	8,646	10,808	13,328	17,109	21,370	27,378	33,925
Services	10,570	19,526	28,904	36,438	44,934	56,078	70,045	88,052	109,111
Government	8,596	16,020	23,716	29,336	36,176	45,623	56,985	76,953	95,357

Source: Projections by the author.

source or industry. The share of earnings produced by each industry in this study area was derived by expressing the projected earnings from each industry for the two subareas as a percent of the total earnings of the two subareas. It was assumed that the share of each industry's earnings to total earnings for the water resource subareas applies to the study area.

1.8.11 Analysis of Total Earnings. Table 48 shows the projected total earnings by source for the study area from 1970 to 2010. It indicates that total earnings from agriculture will increase from \$22.9 million in 1970 to \$187.9 million in 2010. Construction, manufacturing, trade and services will be the rapid growing industries. The contribution of the government sector will also be very substantial. Manufacturing, government, trade and services will be the leading earnings-producing sectors. In 2010 manufacturing will contribute to the total earnings of the study area about \$270.5 million, trade \$125.6 million, services \$109.1 million and government \$95.4 million.

In summary, it was projected that the population of the study area will sustain future growth, especially after 1980. The area's total personal income will increase from about 119.6 million in 1970 to \$1,171 million in 2010. The per capita income will reach the \$18,145 level by 2010. Total employment is expected to increase. Manpower needs in agriculture are estimated to stabilize by 2010 at a level of 1,000 workers. The projections show that the employment requirements in the goods-producing industries will grow faster than in service-producing industries. Manufacturing, government, trade and services will be the main contributors to the area's total earnings.

1.9 Determination of Employment and Income Multipliers

The study of regional multipliers stresses the interrelationships of sectors within a regional economy and the spread of impulses originating in any one sector to all other sectors either directly or indirectly. The relevance of the multiplier for programming regional development is very important. It points out how growth or slowdown in one sector induces growth or reduction in another. One of the most straightforward and useful types of regional multiplier analysis is the employment multiplier that is associated with economic base studies.

The economic base type of analysis distinguishes between basic (primary, non-local) industry and nonbasic (local, service, derivative) industry. A basic activity is the area's stimulus because it provides the export surplus which generates the net income stream upon which new demand and employment is created.

Basic employment is defined as that employment which leads to the production of goods or services which are exported outside the boundaries of the region under study and for which payment is received from outside of the region.¹⁶

Nonbasic employment is defined as the employment which leads to the production of goods and services that are consumed or used within the boundaries of the region.¹⁷

In addition to the pioneer work made by Homer Hoyt, while in the Division of Economics and Statistics in the Federal Housing Administration, several others wrote on the economic base concept.¹⁸

Footnotes are shown in Appendix I.

The following procedures were used in determining the basic and nonbasic employment for the study area.

- (a) The Index of Local Specialization (ILS) for the White River Planning & Development District was developed for 1960, 1965, 1970 and 1975 by industrial classification.
- (b) The ILS was converted to show what share of employment in each industrial classification was basic or nonbasic.
- (c) These shares of basic or nonbasic employment by industrial classification were applied to the employment in the study areas to estimate the basic and nonbasic employment by industrial classification for the study area.

1.9.1 Index of Local Specialization (ILS). The ILS is used to identify the economic base of a region. The index is a ratio expressing an industry's share of national employment. The index can be used as an indicator of the product specialization of the regional industry.

$$ILS = \frac{\frac{e_i}{e_t}}{\frac{E_i}{E_t}}$$

where e_i regional industry i employment
 e_t regional total employment
 E_i national industry i employment
 E_t national total employment

Table 49 shows the Index of Local Specialization (ILS) for the White River District in 1960, 1965, 1970 and 1975 by industrial categories.

In order to assess any possible difference in regional productivity of industry, a survey was conducted and its results are shown in Table 50. Since most of the manufacturing firms in the area are branches of multifirm corporations, they were able to estimate their performance and thus make their response to the questionnaire rather valid.¹⁹

When the ILS is greater than 1 in industry X, it indicates that specialization in industry X is greater in the region than in the nation. The ILS, therefore, can be used as an indicator of regional specialization

Footnotes are shown in Appendix I.

TABLE 49

INDEX OF LOCAL SPECIALIZATION
FOR
WHITE RIVER PLANNING AND DEVELOPEMENT DISTRICT
IN 1960, 1965, 1970, and 1975

	1960	1965	1970	1975
Agriculture, Forestry and Fisheries	3.55	3.18	3.42	3.08
Manufacturing	.52	.68	.82	.98
Durable Goods	—	—	.72	.84
Lumber and Wood Products	4.33	3.54	3.16	2.97
Furniture and Fixtures	—	—	.71	.96
Stone, Clay, and Glass Products	—	—	.52	.71
Primary Metal Industries	.39	.57	.53	.74
Fabricated Metal Industries	—	—	.69	.92
Electrical Equipment and Supplies	—	—	.38	.58
Transportation Equipment	—	—	.16	.24
Non-Durable Goods	—	—	.95	1.17
Food and Kindred Products	.93	.98	1.20	1.39
Apparel and other Textile Products	—	1.16	2.26	2.94
Printing and Publishing	.21	.20	.19	.26
Mining	.54	.67	.47	.42
Construction	.79	.73	1.36	1.67
Transportation and Public Utilities	.60	.64	.70	.76
Trade, Total	.67	.75	.81	.85
Wholesale Trade	—	—	.40	.43
Retail Trade	—	—	.95	.99
Finance, Insurance, and Real Estate	.37	.61	.73	.83
Services	2.96	2.88	2.21	1.91
Public Administration	.26	.22	.14	.13
Federal Public Administration	—	—	.35	.36
State & Local Public Administration	—	—	.09	.07
Other Non-Agriculture				

Source: Calculations by the author.

TABLE 50

RESULTS OF THE SURVEY MAILED TO SAMPLE FIRMS
IN DIFFERENT INDUSTRIES AS TO THEIR PRODUCTIVITY
RELATIVE TO THE NATIONAL AND THEIR EXPORTS

	Productivity Relative to National	Export	Amounts Exported		
			Large	Medium	Small
Agriculture	Greater	Yes	X		
Manufacturing					
Food and Kindred Products	Less	Yes		X	
Apparel and Other Textile Products	Same	Yes		X	
Lumber and Wood Products	Same	Yes	X		
Leather and Leather Products	Same	Yes	X		
Stone, Clay, and Glass Products	Less	No			X
Fabricated Metal Products	Same	Yes		X	
Machinery, Except Electrical	Same	Yes			X
Electrical Equipment & Supplies	Same	Yes			X
Non-manufacturing					
Mining	Less	No			
Contract Construction	Same	Some			X
Transportation-Public Utilities	Less	Some			X
Trade	Same	Some			X
Finance, Insurance and Real Estate	Less	Some			X
Service and Miscellaneous Non-manufacturing					
Government	Same	Some			X

Source: Results of a survey conducted by the author.

in a product. If the ILS of an industry is greater than 1, it may be inferred indirectly or implicitly that a region is export oriented in that particular industry. But in such a case, two assumptions are in order. First, the industry's Marginal Physical Product of Labor (MPP_L) needs to be equal to or greater than the national marginal productivity and, secondly, the regional consumption for the good should be equal to or less than the national consumption for the same good.¹¹

When the index is less than 1, several inferences can be made. First, the MPP_L of the industry in the region is less than the marginal productivity of the same industry nationwide. Second, the region will not export substantial quantities of goods or services of the industry in question. Third, the relative low employment concentration in the region may also be contributed to the region's high marginal labor cost (MLC). Fourth, it can be added that under certain conditions some regional industries may show less relative employment concentration due to their very high MPP_L .

The survey that was conducted to estimate the productivity of industries in the region and to determine their exports tends to reduce the probabilities for error in estimating the region's specialization in basic or nonbasic activities.

When the coefficient of ILS is say 5, it indicates that the region is 5 times as specialized in the industry as is the nation as a whole. By inference (considering the necessary assumptions outlined above) the industry has 5 times as many workers as are needed for the region's own consumption of the good or service. In other words, one-fifth of the region's industry employment is required to satisfy domestic needs and the remaining four-fifths are "surplus" workers presumably producing for export.²¹

Footnotes are shown in Appendix I.

1.9.2 Conversion of ILS into Basic and Nonbasic Shares of Employment. As the example mentioned above indicates, the ILS can be converted to show the share of basic and nonbasic employment in each industrial category. Those shares are shown in Table 51.

1.9.3 Basic and Nonbasic Employment in the Study Area. Due to the fact that the socioeconomic and demographic characteristics of the counties of the White River District are basically the same, it can be assumed that the share of basic and nonbasic employment determined for the region can be applied to the study area.

Table 52 shows employment in the study area by industrial categories and by basic and nonbasic employment. This table is important in providing the data for the calculation of basic-nonbasic ratios (indirect employment multiplier) and the regional employment multiplier for the study area. Total employment for years 1970, 1972 and 1974 is listed in the first three columns by industry. The last six columns show the basic and nonbasic employment by industry. That part of employment which produces and caters to the local market is classified as nonbasic employment. That part which produces for the regional, national and world markets is classified as basic.

1.9.4 Basic-Nonbasic Ratios (Indirect Employment Multiplier) and Regional Employment Multiplier. The data of the previous table can be used to calculate both an indirect employment multiplier and a regional employment multiplier.

In Table 53 the basic-nonbasic ratios or indirect employment multipliers are calculated on the basis of total employment in 1970, 1972 and 1974. An average employment multiplier for the years of 1970, 1972 and 1974 was also

TABLE 51

BASIC AND NONBASIC SHARES OF EMPLOYMENT
BY INDUSTRIAL CATEGORIES FOR
WHITE RIVER PLANNING AND DEVELOPMENT DISTRICT

	1960		1965		1970		1975	
	Basic	Nonbasic	Basic	Nonbasic	Basic	Nonbasic	Basic	Nonbasic
Agriculture	.72	.28	.69	.31	.71	.29	.68	.32
Manufacturing	.36	.64	.43	.57	.53	.47	.60	.40
Mining	.07	.93	.09	.91	.09	.91	.09	.91
Construction	.50	.50	.42	.58	.27	.73	.40	.60
Transportation and Public Utilities	.46	.54	.42	.58	.47	.53	.50	.50
Trade	.41	.59	.42	.58	.42	.56	.46	.54
Finance, Insurance and Real Estate	.28	.72	.46	.54	.54	.46	.59	.41
Service	.66	.34	.65	.35	.55	.45	.48	.52
Government	.02	.98	.03	.97	.01	.99	.01	.99

Source: Estimates by the author.

TABLE 52

EMPLOYMENT BY INDUSTRIAL CATEGORIES AND BY BASIC AND NONBASIC EMPLOYMENT
FOR STUDY AREA, 1970, 1972, 1974

	Employment			Share Employment by				Market Served					
				Basic		Nonbasic		Basic			Nonbasic		
	1970	1972	1974	Employment	Employment	Employment	Employment	1970	1972	1974	Employment	Employment	Employment
1970													
Wage & Salary													
Employment	14,166	15,347	15,920	--	--	--	--	6,549	7,313	7,590	7,617	8,034	8,330
Farm	2,247	1,982	1,753	.71	.68	.29	.32	1,595	1,348	1,192	652	634	561
Non-Farm	11,919	13,365	14,167	--	--	--	--						
Government	1,722	1,805	1,925	.01	.01	.99	.99	17	18	19	1,705	1,787	1,906
Federal	211	210	218	--	--	--	--						
State & Local	1,511	1,596	1,707	--	--	--	--						
Private Non-Farm	10,197	11,559	12,242	--	--	--	--						
Manufacturing	3,818	4,717	5,384	.53	.60	.47	.40	2,023	2,830	3,230	1,795	1,887	2,154
Mining	39	45	29	.09	.09	.91	.91	3	4	3	36	41	26
Construction	475	509	498	.27	.40	.73	.60	128	204	199	347	306	299
Transport., Comm., & Pub. Utilities	591	607	596	.47	.50	.53	.50	278	303	298	313	304	298
Trade	2,490	2,661	2,665	.44	.46	.56	.54	1,095	1,224	1,226	1,395	1,437	1,439
Fin., Ins., & Real Estate	299	333	318	.54	.59	.46	.41	161	196	188	138	137	130
Services	2,272	2,472	2,574	.55	.48	.45	.52	1,249	1,186	1,235	1,023	1,286	1,339
Other	213	215	178	--	--	--	--				213	215	178

Source: Table 12. Calculations by the author.

TABLE 53
BASIC-NONBASIC EMPLOYMENT RATIOS AND
EMPLOYMENT MULTIPLIER FOR STUDY AREA

		Basic-Nonbasic Ratio or Indirect Employment Multiplier	Regional Employment Multiplier
L. Based on total employment:	1970	$\frac{6,549}{7,617} = 1:1.16$	2.16
2. Based on total employment:	1972	$\frac{7,313}{8,034} = 1:1.10$	2.10
3. Based on total employment:	1974	$\frac{7,590}{8,330} = 1:1.10$	2.10
4. Based on the 3-year average employment: 1970, 1972, 1974		$\frac{21,452}{23,981} = 1:1.12$	2.12

Source: Calculations by the author.

calculated. The corresponding regional employment multipliers are simply basic-nonbasic employment plus unity (1).²²

This study attempted to resolve some of the limitations of the basic-nonbasic ratios and regional employment multiplier by:

- (a) Developing the ILS.
- (b) Survey the productivity of industries.
- (c) Survey the share of production exported by those industries.

The 3-year average indirect employment multiplier 1:1.12 indicates that for each basic employment created in the study area, another 1.12 nonbasic employment opportunities will be induced in the area. The regional employment multiplier shows the direct and indirect employment created in the area.

This study has shown evidence that the indirect employment multiplier in the study area is greater than 1, ranging from 1.10 to 1.16.

1.9.5 Determination of Consumption Multiplier or Regional Income Multiplier.

The late Charles Tiebout divides a community's economy into three sectors: exports, local investment and local consumption. Tiebout considers income as a unit of measurement of an area's economic performance. Thus, income accrues to local families from the aforesaid three sectors.²³

In the short run, income created by exports and local investment depends largely on forces other than the level of local income--mostly on forces operating outside the local market. All of this means that, for short run analysis, export and local investment income are taken as given, that is, they are measured but not explained by a base study. This leaves the local consumption sector which is explained. The income derived from the local consumption sector depends upon local spending out of income originating in other sectors, just as nonbasic employment depends upon basic employment.²⁴

Footnotes are shown in Appendix I.

According to Tiebout, if the base analyst wants to be quite sophisticated, he could use a multiplier formula as follows:²⁵

$$\text{Local Income Increase} = \text{Increase in Basic Income} \times \frac{1}{1 - \frac{\text{Nonbasic Income}}{\text{Total Income}}}$$

Where: $\frac{1}{1 - \frac{\text{Nonbasic Income}}{\text{Total Income}}}$ is the Local Consumption or Local Income Multiplier

Nonbasic Income - Study Area, 1974 = \$74,268,000^{25a}

Total Income - Study Area, 1974 = \$187,064,000

Substituting to:

$$K = \frac{1}{1 - \frac{\$74,268,000}{\$187,064,000}} = \frac{1}{1 - .397} = \frac{1}{.603} = 1.66$$

The income multiplier described above has its main effect over a relatively short period of months or years, since it is based primarily on public and private expenditures for current consumption. A longer term multiplier effect can also develop, based on investment expenditures stemming from the initial confusion of payroll spending and tax payments. No attempt has been made to estimate this secondary income multiplier, however, owing to the lack of data on which to develop projections.

2.0 ENVIRONMENTAL IMPACT ACTION

2.1 Construction Impacts

2.1.1 Employment and Population Changes

2.1.1.1 Impact on Employment. The economic base analysis described in the previous section concluded that the average local employment multiplier is 1.12 for the study area. That is, for each new basic employment created in the area, 1.12 new indirect (nonbasic) employment is induced.

Footnotes are shown in Appendix I.

TABLE 54

ESTIMATED QUARTERLY EMPLOYMENT BY CRAFT DURING CONSTRUCTION

Quarter	Year	Carpenters	Iron workers	Painters	Electricians	Boiler- makers	Mill- wrights	Pipe- fitters	Insulators	Operators	Laborers	Total
1	1979	10	8	2	2	2	4	4	-	5	10	50
2	1979	15	25	4	9	8	8	12	-	10	19	110
3	1979	17	36	5	14	20	12	20	-	17	39	180
4	1979	28	47	7	20	25	15	23	-	17	78	260
1	1980	32	56	8	22	33	17	27	5	17	113	330
2	1980	33	65	9	26	41	21	33	8	21	153	410
3	1980	35	77	10	30	46	25	39	10	24	184	480
4	1980	40	82	12	34	55	29	44	12	28	214	550
1	1981	46	98	13	39	65	33	52	13	33	248	640
2	1981	58	125	16	50	83	42	66	17	42	331	830
3	1981	63	136	18	54	90	45	72	18	45	353	905
4	1981	58	124	16	50	83	42	66	17	42	342	840
1	1982	48	104	14	42	67	34	54	14	34	249	660
2	1982	37	79	11	32	53	27	42	11	26	212	530
3	1982	39	82	12	33	56	29	44	11	28	221	560
4	1982	46	98	13	39	65	33	52	13	33	258	650
1	1983	45	100	14	40	66	35	56	15	37	282	690
2	1983	48	112	16	44	73	38	59	15	40	295	740
3	1983	45	110	15	41	70	35	57	15	40	292	720
4	1983	46	98	13	39	65	33	52	13	33	248	640
1	1984	37	79	11	32	53	27	42	11	26	212	530
2	1984	33	56	8	24	27	16	30	15	20	121	350
3	1984	10	35	5	20	15	12	25	17	17	24	180
4	1984	2	8	2	16	-	-	3	18	3	8	60

Source: Arkansas Power and Light Company.

During the construction phase of the plant, AP&L expects to employ several hundred craft workers and 40-50 supervisors. Table 54 shows the number of workers by craft to be employed at the plant site by AP&L quarterly during its construction phase. Table 55 summarizes the number of craft workers and supervisors to be employed during the construction phase of the plant.

TABLE 55
ESTIMATED QUARTERLY EMPLOYMENT
DURING CONSTRUCTION

Quarter	Year	Craftsmen	Supervisors	Total
1	1979	50	30	80
2	1979	110	35	145
3	1979	180	35	215
4	1979	260	35	295
1	1980	330	40	370
2	1980	410	40	450
3	1980	480	40	520
4	1980	550	45	595
1	1981	640	45	685
2	1981	830	50	880
3	1981	905	50	955
4	1981	840	50	890
1	1982	660	45	705
2	1982	530	45	575
3	1982	560	45	605
4	1982	650	40	690
1	1983	690	40	730
2	1983	740	40	780
3	1983	720	40	760
4	1983	640	40	680
1	1984	530	40	570
2	1984	350	35	385
3	1984	180	35	215
4	1984	60	30	90

Source: Arkansas Power and Light Company.

Tables 54 and 55 state the total amount of new direct employment that will be created as a result of constructing the new power plant. The indirect effect that the plant will have on the employment of the local economy is shown in Table 56. The indirect effect on employment was derived by multiplying the new direct employment induced by the construction of the plant times the average employment multiplier. It was estimated that on the average AP&L will employ annually about 535 workers during the construction phase. The annual direct effect of the AP&L plant on the employment of the local economy is shown in the second column of Table 56. The construction phase will start with an average annual employment of about 185 workers, during the third year of the project about 854 workers will be employed, and during the last year of construction, about 315 workers will be employed.

In addition to the direct effect, the construction of the plant will have an indirect effect on the local employment. The indirect effect is shown in the fourth column of Table 56. During the first three years of construction, about 957 new supporting jobs will be generated. Most of the new supporting jobs generated in the area will be phased out when the construction nears completion and the number of construction related workers declines.

Taking into consideration that the majority of the technical workers employed for the construction of the recently completed Arkansas Eastman Plant came from within the study area or within a 50-mile radius, it can be stated that most of the workers needed by AP&L will be supplied by the area. Mr. A. C. Roden, Daniels International, the building contractor of the Arkansas Eastman plant, stated in an interview with regard to the availability of local technical labor needed for the construction of a big plant that:

TABLE 56
ESTIMATED EMPLOYMENT IMPACT
DURING CONSTRUCTION PHASE

Year	Direct Effect on Employment Average Annual Craft and Supervision	Employment Multiplier	Indirect Effect on Employment	Cumulative Indirect Effect on Employment
1979	185	1.12	207	207
1980	482	1.12	333	540
1981	854	1.12	417	957
1982	645	1.12	-234	723
1983	732	1.12	97	820
1984	315	1.12	-467	353
Annual Average	535			

Source: Arkansas Power and Light. Estimates by the author.

Not too many single qualified boilermakers were used on the job. Trainees, unskilled laborers, who proved to be quickly and easily trained, were used. They produced exceptionally high quality products in less than the pre-planned time for construction. Additionally, I trained pipe fitters and welders. I noted that the hardest to obtain craftsmen were pipe fitters and electricians. Of the total employees in these two crafts, 40% came from the local area and 60% from outside the area. I used about 400 pipe fitters and welders; approximately 160 came from the local area. Of the 150 electricians employed, about 55 came from the local area.

He further stated that:

Boilermakers were all local.
Ironworkers--easiest to man.
Operators were plentiful.
Millwrights were plentiful.
Carpenters--not too plentiful but enough.

Based on the Arkansas Eastman plant experience and statements made by other local contractors as to the availability of local labor to man the construction of the AP&L plant, the needs for technical labor to be imported will be rather limited. An estimated amount of skilled labor to be imported to the area is shown below:

Estimated Type of Imported Labor

<u>Type</u>	<u>Number</u>
Electricians (60% of maximum needed)	30
Pipe fitters (60% of maximum needed)	45
Others (15% of the average annual workers)	<u>135</u>
Total	210

About 75 electricians and pipe fitters and 135 other workers may need to come from areas outside the study area. Special attention needs to be given also to the local availability of a large number of iron workers since at times as many as 136 iron workers will be needed. The availability of carpenters will depend basically on the level of housing construction going on in the area at the same time the plant is being constructed.

It is also found that most of the workers will commute to the plant site, thus there will be less pressure on the housing, schools and other facilities available in towns close to the site of the plant.

In short, during the construction phase of the AP&L plant, several hundred new jobs will be generated through both direct and indirect effects. Most of the labor needed will be supplied by the local area.

2.1.1.2 Impact on Unemployment. The construction of the AP&L plant will produce several positive effects in the study area, but the most beneficial effect will be the one on unemployment. For purposes of analyzing the unemployment conditions which are estimated to exist with and without the construction of the AP&L plant, the date of July, 1977 was used as a benchmark date. The most recent information available as to the civilian labor force, employment and unemployment is for June, 1977. These data appear in Table 57. The same table shows employment, unemployment and the unemployment rate before and after the construction of the AP&L plant in the study area.

On the average during the construction period, local employment will increase by around 675 jobs. This figure is based on the average direct employment, estimated to be 535 construction jobs plus the net increase of 353 jobs associated with induced employment over the course of the project, minus an estimated 210 jobs filled by imported workers.

It was estimated that average unemployment in the study area will decrease from 1,025 to 100 ($1025 - 925 = 100$), or from 4.8 percent prior to the construction of the plant to 0.5 percent if the action is taken. The civilian labor force of the study area with construction would be increased by 210 workers, representing the estimated amount of workers that need to be imported into the area to fill some scarce labor skills not available in the local area.

TABLE 57

EFFECTS OF CONSTRUCTING THE INDEPENDENCE
STEAM ELECTRIC STATION ON THE EMPLOYMENT
AND UNEMPLOYMENT OF STUDY AREA

Labor	Estimated	
	Study Area Without Construction as of 6/30/77	Study Area Situation With Construction as of 6/30/77
Civilian Labor Force	21,525	21,735
Unemployment	1,025	350
Unemployment Rate	4.8	1.6
Employment	20,500	21,385

Source: Arkansas Department of Labor, Employment Security Division,
Preliminary Labor Force Estimates, August, 1977. Estimates by the author.

2.1.1.3 Impact on Population. Taking into consideration that only a small number of newly generated job openings will be filled by persons moving in from areas outside the study area, it can be stated that the impact of the construction of the AP&L plant on local population will be limited. It was estimated in a previous section that the direct and indirect effects on local employment of constructing the AP&L plant will be the creation of as many as 890 new jobs in the area, but only about 210 job openings will be met by outside labor. The methodology used in determining the number of people to move into the area is shown in footnote 1 of Table 58. It was estimated that about 534 people would move into the area as a result of job opportunities created by the construction of the AP&L plant.

2.1.2 Income and Spending Changes

2.1.2.1 Direct Income Changes. The annual payroll for the construction of the AP&L plant is shown on Table 59. This amount is estimated to be about \$3.2 million the first year of construction, reaching a high of \$15.9 million during the third year and then dropping to \$7.7 million in the last year of construction. Since more than 75 percent of the workers to be employed during the construction of the plant will come from within the study area, it seems that the same percentage of the payroll will be earned by residents of the area. It is expected that the workers employed from within the area will spend 80 percent of their income locally, and that workers from outside the area will spend 60 percent of their income locally. Thus, using these proportions, the income earned during construction and spent locally can be estimated and is shown in the last column of Table 59. It was estimated that the total annual payroll for the six years of construction will be about \$64.5 million. Of that amount about \$48.4 million will be spent in the local economy.

TABLE 58

ESTIMATED TOTAL POPULATION GAINS IN THE
STUDY AREA DURING THE CONSTRUCTION PHASE

	Potential Population to be Moved into the area	Population Gains
Direct and indirect employment ¹	210	
Family members of workers	<u>324</u>	
Total	534	534

¹The number of people moving into the study area due to the direct and indirect effects on employment by constructing the plant was estimated on the basis of the following procedure:

210	Jobs generated and held by outsiders
<u>x.77</u>	Male or female workers heads of families
162	Workers, probable heads of families
<u>+48</u>	Singles
210	Total married and single workers
<u>210</u>	Total outside workers
<u>-48</u>	Singles
162	Workers head of family
<u>x3</u>	Persons per family
486	Persons in families
<u>+48</u>	Singles
534	Number of persons to move in study area

The ratio $\frac{534}{890} = .60$ shows that for each job created, about 0.6 persons move into the area.

TABLE 59
ESTIMATED ANNUAL PAYROLL BY AP&L
DURING CONSTRUCTION

(In Thousands of Dollars)

Year	Annual Payroll	Locally Spent Income
1979	\$ 3,246	\$ 2,434
1980	8,525	6,394
1981	15,926	11,944
1982	13,057	9,793
1983	16,017	12,013
1984	<u>7,763</u>	<u>5,822</u>
Total	<u>\$64,534</u>	<u>\$48,400</u>

Source: Arkansas Power & Light. Estimates of locally spent income by the author.

TABLE 60
ESTIMATED QUARTERLY PAYROLL
DURING CONSTRUCTION

Quarter	Year	Total Payroll
1	1979	\$ 368
2	1979	664
3	1979	955
4	1979	1,259
1	1980	1,660
2	1980	1,989
3	1980	2,278
4	1980	2,598
1	1981	3,222
2	1981	4,103
3	1981	4,470
4	1981	4,131
1	1982	3,596
2	1982	2,912
3	1982	3,069
4	1982	3,480
1	1983	3,947
2	1983	4,236
3	1983	4,114
4	1983	3,720
1	1984	3,357
2	1984	2,340
3	1984	1,447
4	1984	619

Source: Arkansas Power and Light Company.

The estimated quarterly wage and payroll to craft workers and supervisors during the six years of construction is shown in Table 60.

2.1.2.2 Induced Income and Spending (Multiplier Effects). As a result of constructing the AP&L plant, there will be several basic activities that will be positively affected and thus increase the basic income of the area. The activities that will probably be affected will be the following:

AP&L Construction Workers Payroll spent in the study area	\$48,400,000
Locally Purchased Supplies	1,000,000
Increase in Local Tax Revenues	<u>27,263,588</u>
Total Increase in Basic Income	\$76,663,588

The construction of the plant and production of the above basic activities or expenditures will have a multiplied effect in the study area. The AP&L construction payroll was shown in Table 59. It is very difficult to estimate the amount that will be spent by the contractor on locally purchased supplies. With the exception of gravel, sand and fuel, very few other supplies will come from the study area. Estimates given by some experts do not value the amount of local purchases more than one million dollars during the construction period. Due to the very minimum effect that each school district will feel with regard to new student population, it is likely that additional state school aid will be negligible.

New local tax revenues resulting from the construction of the plant are explained in a rather detailed form in a following section. This section concludes that the additional local tax revenue during the six-year construction period will be \$27,263,588.

In estimating the multiplied effect that the basic activities or expenditure will have on the study area, the previously determined Local Income Multiplier (1.66) for the study area was applied.

In calculating the increase in local income due to growth of basic income, the following procedure is used:

$$\text{Increase in Local Income} = \text{Increase in Basic Income} \times \frac{1}{1 - \frac{\text{Nonbasic Income}}{\text{Total Income}}}$$

or

$$\text{Increase in Local Income} = \text{Increase in Basic Income} \times \text{Local Income Multiplier}$$

Substituting:

$$\text{Increase in Local Income} = \$76,663,588 \times 1.66 = \$127,261,556$$

In short, the income of the study area will increase, as a result of the multiplier effect on the income generated by the basic activities of the AP&L plant, by an amount of about \$127.3 million during the six-year construction period. In the long run, this effect can be greater if one considers the local investment multiplier.

2.1.2.3 Impact on Retail Sales. The proposed AP&L plant will have a positive effect on the retail sales of the study area. The basic income earned from the construction of the plant and spent locally has been determined to be \$48,400,000 over a six-year period. This amount would have a direct effect of increasing retail sales by \$30.6 million. This rate of income spent by the general public on retail sales was determined to be 0.632.

$$\frac{\text{Study Area Retail Sales (1972)}}{\text{Study Area Personal Income (1972)}} = \frac{\$ 88,525,000}{\$140,036,000} = 0.632$$

Multiplying the retail sales/personal income ratio (0.632) by the additional income earned and spent locally (\$48,400,000), the increase of retail sales in the study area during the six years can be estimated as being \$30,588,800.

The estimated increase in retail sales as measured above shows the direct effect of income on retail sales. To be more realistic, however, the total effect of the increase in income on retail sales must be determined from income derived in the area after the income multiplier is applied.

This multiplier was calculated in a previous section and was determined to be 1.66. When it is applied to the increase in basic income of \$76.7 million, the total increase in income in the short run will be \$127.3 million. By applying the rate of income spent on retail sales by the general public of 0.632, this could create an estimated increase of \$80.4 million in retail sales for the six-year construction period. Table 61 shows the estimated retail sales gained due to the increase in income in the study area.

TABLE 61
ESTIMATED RETAIL SALES GAINED DUE TO INCREASE
IN INCOME OVER CONSTRUCTION PHASE
(In Thousands of Dollars)

	Increase in Retail Sales
Due to Payroll Increase	\$30.6
Additional Increase Due to Multiplier Effect	<u>49.8</u>
Total Increase of Retail Sales Due to Increase in Income	<u>\$80.4</u>

2.1.3 Housing Impacts

2.1.3.1 Projected Pattern of Construction Worker Relocation. In a previous section of this report, it was determined that on the average 534 persons may move into the study area, possibly to Batesville, Newport or Newark, as a result of the construction phase of the AP&L plant. This number as shown in Table 58 constitutes about 162 workers who are heads of

families, or 486 persons in families, and about 48 single workers. The rest of the labor needs, as this study previously concluded, will be met by people commuting from surrounding areas to the site of the plant.

In determining how the housing needs of the workers will be met by the already available housing units and what the demand for new housing needs will be in the area, two approaches were used:

- (a) The Housing Coordinators of the White River Planning and Development District, the Executive Vice-President of the Newport Chamber of Commerce, and real estate developers were interviewed on this matter.
- (b) Present housing availability as shown in Tables 24 and 27 was used to determine the extent to which the existing housing can meet the new housing needs.

(a) Results of the Interviews. The following statements are summaries of interviews with the White River Planning and Development District, the Chamber of Commerce and realtors, shown in Exhibits I and II in Appendix E.

The housing coordinators of the White River Planning and Development District stated:

Temporary housing in Independence and Jackson Counties is primarily within Batesville and Newport, respectively. Rental units in these two towns are very scarce. Most vacancies are either for sale or are sub-standard. The majority of new construction is single family, owner-occupied, and there is no significant number of multi-unit housing under construction. They did speculate that with a project the size of the proposed AP&L power plant, and lasting several years as planned, some of the local workers who presently rent may purchase homes and some rentals will be built during the latter stages of construction.

Chamber of Commerce and realtors stated:

Rental houses in Newport are for the most part sub-standard. As a result of the condemnation program, these units are identified for upgrading or demolition as soon as they become vacant. Very few are upgraded. Most homes which are vacant are for sale. The availability of apartments is also limited. There is one apartment building presently under construction which will have 15 units. This is the extent of multi-unit construction in Newport. Real Estate developers are keeping a close watch on the AP&L power plant project, with the intention of constructing, or upgrading present housing as soon as the location and construction start date is established.

It can be concluded from the above statements made by local experts on housing availability that:

- a) Rental units are very scarce.
- b) Most vacancies are either for sale or sub-standard.
- c) Availability of apartments is limited.
- d) Private sector, however, may be mobilized to construct housing to meet future housing needs.

In short, meeting the housing needs of the labor force would be a serious problem, at least at the beginning of the project.

(b) Existing Housing and Housing Needs. This report showed that an average of about 210 housing units or living accommodations will be needed to meet the housing needs created by the labor employed during the construction of the AP&L plant.

Considering the lack of rental housing in the area, the high occupancy rate of the 512 motel rooms available in the area, and the high cost of motel living, it can be said that the ability to house more than 200 new families or individuals will come from three sources:

- (1) Purchase of vacant houses for sale
- (2) Use mobile homes
- (3) Build new housing

It was estimated that most of the vacant houses are substandard or need substantial upgrading. The current number of housing units available for sale, according to statements made by local realtors, is either not sufficient to meet the needs or the price range of available housing is above that which can be afforded by the workers at the plant. In Batesville and Newport, the two largest cities in the study area, 985 new housing units were built from 1970 to 1976, but only 276 units were apartment-type housing

accommodations. From a survey made the occupancy of these apartments is very high under present demand conditions. Some of the single workers (20-30) may be accommodated by the available apartments.

The rest of the needs must be met by either mobile homes moved into an area close to the site or the construction of new houses. If, on the basis of the data presented and interviews conducted, it is assumed that existing available housing units will meet about 20 percent of the needs (.20 X 210), then about 170 additional housing accommodations may be needed.

Considering that about 40 to 50 employees on the site will be of the supervisor level, then part of the housing needs will require new houses, and the remainder mobile homes.

It is estimated that the new housing needs can be met by the following allocation:

ALLOCATION OF NEW HOUSING NEEDS

Mobile Homes	120
New Housing Units	<u>50</u>
Total New Housing Needs	<u>170</u>

2.1.3.2 Impact of New Housing. The development of the new housing and the renting or sale of vacant housing in the area will produce the following impact in the local economy:

TOTAL NEW HOUSING COST

New Mobile Homes (120 @ \$10,000)	\$1,200,000
New Housing Units (50 @ \$35,000)	1,750,000
Renting of Apts. or Houses (40 @ \$150 monthly for 6 years)	<u>432,000</u>
Total New Housing Cost and Rental Cost	\$3,382,000
Rounded to \$3,400,000	

This means that about \$2.9 million in value of housing will be added in the study area, and about \$0.5 million of rentals will be added to the income of the local economy. The estimate of the cost of housing was based on Marshall and Swift Residential Cost Handbook, which stated that in September, 1976, the average construction cost of homes in Newport and Batesville was about 85% of the national average, $(\$42,500 \times .85) = \$36,125$.

An additional factor which must be emphasized is the impact on tax revenues due to the creation of new real estate property values. Based on the present tax law which requires that real property be assessed at 20 percent of market value, these new properties will increase the assessed real estate value by $(\$2,950,000 \times .20) = \$590,000$. Applying an average rate of 67.2 mills for the study area, real property taxes will be increased by \$39,648 per year. This rate was obtained by considering the rate for the various incorporated communities within the study area.

2.1.4 Public Service Impacts. This section treats the public-sector impact of the previously estimated changes in employment, population, housing and other factors during the plant's construction phase. The projected changes will bring both benefit and burden to the public sector, and the two will not necessarily be distributed evenly throughout the impact area.

2.1.4.1 Requirements for Additional Utility Services

Energy: Over the six-year construction phase of the AP&L plant, 210 new jobs will be met by workers imported into the area. These newly imported workers should bring approximately 162 new families into the area. With three people per family, plus 48 single workers, a population increase of 534 is projected. This will mean 170 new homes, all using electricity and

some using natural gas. The remainder (mainly mobile homes) will use LP gas. The supply of electricity and LP gas will be sufficient. The supply of natural gas will be sufficient if these houses are built close to an already existing gas line.

Water Systems: Since water is plentiful in the area, there will be little problem in adding 170 new homes to the existing water systems, provided these homes are well dispersed. Newark is served from two wells and serves customers a few hundred yards beyond the city limits. The Newark water system extends west up Highway 69 to the city limits of Magness. The majority (an estimated 60 to 80) of the estimated 120 mobile homes to be added in the area would be served by this system.²⁶

Wastewater Treatment Facilities: Batesville's facilities already have need for expansion and improvement. Other facilities vary greatly in size and quality, as discussed in Exhibit I, Appendix F. The Newark facility has a lift station south of town on Highway 122 with a force main extended to the east along the Missouri Pacific Railroad to the city's stabilization pond.²⁷ It will be sufficient to handle the anticipated influx of 60 to 80 mobile homes. Expansion will not be necessary (the plant will have its own on-site waste treatment system).

2.1.4.2 Requirements for Road and Traffic Control Improvements. Expenses for road upkeep during the construction phase will increase. Also, it is estimated (see Section 2.1.5.2) that an additional 178 cars would be owned by residents in the impact area. Highways 122 and 69 in the Newark area will be the more severely affected roads. Because of housing availability and highway access, most construction workers will live in (or near) Newport, Batesville or Newark.

Footnotes are shown in Appendix I.

The Point Ferry across Black River at Jacksonport, although free, will slow traffic and discourage workers from using that route. It presently operates from 7:00 a.m. to 7:00 p.m. and can carry six cars per trip. (In 1976, the 24-hour annual average traffic count at Point Ferry was 129 vehicles. There were 65 days during which the ferry did not operate.)²⁸ Thus, most workers who live in Newport will utilize Highway 14 to Oil Trough, then Highway 122 to Newark.

State Highway District 5 Engineer Jim Chaney stated that the major need for improvement in the area is Highway 69 from Batesville to Newark. It is in the Department's five-year plan for upgrading, probably to include widening to 22 feet from the present 20 feet. The sharp corner south of Sulphur Rock is to be corrected. Survey work is complete on this project. The prospects of the AP&L plant will probably speed up this work.

The intersection of Highways 67 and 14 near Newport is dangerous because of the angle of approach and slope, calling for improvement. More frequent surfacing will be required on all roads in the area. County roads will be burdened as well, but Independence County will have considerable revenue for road improvement from their 11.4 mills tax on the new facility. Estimates of the County's tax intake are shown in Exhibit II, Appendix G. The additional tax revenue for the county is estimated to rise from \$135,500 in 1979 to \$1,524,667 in 1984. Jackson County will have some increased costs of road improvements, but only some spillover benefits from property tax revenues.

2.1.4.3 Requirements for Increased Public Safety Service. U. S. cities with populations from 10,000 to 24,999 in 1976 averaged 2.05 policemen per 1,000 persons.²⁹ Such data are not collected for smaller cities. For Batesville this would call for 15 policemen. Batesville actually has 11 policemen, or 1.526 per 1,000 population. A 1968 study of Arkansas police

Footnotes are shown in Appendix I.

departments showed an average of 1.164 per 1,000 for cities in the 5,000 to 9,999 class.³⁰ This would call for eight policemen. It would appear from these data that Batesville could handle the expected increase in population with little or no increase in the size of its police force. Newport has 11 policemen for a population of 7,854 or 1.401 per 1,000 persons, which exceeds the state average. Newark, with only one city marshall, will need at least one additional marshall (or policeman) because of its central location in the impact area. A policeman will cost about 8,220 per year (Arkansas average police salary).

Newark is the largest city in the area with only a volunteer fire department. For comparison Tuckerman, with twice the population, has one paid fire fighter to support its volunteer force. Newark will thus need to add a paid fireman at an approximate salary of \$7,829 or increase its volunteer force.

The hospital occupancy rate in the area, shown in Table 33, is low, averaging 53.7 percent in 1976. No new hospitals will be needed. Health manpower in the area is generally adequate (Table 34), with one practicing physician per 1,542 persons, although the state average is one resident physician per 844 persons. The situation is not considered critical by the Bureau of Health Manpower unless the number of doctors drops below one per 4,000 population.³²

2.1.4.4 Requirements for Increased Public School Facilities. There is a wide discrepancy in expenditure per pupil among the 15 school districts in the area, as can be seen in Table 35. Newark is ranked 37th in the state, while Southside is ranked 378th. Student/teacher ratios better reflect the ability of a school system to handle an increase in enrollment. The state average student/teacher ratio is 20.60. The two-county average is 18.55. If the estimated 126 new pupils were evenly distributed throughout the various districts, their impact would be negligible. They will likely,

Footnotes are shown in Appendix I.

however, be concentrated somewhat in three districts: Batesville, Newport and Newark. If they were divided equally, with 42 in each, it would raise the student/teacher ratio in Batesville to 19.63; Newport to 20.91; and Newark to 16.78. All these figures are reasonably near the state average of 20.60. A few additional teachers may be added, but the burden will not be great for any one district. With 20 students per teacher, the 126 new pupils would require six new teachers, if all were to attend a single school district. At an average salary of \$10,000, the additional cost would be \$60,000. Six new classrooms could be added at a cost of from \$70,000 to \$150,000, depending upon how many separate structures would be involved. The Newark school district will gradually derive a great benefit from its 45 mill property tax. From \$534,833 in 1979, this amount is estimated to grow to about \$6.0 million in 1984. (See Exhibit II, Appendix G.) As shown in Table 37, the Newark school district has almost no debt, and has borrowing power in excess of estimated needs for expansion. Batesville, Newport and the other school districts in the impact area are also in generally excellent financial condition, as shown in Tables 37 and 38. These districts will have the burden of additional students, but will also benefit from added property taxes on new dwelling units and increased state subventions due to increased attendance.

2.1.4.5 Impact on Financial Institutions. The earnings of financial institutions in the impact area will be affected in a positive manner during the construction phase of the project as a result of increased deposits and increased demand for loans. Deposit growth during this phase will result primarily from increasing incomes of persons and businesses and rapidly growing tax revenues resulting from additional property and turnback taxes.

An effort was made to estimate the additional income accruing to financial institutions in the region as a result of the construction of the plant facility. An examination was first made of historical relationships between annual total personal income in the area and growth in deposits. It was found that on the average deposits increase by an amount equal to 12.5 percent of the annual personal income. By applying this factor to the projected income growth during the construction phase, it yields an estimated increase in deposits of \$6.2 million (see Table 62). Increased tax revenues during the construction phase will amount to \$27,263,588, all of which it is assumed will show up in deposits of one type or another. This procedure yields an estimated growth in total deposits during construction of \$33,438,588. Assuming the financial institutions will earn a two percent margin on these deposits, this yields an income of \$668,772, which will be added to the area economy by the financial institutions during the construction period.

2.1.4.6 Impact on Minorities. It is estimated that about 50 persons, or about 9 percent of the people expected to move into the impact area, will likely be minorities. This amount was estimated based on the fact that about 8.5 percent of the population in the study area represents minorities.

About 30 non-white workers will be employed during the six years of construction. The amount of the non-white employed workers was derived by assuming that about 3.1 percent of the employed will be non-white. The assumption was based on the fact that the minorities make up 3.1 percent of the labor force in the study area.

The amount of income to be earned by employed non-whites in the six-year period was estimated to be \$2.2 million by multiplying the number of employed non-white workers times the average annual income of craftsmen and labor.

TABLE 62

AN ESTIMATE OF INCOME GENERATED BY
FINANCIAL INSTITUTIONS DURING
CONSTRUCTION PERIOD

Growth in area's income due to AP&L payroll and locally purchased supplies	\$ 49,400,000
Percent of income going to deposits	<u>.125</u>
Deposit growth from income	\$ 6,175,000
Deposit growth from new taxes due to construction of AP&L plant	<u>27,263,588</u>
Total deposit growth	\$ 33,438,588
Income margin	<u>.02</u>
Income attributable to deposit growth	\$ 668,772

SOURCE: Computations provided by the author.

2.1.5 Fiscal Impacts. Table 63 shows the historical data for selected major sources of revenue for the study area. Table G-1, Appendix G, shows historical data for sales tax and personal income tax for the study area from 1970-76. Federal revenue sharing funds for counties and cities was initiated in 1973. The method of computation of the funds to be provided is based on per capita income of the specific area, county or city, population of the area and the taxation efforts made by the county or city. The exact formula to be used for future computations is not available as it is normally a result of a compromise between the two different methods for computation used by the United States Senate and House of Representatives.

The state returns funds to counties and municipalities in two categories, general funds, which may be used for administration purposes, and special funds, which are used for road and street needs. These funds are derived from two major tax bases: a) the general taxes, which include sales and use taxes, personal and corporate income taxes and similar levies; and b) the special taxes, which consist of automobile license fees, gasoline taxes, severance taxes, and like revenues. The principles used for computation of these funds are defined in Acts of Arkansas, Act 750, 1973, which is presented as Exhibit I in Appendix G.

The property taxes shown in Table 63 are the county's share, and do not include taxes levied and collected in each separate school district.

2.1.5.1 Assessed Valuation Changes. The increase in revenues projected for the state and the study area for the construction phase are shown on Table 64. The total revenue gained is about \$30.8 million. This figure excludes a small amount of property tax paid before commencement of construction in 1979. The study area will gain \$27.3 million, mostly from the increase in property taxes from the AP&L plant. Exhibit II in Appendix G shows AP&L's

TABLE 63

REVENUES FROM SELECTED SOURCES FOR BATESVILLE,
NEWPORT, INDEPENDENCE AND JACKSON COUNTIES, AND THE STUDY AREA
FOR YEARS 1970 THROUGH 1976

	1970	1971	1972	1973	1974	1975	1976
Federal Revenue Sharing							
Independence County	--	--	--	\$256,214	\$203,440	\$221,689	\$258,226
Batesville	--	--	--	99,569	59,606	99,641	172,056
Jackson County	--	--	--	405,753	401,912	352,981	291,529
Newport	--	--	--	155,396	150,472	142,198	143,433
Study Area	--	--	--	\$916,932	\$815,430	\$816,509	\$865,244
State Revenue Turn Back							
Independence County	\$216,599	\$292,383	n.a.	\$336,701	\$ 377,289	\$ 371,999	\$ 410,969
Batesville	122,135	135,959	\$149,769	150,772	188,937	189,143	201,377
Jackson County	243,547	262,233	290,603	300,068	340,158	348,061	370,770
Newport	130,325	148,689	162,490	170,056	202,233	195,196	213,558
Study Area	\$712,606	\$839,264	\$602,862	\$957,597	\$1,108,617	\$1,104,399	\$1,196,674
Property Taxes*							
Independence County	\$ 44,565	\$ 44,565	\$ 44,565	\$ 85,379	\$ 85,379	\$ 63,843	\$ 63,843
Jackson County	68,687	74,536	76,438	75,753	78,822	79,856	79,018
Study Area	\$113,252	\$119,101	\$121,003	\$ 161,132	\$ 164,201	\$ 143,699	\$ 142,861
Total Revenues for Study Area	\$825,858	\$958,365	\$723,865	\$2,035,661	\$2,088,248	\$2,064,607	\$2,204,779

Note: Due to method of recording historical data, taxes were averaged for Independence County for reporting period.

*Taxes reported do not include special levies by specific school districts.

Source: Mrs. D. Pearson, County Tax Collector's Office, Independence County, Arkansas.
Mr. J. B. Thompson, County Treasurer, Jackson County, Arkansas.
Mr. M. Smith, City Clerk, Batesville, Arkansas.
Mrs. V. Sherly, County Clerk, Independence County, Arkansas.
Mr. P. Heard, City Clerk, Newport, Arkansas.

TABLE 64

PROJECTED GAINS FROM SELECTED REVENUE SOURCES FOR
ARKANSAS AND THE STUDY AREA DURING THE CONSTRUCTION PHASE

	1979	1980	1981	1982	1983	1984	Total Gain
State Gain:							
Sales Tax	\$ 61,544	\$161,634	\$301,957	\$247,561	\$303,682	\$147,186	\$1,223,564
Automobile License	3,382	3,382	3,382	3,382	3,382	3,382	20,292
Personal Income Tax	101,752	276,652	520,330	448,868	577,854	301,140	2,217,596
Gasoline Tax	<u>10,761</u>	<u>10,761</u>	<u>10,761</u>	<u>10,761</u>	<u>10,761</u>	<u>10,761</u>	<u>64,556</u>
Total	\$177,439	\$452,428	\$836,430	\$710,572	\$895,679	\$462,469	\$3,526,018
Study Area Gain:							
Federal Revenue Sharing	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
State Turnback:							
General	\$ 7,566	\$ 7,946	\$ 8,341	\$ 8,758	\$ 9,195	\$ 9,655	\$ 51,461
Special	12,010	12,608	13,238	13,900	14,594	15,326	81,676
Property Tax:							
Plant*	670,500	1,931,333	3,921,333	5,906,500	6,919,500	7,543,167	26,892,563
Housing	<u>39,648</u>	<u>39,648</u>	<u>39,648</u>	<u>39,648</u>	<u>39,648</u>	<u>39,648</u>	<u>237,888</u>
	\$729,724	\$1,991,535	\$3,982,560	\$5,968,806	\$6,982,937	\$7,607,796	\$27,263,588
Total Annual Gain:	\$907,163	\$2,443,963	\$4,818,990	\$6,679,378	\$7,878,616	\$8,070,265	
Total Gain							\$30,789,606

*Assumes all owners pay pro-rata shares of property taxes on plant

Source: State of Arkansas, Department of Finance and Administration.

Acts of Arkansas. 750,1973.

Arkansas Power and Light Company.

Mrs. J. Moser, County Tax Collector's Office, Independence County.

Mrs. D. Pearson, County Tax Collector's Office, Jackson County.

share (60 percent) of the annual property taxes to be paid on the plant to Newark School District and Independence County. It is assumed, however, that all owners will pay pro rata property taxes on the plant.

Property taxes from the plant were reported by Arkansas Power and Light Company, and were based on the standard 20 percent valuation rate and a total of 56.4 mills for the Newark School District and Independence County. The property taxes from new housing within the study area were calculated by multiplying the estimated number of new residences, 170, by the average value, \$17,350, as shown in section 2.1.3, applying the 20 percent valuation rate, and using a 67.2 millage rate. This millage rate was obtained as a simple average of the rates for each incorporated area within the study area, which is shown in Table G-2, Appendix G.

2.1.5.2 Tax Revenue Changes. Personal income tax is clearly the major contribution to state revenue gains and amounts to over \$2.2 million during the construction phase. This estimate was obtained by dividing the annual construction payroll by the average annual wage of the employees, and then dividing by 12 to obtain an average monthly wage. The standard state tax withholding for a family of three, as shown in Exhibit III of Appendix G, was used to estimate the average monthly withholding. The average monthly withholding was then multiplied by 12 to obtain the annual withholding, which was then multiplied by the average annual construction employment.

The gasoline tax and license fees, estimated to be \$84,858 over the six years of the construction phase, were obtained by first deriving the number of additional vehicles which are expected to be introduced into the area during the construction phase. This was accomplished by assuming an average of 3 persons per household, and then dividing the projected population increase, 534, by this figure, yielding 178 vehicles. The number of vehicles

was then multiplied by \$19, the standard cost of a license. Estimated gasoline taxes were computed by multiplying the number of vehicles by the average yearly miles driven, 9,957, as reported by the Automobile Manufacturers Association. The total annual vehicle miles was then divided by an assumed 14 miles per gallon of gasoline to arrive at the number of gallons of gasoline consumed per year. The results were multiplied by .085, the Arkansas gasoline tax rate. It was assumed that the number of vehicles, miles driven and fuel consumption would remain stable during the construction time period. Not all revenues which would be increased as a result of the gain from both population and payroll in the study area are shown. For example, data for tobacco and alcoholic beverages are not available on a city or county basis; therefore, no base existed for computation of estimated gains.

Revenue gains by the study area are primarily in the area of property taxes, as stated in section 2 above, and comprise over 99 percent of the projected revenue increases. Federal revenue sharing was not projected due to the complexities as described above. Despite the increased level of revenues flowing to the State from the study area, the pooling of all revenues and the use of per capita distribution will not significantly change the funds being returned to the study area from the state turnback program. A simplified method of computation was used to compute the turnback, as a detailed computation using the principles contained in the governing legislation would have required estimating population and income for every municipality and county in Arkansas. Therefore, the monthly per capita turnback for 1977 of \$1.12 general funds and \$1.70 special funds, as reported by the state treasurer's office, was used as the basis for the projection. This per capita amount was multiplied by the projected increased population during the construction phase, 534, and escalated at 5 percent

per year for the construction time period, thus assuming a stable inflation rate.

2.1.5.3 Sales and Use Tax Impacts. As shown on Table 64, sales and use tax amounts to over \$1.2 million during the period of construction. The sales and use tax computation was accomplished by multiplying the annual payroll by the retail sales/personal income ratio, 0.632, developed in section 2.1.2.3, and then multiplying the result by 0.03, the state sales tax rate. Sales taxes paid as a result of retail sales generated due to the multiplier effect on the payrolls are not included because the sales generated due to this effect are not on an annual basis.

2.1.2 Community Cohesion Impacts. In an effort to determine the residents' attitudes and opinions concerning the contemplated construction at the proposed location, a set of factors relating to the human environment was compiled. Nine basic areas were included in the list presented to the questionnaire respondents. These factors may be seen in Table 65.

Each respondent was asked to record an opinion as to the effect the proposed facility might have on each of the factors listed. Three degrees of "effect" were allowed in recording an answer: 1. "Positive effect", 2. "No effect", and 3. "Harmful effect". In addition, an answer of "No opinion" could also be recorded.

2.1.6.1 Estimate of Potential Impacts on Local Communities' Quality of Life Characteristics. The questionnaire sent to area respondents attempted to take into consideration the point that the quality of the human environment acceptable to a group is a matter of opinion. With this in mind, the question posed to the survey respondent asked:

TABLE 65
OPINIONS OF IMPACT AREA RESPONDENTS
CONCERNING EFFECT OF PROPOSED PLANT ON QUALITY OF LIFE CHARACTERISTICS

Quality of Life Characteristics	Ranking of Effect									
	Positive Effect		No Effect		Harmful Effect		No Opinion		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Water (rivers, streams, lakes)	10	15.6	40	62.5	8	12.5	6	9.4	64	100.0
Air (smoke, pollutants, odors)	--	--	43	67.2	7	10.9	14	21.9	64	100.0
Noise levels	1	1.6	53	82.8	3	4.7	7	10.9	64	100.0
Sources of energy	41	64.1	10	15.6	--	--	13	20.3	64	100.0
Natural resources of the area	12	18.8	37	57.8	8	12.5	7	10.9	64	100.0
Traffic on area roads and highways	17	26.6	26	40.6	13	20.3	8	12.5	64	100.0
Recreation sites or wildlife areas	12	18.8	40	62.5	5	7.8	7	10.9	64	100.0
Safety of the community	8	12.5	42	65.6	4	6.3	10	15.6	64	100.0
Cultural or historical factors of the area	<u>20</u>	<u>31.3</u>	<u>34</u>	<u>53.1</u>	<u>2</u>	<u>3.1</u>	<u>8</u>	<u>12.5</u>	<u>64</u>	<u>100.0</u>
COMPOSITE OF ALL CHARACTERISTICS	121	21.0	325	56.4	50	8.7	80	13.9	576	100.0

Source: Survey conducted by the author.

The points included in the following list contribute to the quality of life. If the proposed AP&L plant is constructed in your area, and accepted environmental standards are followed, how do you think each of the listed factors will be effected?

The results of the survey are presented in Table 65. Examination of the tabulated responses shows an evident pattern of positive attitudes on the part of the area residents. Taking into consideration that the answer "No Effect" was actually a positive answer relating to the quality of life characteristics of the area, then the respondents tended to accept the idea that the plant had little negative effect on their community. In fact, taking a composite look at the data shows that only 8.7 percent of the total responses to all characteristics were given as "Harmful Effect".

2.1.7 Summary of the Overall Income Impact of the Construction Phase of AP&L Plant on the Study Area. The overall income gains in the study area in the short run are estimated by adding the income gains in the local economy due to the increase in basic economic activities and income gains from an increase in nonbasic (local) activities.

Table 66 summarizes the total income impact of the construction phase of the AP&L plant.

The basic income gains in the study area from the construction of the AP&L plant were estimated to be \$76.7 million. The multiplied effect of this basic income was estimated to be \$127.3 million. In the long run, this effect can be greater if one considers the local investment multiplier.

TABLE 66

SUMMARY TABLE SHOWING THE TOTAL INCOME
IMPACT OF THE CONSTRUCTION PHASE OF
INDEPENDENCE STEAM ELECTRIC STATION
ON THE STUDY AREA

<u>Basic Income Gains</u>	
Payroll spending	\$ 48,400,000
Locally purchased supplies	1,000,000
Increase in local tax revenues	<u>27,263,588</u>
	\$ 76,663,588
Local Income Multiplier	<u>x 1.66</u>
Total Income Impact	<u>\$127,261,556</u>

Source: Computations by the author.

2.2 OPERATION IMPACTS

In the preceding section 2.1, the impact on the study area of constructing the AP&L plant was analyzed and the results of such an analysis were presented. The impact of payroll and of other basic activities that will occur were studied. It showed that during the six-year construction period an impact of varying degrees at varying times will be generated on the local economy. The economic impact of the construction project will peak during the third to fourth year of construction and after that will steadily decrease. However, before the overall effect of the construction phase is terminated at the end of the sixth year, it will be supplemented by the operation phase, which will begin at a low level during the last two years of the construction phase. This overlap will produce a continuing economic effect on the local economy.

Table 67 shows the type of employment by the AP&L plant over its operation phase. The operating staff is assumed to remain constant at 207 for the life of the plant.

Table 68 shows the annual payroll by AP&L to its employees during the operation phase, 1983-2012. The salaries were figured at a 6 percent escalating rate.

2.2.1 Employment and Population Changes

2.2.1.1 Direct Employment. As Table 67 indicates the direct employment will hold at a constant number of 207 employees. The required employment needs by occupation to man the AP&L plant operations is shown in the last column of Table 69 and compared to the increased regional needs by occupation from 1975 to 1980. The plant's occupational needs will add some pressure on the growing demand for professionals in the district.

TABLE 67

PROPOSED TYPE OF EMPLOYMENT BY INDEPENDENCE
STEAM ELECTRIC STATION DURING ITS OPERATION PHASE

POSITION	
Plant Supt.	1
Asst. Plant Supt.	1
Office Manager	1
Sec. to Supt.	1
Steno-Clerk	1
Clerk-Typist	3
Operations Supvrsr.	1
Shift Supvsrs.	5
Asst. Shift Supvsrs.	5
Train Onloaders	4
Asst. Train Onloaders	4
Coal System Operators	8
Stacker Reclaimers	4
Dozer Operators	8
Trainees	16
Plant Laborers	16
Ash Hauler	8
Ash Pit Operators	4
Plant Operators	4
Asst. Plant Operators	4
Boiler Operators	4
Auxiliary Operators	4
Filter Plant Operator	4
Supvsr. of Plant Maint.	1
Asst. Maint. Supvsr.	2
Sr. Plant Maint. Elect.	1
Plant Maint. Elect.	6
Plant Maint. Elect. Hlprs.	7
Machinist Repairman	1
Plant Repairmen	16
Plant Repairmen Hlprs.	17
Helpers	7
Storekeeper, Plant	2
Stores Supervisor	1
Sr. Inst. Technicians ..	2
Instrument Technicians	9
Instrument Technician Hlpr.	11
Results Engineer	1
Asst. Results Engineer	3
Coal Yard Supvsr.	1
Mechanical Engineer	1
Civil Engineer	1
Electrical Engineer	1
Plant Chemist	1
Clerk Chemist	3
Chemical Engineer	1
	<u>207</u>

Source: Arkansas Power and Light Company

TABLE 68
PROPOSED ANNUAL PAYROLL BY AP&L TO ITS EMPLOYEES
DURING THE OPERATION PHASE, 1983 TO 2012

Year	Average Monthly Salary ¹	Annual Payroll
1983	\$1,523	\$3,026,506
1984	1,614	4,009,176
1985	1,711	4,250,124
1986	1,814	4,505,976
1987	1,923	4,776,732
1988	2,038	5,062,392
1989	2,160	5,365,440
1990	2,290	5,688,360
1991	2,427	6,028,668
1992	2,573	6,391,332
1993	2,727	6,773,868
1994	2,891	7,181,244
1995	3,064	7,610,976
1996	3,248	8,068,032
1997	3,443	8,552,412
1998	3,649	9,064,116
1999	3,868	9,608,112
2000	4,100	10,184,400
2001	4,346	10,795,464
2002	4,607	11,443,788
2003	4,884	12,131,856
2004	5,177	12,859,668
2005	5,487	13,629,708
2006	5,817	14,449,428
2007	6,166	15,316,344
2008	6,536	16,235,424
2009	6,928	17,209,152
2010	7,344	18,242,496
2011	7,784	19,335,456
2012	8,251	20,495,484

¹Salaries escalate at 6% per year. The operating staff remains constant at 207 for life of plant.

Source: Arkansas Power and Light Company.

TABLE 69

EMPLOYMENT PROJECTIONS BY OCCUPATION
WHITE RIVER PLANNING AND DEVELOPMENT DISTRICT
AND AP&L PLANT
1975-1980

Occupation	1975	1980	Change 1975-80	Employment by AP&L
Total, All Occupations	46,025	51,575	5,550	207
Professional, Technical	4,025	4,425	400	82
Managers, Officials, Proprietors	4,325	5,250	925	3
Sales Workers	2,975	3,575	600	--
Clerical Workers	4,625	5,425	800	7
Craftsmen, Foremen	7,050	8,300	1,250	31
Operators	10,850	12,450	1,600	52
Service Workers	5,250	5,600	350	9
Laborers, Except Farm	2,525	2,750	225	23
Farmers and Farm Workers	4,400	3,800	-600	--

Source: Research & Statistics Section, Arkansas Employment Security Division,
Manpower Projections, North Central Arkansas Manpower Planning Area, October, 1975.

Since the labor supply for the same period is not available and the fact that the Arkansas Eastman Plant has already employed a large number of locally available professionals, the AP&L will need to either train on the job or bring in professionals from outside the study area.

Based on the increasing demand for professional, technical, managers, craftsmen, foremen and operatives in the area, the Arkansas Eastman plant and other firms' experience, it could be suggested that about 60 percent of professional, technical, managers, craftsmen, foremen and operatives need to be recruited from outside the study area. It is estimated that about 100 ($168 \times .60$) highly skilled personnel will be hired from outside the area.

A survey was conducted on July 20, 1977, of vehicle license plates of employees of the Arkansas Eastman Plant, located 13 miles southeast of Batesville. The results are shown in Table 70. The 127 vehicles surveyed were registered in 30 separate locations. Batesville accounted for 60 percent of the total vehicle registrations; however, 21 vehicles were registered in cities outside the study area. Additionally, it was observed at the time of the survey that 30 residences in the \$50,000 plus cost range were located outside of Batesville, at the intersection of Gap Road and Highway 69, an area close to the plant. Several of the houses were in the final stages of construction and the remainder appeared recently completed. The number of vehicles still registered outside the study area, the number of medium to high income houses recently constructed near the Arkansas Eastman plant, and the limited number of highly qualified technical workers available in the area validates the assumption that more than half of the professional and technical employees will be recruited from outside the area.

TABLE 70

ARKANSAS EASTMAN EMPLOYEE VEHICLE REGISTRATION
BY PLACE AND NUMBER
JULY, 1977

Place	Number
Amity	1
Augusta	1
Batesville	76
Bradford	2
Cave City	4
Concord	3
Desha	3
Fayetteville	1
Floral	1
Forrest City	1
Hardy	1
Jacksonville	1
Little Rock	2
Locust Grove	3
Magness	2
Mammoth Spring	1
Marmaduke	1
Marked Tree	1
Mt. Pleasant	2
Newark	2
Newport	5
Oil Trough	2
Pangburn	1
Quitman	1
Siloam Springs	1
Smithville	1
Strawberry	1
Sulphur Rock	2
Thida	2
Tuckerman	2
Total	127

Source: Survey by author.
Arkansas Motor Vehicle Division.

2.2.1.2 Induced Employment. In deriving the induced employment, the employment multiplier (1.12) was applied to the number employed at the plant during its operation phase (207). The induced employment is figured to be about 232 (207×1.12). The effect of such an employment on the area's total employment and unemployment picture which existed during the construction phase will be limited, if any, because it will offset the number of workers laid off upon the completion of the construction of the plant.

2.2.1.3 Projected Population Changes. It was estimated in a previous section of this report that about 534 persons will move into the area as a result of the construction of the plant. The operation phase of the plant will possibly add 300 people ($100 \text{ workers} \times 3 \text{ persons per family}$). This will be less than the number of persons that moved into the area during the construction period. Thus, the long term effect on population will be negligible, assuming that upon completion of the construction phase the majority of the persons who moved into the area will move out seeking other employment opportunities. The net increase in study area population due to the project, therefore, is estimated to be on the order of around 400 persons.

2.2.2 Income and Spending Changes

2.2.2.1 Direct Income and Spending Changes. As Table 68 shows, the annual payroll for the operation of the plant will begin with \$3,026,506 in the first year and will reach the amount of \$20,495,484 in 2012. Salaries were figured on an escalated rate of 6 percent per year. These payrolls are expressed in future values. The following payroll data shows the same information as that shown in Table 68, but aggregated in three different time periods (decades).

PROPOSED PAYROLL BY DECADE

1983 - 1989	\$ 30,996,346
1990 - 1999	74,967,120
2000 - 2012	<u>192,328,668</u>

Total Payroll, 1983 - 2012	\$298,292,134
----------------------------	---------------

The above information shows that payroll during the 1980's will be about \$31 million, in the 1990's it will be about \$75 million, and from 2000-2012 it will be about \$192.3 million. The total amount of payroll over the life of the plant (1983-2012) will be about \$298.3 million.

2.2.2 Indirect (Induced) Income and Spending Changes. The induced income produced by the operation payroll during the life of the plant can be determined by applying to the annual payrolls the 80 percent spending rate for local residents and the estimated income multiplier (1.66). It is assumed that this local income multiplier will remain constant in the future due to the fact that the urban-rural makeup of the area will not change substantially during the projected period (see Table 43). By applying the local income multiplier (1.66) to the portion of annual payroll spent locally (80 percent), the induced annual income is derived. Table 71 shows the annual payrolls and the estimated induced annual incomes from 1983-2012. It was estimated that the induced income, as a result of the \$298.3 million payroll from 1983-2012, will be over \$396.1 million. In addition to payroll, other basic income will be generated by the AP&L plant. As shown later in Table 75 the other basic incomes are: Locally purchased supplies, \$4.5 million, and increase in local tax revenues, \$229.2 million. Thus the total basic income generated by the AP&L plant over its operation phase will be equal to about \$472.4 million. Applying the 1.66 income multiplier to the estimated total basic income (\$472.4 million), the total induced

TABLE 71

ANNUAL PAYROLL DURING THE OPERATION, PHASE
AND ESTIMATES OF MULTIPLIER EFFECT
1983 TO 2012

Year	Annual Payroll	Induced Income- Multiplier Effect of Payroll		
1983	\$ 3,026,506		\$ 4,019,200	
1984	4,009,176		5,324,186	
1985	4,250,124		5,644,164	
1986	4,505,976		5,983,936	
1987	4,776,732		6,343,500	
1988	5,062,392		6,722,856	
1989	5,365,440		7,125,304	
Subtotal		\$30,996,346		\$ 41,163,146
1990	5,688,360		7,554,142	
1991	6,028,668		8,006,071	
1992	6,391,332		8,487,689	
1993	6,773,868		8,995,697	
1994	7,181,244		9,536,692	
1995	7,610,976		10,107,376	
1996	8,068,032		10,714,346	
1997	8,552,412		11,357,603	
1998	9,064,116		12,037,146	
1999	9,608,112		12,759,572	
Subtotal		\$ 74,967,120		\$ 99,556,335
2000	10,184,400		13,524,883	
2001	10,795,464		14,336,376	
2002	11,443,788		15,197,350	
2003	12,131,856		16,111,104	
2004	12,859,668		17,077,638	
2005	13,629,708		18,100,251	
2006	14,449,428		19,188,839	
2007	15,316,344		20,340,104	
2008	16,235,424		21,560,642	
2009	17,209,152		22,853,752	
2010	18,242,496		24,226,033	
2011	19,335,456		25,677,484	
2012	20,495,486		27,218,004	
Subtotal		192,328,668		255,412,470
Total	\$ 298,292,134	\$ 298,292,134	\$ 396,131,951	\$ 396,131,951

Source: Table 68, and estimates by the author.

income for the study area is derived. This total induced income is estimated to be \$783.8 million; i.e., $\$472.2 \text{ million} \times 1.66 = \783.8 million .

The overall induced income of the study area is expected to increase over the life of the plant (1983-2012) by about \$783.8 million. About \$310.9 million will be derived as a result of the consumption multiplier effect applied to total basic activities (again, refer to Table 75). If, in addition to the consumption multiplier, the local investment multiplier is applied to the total basic activity, the overall effect on the local economy could be greater than \$783.8 million.

2.2.2.3 Impact on Retail Sales. The operation of the AP&L plant will affect positively the retail sales of the study area. The basic income earned from the operation of the plant in terms of payrolls has been determined to be about \$238.6 million over the 30-year operation phase. This amount will increase the retail sales during the same period by about \$150.8 million. The increase in retail sales was derived by multiplying the retail sales/personal income ratio (0.632), as it was determined in section 2.1.2.3, by the additional income earned (\$238.6 million). Thus, the increase in retail sales during the 30-year operational period of the plant is figured to be \$150.8 million as follows:

$$\$238.6 \text{ million} \times 0.632 = \$150.8$$

To be more realistic, however, the total effect of the increase in income on retail sales must be determined on income derived in the area after the income multiplier is applied. Thus, by applying the average rate of income spent on retail sales of 0.632 to the total induced income of \$784.1 million, retail sales will increase by an estimated amount of \$495.6 million over the 30-year operation period of the plant. Table 72 shows the estimated sales gained due to increase in income in the study area.

TABLE 72

ESTIMATED RETAIL SALES GAINED DUE TO INCOMES
OVER THE OPERATION PHASE

(In Thousands of Dollars)

	Increase in Retail Sales
Due to Income Increase	\$150.8
Additional Increase due to Multiplier Effect	<u>344.8</u>
Total Increase of Retail Sales Due to Increase in Income	\$495.6

2.2.3 Housing Impacts

2.2.3.1 Estimated New Housing Investments. It was estimated in the employment section that AP&L, during the operation phase, will need to hire about 100 employees from outside the study area. Due to the employment status of these employees, most of them being engineers, managers or supervisors, more expensive housing facilities will be demanded than for the workers during the construction phase. Thus, neither the mobile homes (120 units) nor the rather inexpensive housing (50 units) suggested to be built during the construction phase will satisfy the needs of these employees.

It is possible, however, that about half of the houses (25 units) constructed to meet the needs of construction workers will be purchased by some of the employees of the operation phase of the project. If such is the case, then about 75 more housing units of about \$50,000 each will be needed.

The estimated investment in such a housing project will be approximately
 $\$3,750,000 = (\$50,000 \times 75)$.

Another factor to be considered with regard to the new housing investment is the impact that this investment will have on tax revenues. Due to the creation of new real estate property, the property taxes collected will increase. It is estimated that the \$3.75 million new housing project will contribute about \$50,400 annually to the property tax revenues of the area. This amount was figured by assessing the new property at 20 percent of value. That is, $\$3,750,000 \times .20 = \$750,000$. The assessed value is multiplied by 67.2 mills to get the property taxes for the new housing units. This rate is the same as that used for projecting property taxes during the construction phase, and it is assumed to remain constant during the operation phase of the power plant.

2.2.4 Public Service Impacts. This section treats the impact on the public sector of the previously estimated changes in employment, population, housing and other factors during the operation phase of the new plant. The report has previously estimated that about 534 persons will move into the area during the construction phase. The operation phase will add approximately 300 people. This number is less than the number moved in during the construction phase, thus the effect of the operation phase on population will be less than the construction phase. In other words, there will be a decline in population from the average impact over the construction period. This permanent increase in population has been estimated to be around 400 persons.

2.2.4.1 Utilities. Utilities such as water systems and wastewater treatment facilities which have been built up to support the construction phase will support the operations phase.

2.2.4.2 Public Safety. Fire and police protection, which increased somewhat during the construction phase, will now be adequate. Hospitals and health service in the area will be adequate to support the estimated population during this phase.

2.2.4.3 Public Schools. The rapid increase in property tax paid to the Newark school district should exceed any possible needs for expansion. The burden of increased pupil population which occurred during the construction phase now is reversed as the benefits of new taxes appear. Other school districts in the area will receive some spillover property tax benefits from increased property values in their boundaries, plus increases in state subventions, which should be sufficient to offset their increases in school population.

2.2.4.4 Financial Institutions. The earnings of financial institutions of the area will be elevated to higher levels after the construction of this facility. The results of the analysis of the additional income accruing to these institutions are presented in Table 73. Area income growth resulting from the new facility and calculated over the operating phase amounts to \$243,133,707, including locally purchased supplies. As discussed earlier in this report, about 12.5 percent of the additional income can be expected to be added to deposits of financial institutions. This deposit growth is expected to be about \$30,391,713, resulting from the operation of the new generating facility during the period 1983 to 2012.

TABLE 73

AN ESTIMATE OF INCOME GENERATED
BY FINANCIAL INSTITUTIONS DURING
OPERATION PERIOD

Growth in area income due to AP&L payroll and locally purchased supplies	\$243,133,707
Percent of income going to deposits	<u>.125</u>
Deposit growth from income	\$ 30,391,713
Deposit growth from new taxes due to AP&L plant	<u>229,236,420</u>
Total deposit growth	259,628,133
Income margin	<u>.02</u>
Income attributed to deposit growth	<u><u>5,192,563</u></u>

Source: Computations provided by the author.

Growth in property taxes and turnback taxes resulting from this development during the operational period of the plant will total about \$229,236,420. It is assumed that all these taxes will be deposited in some form. Therefore, total deposit growth resulting from this endeavor will be about \$259,628,133. If it is assumed that a two-percent margin is earned on these additional deposits, some \$5,192,563 in additional income will be added to the earnings of the local financial institutions.

2.2.5 Fiscal Impacts

2.2.5.1 Property Taxes. As was seen in the construction phase, the bulk of the revenues generated for the study area is the result of the property taxes on the proposed plant. As Table 74 shows, about \$229.0 million in revenues is expected to be received within the study area. Of this amount, more than \$226.9 million in property taxes goes to the Newark School District and Independence County. The tax rate of 56.4 mills was assumed to remain stable during the time period the plant will operate.

Property taxes for new residential construction which is projected to occur to meet the needs of the professional employees of the plant during the operation are estimated to be over \$1.5 million. This was calculated by using the housing valuation estimated to be \$750,000. The assessed valuation of new housing was multiplied by the average tax rate of 67.2 mills, as shown in Table G-2, Appendix G. A constant tax rate over the time period of plant operation was assumed.

2.2.5.2 Sales and Use Tax and Other Taxes. The total tax revenues generated by the operation of the power plant throughout its expected 30-year life exceed \$1.1 billion. The state and federal governments receive approximately 80 percent of these revenues and the study area 20 percent. Arkansas

TABLE 74

PROJECTED GAINS FROM SELECTED REVENUE SOURCES FOR
ARKANSAS AND THE STUDY AREA DURING THE OPERATION PHASE

	1985 Revenue	Total Revenue for 30 Years Life of the Plant
State Gain:		
Sales Tax (power sales and coal supply):	\$12,089,500	\$362,685,000
Automobile license	3,382	101,460
Personal income tax	150,232	11,875,840
Corporate income tax	18,136,000	544,080,000
Gasoline tax	<u>10,761</u>	<u>322,830</u>
Total	\$30,389,875	\$919,065,130
Study Area Gain:		
Federal Revenue Sharing:	n.a.	n.a.
State Turnback:		
General	\$ 7,232	216,966
Special	11,480	344,405
Property Tax:		
Plant*	7,565,833	226,974,990
Housing	<u>50,400</u>	<u>1,512,000</u>
Total	\$7,634,945	\$299,048,361
Total Annual Gain:	\$38,024,820	
Total Gain During Life of Plant:		\$1,148,113,491

*Assume all owners will pay pro-rata shares of property taxes.

Source: Arkansas Power and Light
 State of Arkansas, Department of Finance and Administration
 State of Arkansas, Treasurer
 Automobile Manufacturers Association, 1971 Automobile Facts and Figures, (Detroit, Michigan)
 Computation by author.

Power and Light estimated that the sales taxes on fuel consumed each year would amount to \$3,334,000, and the sales tax on fuel inventory would be \$843,000, as shown in Exhibit IV, Appendix G. Sales taxes arising from payroll spending and local procurements are estimated to amount to around \$462,500 per year when the plant becomes fully operational. Sales tax revenue generated by sales of power to ultimate customers has been estimated at about \$7.45 million per year when both units are in full operation (on the basis of projected average rates per KWH in 1983-85 (see Exhibit V, Appendix G)).

The tax revenues from automobile operation by project personnel was assumed to remain the same as for the construction phase, that is, 178 automobiles, each driving 9,957 miles per year, averaging 14 miles per gallon of gasoline, with the gasoline tax rate and license fee also remaining stable at .085 and \$19 respectively.

Federal revenue sharing funds for the area were not estimated for the same reasons they were not estimated for the construction phase of the operation; that is, no constant formula for computation is available.

State turnback funds projected for the study area during the operation phase are projected to decline somewhat on an annual basis from the construction phase average level. Assuming a net population increase of 500 persons, turnback funds in 1985 are projected to amount to about \$18,712. Over the 30-year period at that rate they would total over \$561 thousand.

2.2.5.3 Income Taxes on Additional Power Sales. Estimated State and Federal Corporate Income Taxes generated by the plant operation were provided by Arkansas Power and Light Company (see Exhibit V, Appendix G). These revenues are expected to be over \$18 million per year after Unit 2 comes on stream in 1985. These estimates were based on 40 percent ownership by

Arkansas Electrical Cooperative Company, and Jonesboro City Water and Light Company, neither of which pay income taxes. Income tax revenues for the 30-year life of the plant at that level would amount to over \$544 million (see Table 74).

Estimates of the personal income tax paid by the employees amounts to over \$11.8 million during the operation phase of the plant. The estimate was obtained by use of the average monthly employee wage, a family of 3, and the standard withholding for Arkansas income tax, as shown in Exhibit III, Appendix G. As Arkansas Power and Light Company projected a 6 percent per year increase in pay during each year of operation, the income tax was escalated at this same rate. This calculation assumes that the tax rate will remain stable during the period of operation.

2.2.6 Community Cohesion Impacts. There is no doubt about the fact that an undertaking of this magnitude will have a profound effect on the study area. Survey results show, however, that the vast majority of the respondents held the opinion that their progressive communities will willingly accept the plant and the workers into their area. Although several newspaper articles have played on the mixed emotions held by the residents concerning the announcement of the AP&L plant (Exhibits VII, VIII, IX, X, XI and XII, Appendix H), the results of the attitude survey show that positive opinions are held by the vast majority. In fact, a quote made by the Major of Newark, Rosemary Williams, in a recent "Commercial Appeal" article (see Exhibit VIII, Appendix H) stated:

But we can't mess up progress for a few people. There are those who are making their living here that were born and raised here--and their ancestors were here--and they need something too.

They feel their children are growing up and going to college and then going somewhere else to live.

Why, my three boys don't live here because they have better jobs elsewhere.

There is no doubt about the fact that the construction of the AP&L plant will provide area residents with the "better jobs" mentioned by Mayor Williams. With these jobs will come increased personal incomes, improved roads, better schools, and greater levels of community services. All of these improvements will be forthcoming while, in the opinion of the vast majority of residents surveyed, there will be no significant decrease in the quality of life.

SUMMARY OF THE OVERALL INCOME IMPACT OF THE OPERATION
PHASE OF THE AP&L PLANT ON THE STUDY AREA

The overall impact that the operation of the AP&L plant will have on the study area is summarized in the following Table 75.

TABLE 75

SUMMARY OF THE TOTAL INCOME IMPACT OF THE
OPERATION PHASE OF THE AP&L PLANT ON THE STUDY AREA

	Amount
Basic Income Gains:	
Payroll	\$238,633,707
Increase in Local Tax Revenues	229,048,361
Locally Purchases Supplies	
(\$150,000 per year for 30 years)	4,500,000
	\$472,182,068
Local Income Multiplier	x 1.66
Total Local Income Gained from	
Basic Activities	\$783,822,233

Source: Computations by the author.

The basic income gains in the study area over the operation life of the plant were estimated to be about \$472.2 million. About \$238.6 million will represent payroll payments; about \$229.0 million will be mostly additional property tax revenues; and about \$4.5 million will be for locally purchased supplies. The latter amount was estimated by assuming that the AP&L plant will purchase locally about \$150,000 per year in supplies. In 30 years the locally purchased supplies will amount to \$4.5 million.

SUMMARY OF THE TOTAL INCOME IMPACT OF THE
CONSTRUCTION AND OPERATION PHASES OF THE
AP&L PLANT ON THE STUDY AREA

The following Table 76 shows the combined income impact of the construction and operation phases of the AP&L plant on the study area.

TABLE 76

SUMMARY OF THE TOTAL INCOME IMPACT OF THE
CONSTRUCTION AND OPERATION PHASES OF THE
AP&L PLANT ON THE STUDY AREA

Basic Income Gains:	
Payroll	\$287,033,707
Increase in Local Tax Revenues	256,311,949
Locally Purchased Supplies	<u>5,500,000</u>
Total	\$548,845,656
	<u>x 1.66</u>
Total Local Income Gained	
from Basic Activities	\$911,083,789

Source: Computations by the author

It was estimated that the combined income impact on the study area will be about \$911.1 million. The AP&L plant over its life will generate about \$548.8 million of additional basic income in the study area.

APPENDIX A

DELINEATION OF THE STUDY AREA

TABLE A-1.
ACREAGE OF DEVELOPED AREA BY LAND USE CATEGORY
FOR INDEPENDENCE, JACKSON AND STUDY AREA
1976

Land Use Category	Independence	Jackson	Study Area
Residential	3,459	2,471	5,930
Commercial	988	494	1,482
Industrial	494	988	1,482
Extractive	494	0	494
Strip & Clustered Settlement	2,965	2,224	5,189
Open Space	254,519	78,085	332,604
Agricultural	231,785	336,558	568,343
Institutional	247	494	741
Transportation, Utilities	494	247	741
TOTAL	495,445	421,561	917,006

Source: Soil Conservation Service

TABLE A-2
POPULATION, BY TOWN
INDEPENDENCE COUNTY

Town	Population		
	1960	1970	1977*
Batesville	6,207	7,209	7,209
Newark	728	849	849
Desha		600	
Oil Trough	237	524	524
Salado	250	449 ^T	
Cushman		427	427
Locust Grove		300	
Sulphur Rock	225	224	290
Rosie	150	256 ^T	
Pleasant Plains	112	162	162
Magness	140	139	139
Moorefield	-	127	127

*Latest available data; largely represents 1970 Census.

T = Township

Source: Industrial Research and Extension Center, Population Growth of Arkansas' Towns and Cities: 1940 to Present.

TABLE A-3
POPULATION, BY TOWN
JACKSON COUNTY

Town	Population		
	1960	1970	1977*
Newport	7,007	7,725	7,854
Tuckerman	1,539	1,731	1,731
Swifton	601	703	703
Diaz	348	283	674
Grubbs	360	442	442
Jacksonport	-	306	306
Tupelo	201	246	246
Campbell Station	140	218	218
Beedeville	-	144	144
Amagon	234	136	136
Weldon	-	133	133

*Latest available data; largely represents 1970 Census.

Source: Industrial Research and Extension Center, Population Growth of Arkansas' Towns and Cities: 1940 to Present.

APPENDIX B

EMPLOYMENT

TABLE B-1

ESTIMATED QUARTERLY EMPLOYMENT BY CRAFT DURING CONSTRUCTION

Quarter	Year	Carpenters	Iron workers	Painters	Electricians	Boiler- makers	Mill- wrights	Pipe- fitters	Insulators	Operators	Laborers	Total
1	1979	10	8	2	2	2	4	4	-	5	10	50
2	1979	15	25	4	9	8	8	12	-	10	19	110
3	1979	17	36	5	14	20	12	20	-	17	39	180
4	1979	28	47	7	20	25	15	23	-	17	78	260
1	1980	32	56	8	22	33	17	27	5	17	113	330
2	1980	33	65	9	26	41	21	33	8	21	153	410
3	1980	35	77	10	30	46	25	39	10	24	184	480
4	1980	40	82	12	34	55	29	44	12	28	214	550
1	1981	46	98	13	39	65	33	52	13	33	248	640
2	1981	58	125	16	50	83	42	66	17	42	331	830
3	1981	63	136	18	54	90	45	72	18	45	353	905
4	1981	58	124	16	50	83	42	66	17	42	342	840
1	1982	48	104	14	42	67	34	54	14	34	249	660
2	1982	37	79	11	32	53	27	42	11	26	212	530
3	1982	39	82	12	33	56	29	44	11	28	221	560
4	1982	46	98	13	39	65	33	52	13	33	258	650
1	1983	45	100	14	40	66	35	56	15	37	282	690
2	1983	48	112	16	44	73	38	59	15	40	295	740
3	1983	45	110	15	41	70	35	57	15	40	292	720
4	1983	46	98	13	39	65	33	52	13	33	248	640
1	1984	37	79	11	32	53	27	42	11	26	212	530
2	1984	33	56	8	24	27	16	30	15	20	121	350
3	1984	10	35	5	20	15	12	25	17	17	24	180
4	1984	2	8	2	16	-	-	3	18	3	8	60

Source: Arkansas Power and Light Company.

TABLE B-2

PROPOSED TYPE OF EMPLOYMENT BY INDEPENDENCE
STEAM ELECTRIC STATION DURING ITS OPERATION PHASE

POSITION	
<hr/>	
Plant Supt.	1
Asst. Plant Supt.	1
Office Manager	1
Sec. to Supt.	1
Steno-Clerk	1
Clerk-Typist	3
Operations Supvrsr.	1
Shift Supvrsr.	5
Asst. Shift Supvrsr.	5
Train Onloaders	4
Asst. Train Onloaders	4
Coal System Operators	8
Stacker Reclaimers	4
Dozer Operators	8
Trainees	16
Plant Laborers	16
Ash Hauler	8
Ash Pit Operators	4
Plant Operators	4
Asst. Plant Operators	4
Boiler Operators	4
Auxiliary Operators	4
Filter Plant Operator	4
Supvrsr. of Plant Maint.	1
Asst. Maint. Supvrsr.	2
Sr. Plant Maint. Elect.	1
Plant Maint. Elect.	6
Plant Maint. Elect. Hlprs.	7
Machinist Repairman	1
Plant Repairmen	16
Plant Repairmen Hlprs.	17
Helpers	7
Storekeeper, Plant	2
Stores Supervisor	1
Sr. Inst. Technicians	2
Instrument Technicians	9
Instrument Technician Hlpr.	11
Results Engineer	1
Asst. Results Engineer	3
Coal Yard Supvrsr.	1
Mechanical Engineer	1
Civil Engineer	1
Electrical Engineer	1
Plant Chemist	1
Clerk Chemist	3
Chemical Engineer	1
	<hr/>
	207

Source: Arkansas Power and Light Company

EXHIBIT I

INTERVIEW WITH CONSTRUCTION SUPERVISOR OF
ARKANSAS EASTMAN PLANT AS TO THE
AVAILABILITY OF LOCAL LABOR

Date: July 20, 1977. Interview of Mr. A. C. Roden, Daniels International, Contractor for Construction of Eastman Kodak Plant.

General: The Eastman Kodak Chemical plant is comparable to the type of plant AP&L will build from the standpoint of quantity, type and skill level of the workers used for the construction. There were just over 800 workers employed at the peak of the construction at Eastman.

The construction was non-union, open-shop.

Personnel: Mr. Roden stated that he did not use a single qualified boiler-maker on the job, but trained unskilled laborers, who proved to be quickly and easily trained, and produced exceptionally high quality products in less than the pre-planned time for construction. Additionally, he trained pipe fitters and welders.

He noted that the hardest to obtain crafts were pipe fitters and electricians. Of the total employees, 40% came from the local area and 60% from outside the area. He defined the local area as including the workers who commuted as much as 50 miles one way. He used about 400 pipe fitters and welders; approximately 160 came from the local area. Of the 150 electricians employed, about 55 came from the local area.

Boilermakers were all local.
Ironworkers - easiest to man.
Operators were plentiful.
Millwrights were plentiful.
Carpenters - not too plentiful but enough.

EXHIBIT I (Continued)

Comment: Due to the recent completion of the Eastman construction, there is a high probability that the workers trained by Daniel International are still available within the area. The 40%-60% ratio of local to imported labor appears to be a valid figure for all major construction outside the Little Rock-Pine Bluff area as it was estimated by local contractors (Jonesboro) and confirmed by Mr. Roden for the Eastman contract.

APPENDIX C

INCOME

TABLE C-1
PERSONAL INCOME BY MAJOR SOURCES
FOR INDEPENDENCE COUNTY
1970-1974
(In Thousands of Dollars)

	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
By Type					
Wage & Salary Disbursements	33,110	36,347	41,276	47,061	50,237
Other Labor Income	2,615	2,960	3,438	3,889	4,312
Proprietors Income	10,252	10,215	12,668	19,650	16,603
Farm	5,263	5,047	6,657	12,592	9,143
NonFarm	4,989	5,168	6,011	7,058	7,460
By Industry					
Farm	6,287	5,978	7,573	13,566	10,123
NonFarm	39,690	43,544	49,809	57,034	61,029
Private	34,938	38,271	44,118	50,678	53,940
Manufacturing	15,748	16,727	19,732	24,066	26,842
Contract Construction	1,217	1,606	1,835	1,806	1,938
Wholesale & Retail Trade	7,537	8,559	9,652	10,812	10,977
Fin., Ins., & Real Estate	1,149	1,295	1,453	1,528	1,543
Transp., Comm., & Pub. Utl.	2,142	2,441	2,929	3,041	3,096
Services	6,056	6,335	7,323	8,121	8,384
Other Industries	846	964	912	938	847
Government	4,752	5,273	5,691	6,356	7,089
Federal, Civilian	1,169	1,290	1,403	1,633	1,800
Federal, Military	275	380	395	404	445
State & Local	3,308	3,603	3,888	4,319	4,844
Total Population (Thousands)	22.8	23.7	24.4	24.3	24.5
Per Capita Income	2,669	2,802	3,093	3,747	3,915
Total Labor & Proprietors					
Income (by place of work)	45,977	49,522	57,382	70,600	71,152
Less: Personal Contr. to SS	1,779	2,166	2,580	3,317	3,664
Net Labor & Proprietors					
Income (by place of work)	44,198	47,356	54,802	67,283	67,488
Residence Adjustment	-656	-660	-737	-812	-731
Net Labor & Proprietors					
Income (by Place of res.)	43,542	46,696	54,065	66,471	66,757
+Dividends	7,599	8,244	9,062	10,391	11,599
+Transfer Payments	9,783	11,383	12,347	14,356	17,567
Pers. Inc. by Place of Res.	60,924	66,323	75,474	91,218	95,923

Source: Bureau of Economic Analysis, Regional Economics Information Systems, Arkansas Employment Security Division.

TABLE C-2

PERSONAL INCOME BY MAJOR SOURCES

FOR JACKSON COUNTY

1970-1974

(In Thousands of Dollars)

	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
By Type					
Wage & Salary Disbursements	26,969	29,620	33,342	37,899	42,532
Other Labor Income	1,796	2,184	2,668	3,028	3,459
Proprietors Income	17,788	13,360	14,009	24,711	26,213
Farm	13,989	9,442	9,539	19,494	20,694
NonFarm	3,799	3,918	4,470	5,217	5,519
By Industry					
Farm	16,666	11,880	11,940	22,048	23,259
NonFarm	29,887	33,284	38,079	43,590	48,945
Private	26,043	29,040	33,495	38,452	43,315
Manufacturing	8,138	10,472	13,567	16,338	17,030
Contract Construction	2,675	2,444	2,455	2,574	3,212
Wholesale & Retail Trade	6,404	6,727	7,189	7,761	9,268
Fin., Ins., & Real Estate	1,300	1,442	1,535	1,577	1,940
Transp., Comm., & Pub. Utl.	2,706	2,794	2,880	3,423	4,032
Services	4,514	4,888	5,560	6,456	7,486
Other Industries	306	273	309	323	347
Government	3,844	4,244	4,584	5,138	5,630
Federal, Civilian	603	596	636	779	767
Federal, Military	257	353	353	362	396
State & Local	2,984	3,295	3,595	3,997	4,467
Total Population (Thousands)	20.5	21.4	21.6	21.5	21.7
Per Capita Income	2,854	2,743	2,989	3,808	4,206
Total Labor & Proprietors Income (by place of work)	46,553	45,164	50,019	65,638	72,204
Less: Personal Contr. to SS	1,477	1,658	2,012	2,586	3,012
Net Labor & Proprietors Income (by place of work)	45,076	43,506	48,007	63,052	69,192
Residence Adjustment	-1,095	-1,272	-1,504	-1,714	-1,989
Net Labor & Proprietors Income (by Place of res.)	43,981	42,234	46,503	61,338	67,203
+Dividends	6,371	6,808	7,494	8,507	9,491
+Transfer Payments	8,287	9,516	10,565	12,152	14,447
Pers. Inc. by Place of Res.	58,639	58,558	64,562	81,997	91,141

Source: Bureau of Economic Analysis, Regional Economics Information Systems, Arkansas
Employment Security Division.

APPENDIX D

RETAIL SALES

TABLE D-1
RETAIL SALES
FOR COUNTIES AND MAJOR TOWNS WITHIN THE
WHITE RIVER PLANNING AND DEVELOPMENT DISTRICT
1963-1967-1972

County	1963 (000)	1967 (000)	1972 (000)
Cleburne	\$ 7,719	\$ 11,161	\$ 25,933
Fulton	5,226	5,619	7,656
Independence	21,882	28,368	47,105
Batesville	19,281	23,416	41,718
Izard	3,554	6,764	10,773
Jackson	31,107	33,159	41,420
Newport	25,401	24,650	33,334
Sharp	3,993	5,851	10,671
Stone	4,714	7,302	8,596
Van Buren	4,508	6,626	10,653
White	36,847	48,147	76,287
Searcy	21,914	25,460	49,999
Woodruff	<u>10,831</u>	<u>13,401</u>	<u>11,690</u>
Total	130,381	166,398	250,784

Source: U. S. Department of Commerce, Bureau of Census, 1963 Census of Business, Retail Trade Area Statistics, Vol. II, Part 1, Section 5, Table 3.
U. S. Department of Commerce, Bureau of Census, 1967 Census of Business, Retail Trade Area Statistics, Vol. II, Part 1, Section 5, Table 3.
U. S. Department of Commerce, Bureau of Census, 1972 Census of Business, Retail Trade Area Statistics, Vol. II, Part 1, Section 4, Table 6.

TABLE D-2
 SALES TAX RECEIPTS - INDEPENDENCE COUNTY,
 JACKSON COUNTY AND STUDY AREA - 1970-1976

Year	Study Area	Independence	Jackson
1970	\$1,792,201.00	\$ 875,767.30	\$ 916,433.70
1971	2,158,938.00	1,053,721.63	1,105,216.49
1972	2,445,706.00	1,238,853.94	1,206,851.58
1973	2,797,645.00	1,476,816.13	1,320,828.77
1974	3,110,228.00	1,542,492.00	1,567,736.12
1975	3,388,579.00	1,730,675.37	1,657,903.58
1976	4,013,325.00	2,294,742.29	1,718,582.52

Source: State of Arkansas, Department of Finance and Administration, Little Rock, Arkansas.

APPENDIX E

HOUSING

TABLE E-1

HOUSING CHARACTERISTICS
FOR INDEPENDENCE AND JACKSON COUNTIES, PRINCIPLE TOWNS, STUDY AREA, AND
WHITE RIVER PLANNING AND DEVELOPMENT DISTRICT
1970

Area	Total Housing	Total Year Round Housing	Total Lacking Some or all Plumbing	Occupied Housing Units					Vacant		
				Owner Occupied		Total	Renter Occupied		Migratory	Year Round	Year Rou per cent of total housing
				Total	With Negro Head of Household		Lacking Some or all Plumbing	With Negro Head of Household			
Independence	8,371	8,359	1,893	5,631	99	2,109	615	88	12	619	7%
177 Batesville	2,881	2,879	220	1,665	57	1,004	-	52	2	210	7
Jackson	7,091	7,064	1,515	3,849	362	2,760	830	455	27	455	6
Newport	2,720	2,720	255	1,380	191	1,234	-	282	-	106	4
Tuckerman	608	608	38	414	51	173	28	22	-	10	1.6
Study Area	15,462	15,423	3,408	9,480	461	4,869	1,445	543	39	1,074	7
W.R. P. &D.D.	54,039	54,039	13,399	33,989	1,261	13,629	4,366	1,259	324	6,421	12

Source: 1970 Census of Housing, Housing Characteristics for States, Cities and Counties, Arkansas.
U.S. Dept. of Commerce, Bureau of Census, Tables 25, 27, and 29.

EXHIBIT I

INTERVIEW CONCERNING RENTAL HOUSING AVAILABILITY
IN THE STUDY AREA

Date: July 20, 1977. Mrs. Donna Goltry, Planner; Messers. Bud Clark and Dennis Wiles, Housing Coordinators; White River Planning and Development District.

General. Temporary housing in Independence and Jackson counties is primarily within Batesville and Newport respectively. Rental units in these two towns is very scarce. Most vacancies are either for sale or are sub-standard. The majority of new construction is single family, owner-occupied, and there is no significant number of multi-unit housing under construction. They did speculate that with a project the size of the proposed AP&L power plant, and lasting several years as planned, that some of the local workers who presently rent may purchase homes and open some rentals during the later stages of construction.

It was further stated that Newport has an active condemnation program. As a result, 121 sub-standard houses were demolished during the 1970 - 76 time period. Batesville does not have such a program, and as a result it was estimated that only 5 houses per year have been removed from Batesville during the 1970 - 76 time period.

EXHIBIT II

INTERVIEW CONCERNING RENTAL HOUSING AVAILABILITY
IN NEWPORT

Date. August 6, 1977. Mr. William H. Heard, Executive Vice-President, Newport Area Chamber of Commerce, and Real Estate Developers.

General. Rental houses in Newport are for the most part sub-standard. As a result of the condemnation program, these units are identified for up-grading or demolition as soon as they become vacant. Very few are up-graded. Most homes which are vacant are for sale. The availability of apartments is also limited. There is one apartment building presently under construction which will have 15 units. This is the extent of multi-unit construction in Newport. Real Estate developers are keeping a close watch on the AP&L power plant project, with the intention of constructing, or up-grading present housing, as soon as the location and construction start date is established.

APPENDIX F
PUBLIC SERVICE & COSTS

Division of Planning and Research

TABLE F-1

In Cooperation with the Federal Highway Administration, U.S. Department of Transportation

Date JANUARY 1, 1977

County INDEPENDENCE

ROAD AND STREET MILEAGES

STATE HIGHWAY SYSTEM

	VEHICLE MILES	Concrete	Bituminous		Gravel	Graded	Unimproved	TOTAL
			High Type	Low Type				
RURAL INTERSTATE								
F.A. PRIMARY	201,293	1.17	77.27		8.36			86.80
F.A. SECONDARY	55,652	.38	27.84	8.25	1.80			38.27
NON-FEDERAL AID	56,343		16.64	51.78	11.38		.09	79.89
TOTAL RURAL	313,288	1.55	121.75	60.03	21.54		.09	204.96
MUNICIPAL INTERSTATE								
F.A. PRIMARY	5,551		1.92					1.92
F.A. SECONDARY	7,659		5.60	.11				5.71
NON-FEDERAL AID	1,162			2.72				2.72
TOTAL MUNICIPAL	14,412		7.52	2.83				10.35
URBAN INTERSTATE								
F.A. PRIMARY	24,988	.12	3.02					3.14
F.A. SECONDARY	35,053	.08	8.51					8.59
NON-FEDERAL AID								
TOTAL URBAN	64,041	.20	11.53					11.73
TOTAL STATE HIGHWAYS	391,741	1.75	140.80	62.86	21.54		.09	227.04

LOCAL ROAD SYSTEM

COUNTY FEDERAL AID	11,127		11.72	8.74	34.98			55.44
COUNTY NON-FEDERAL AID	36,553	.08	15.04	40.02	582.67	14.77		652.58
TOTAL COUNTY ROADS	47,680	.08	26.76	48.76	617.65	14.77		708.02
FOREST HIGHWAYS F.A.S.								
FOREST DEVELOPMENT F.A.S.								
FOREST DEVELOPMENT N.A.								
FEDERAL RESERVATION								
TOTAL FEDERAL ROADS								
CITY STREETS F.A.S. EXTENSIONS	55			.36	.02			.38
CITY STREETS NON F.A.S.	1,885		2.90	3.54	8.36			14.80
OTHER CITY STREETS	40,483	1.22	23.29	38.94	23.40	.07		86.92
TOTAL CITY STREETS	42,463	1.22	26.19	42.84	31.78	.07		102.10
ROADS NOT PUBLICLY MAINTAINED								
TOTAL LOCAL ROADS	90,143	1.30	52.95	91.60	649.43	14.84		810.12

TOTAL ROAD SYSTEM

TOTAL ALL ROADS	32	481,884	3.05	193.75	154.46	670.97	14.84	.09	1,037.16
-----------------	----	---------	------	--------	--------	--------	-------	-----	----------

181

APPENDIX F

Division of Planning and Research TABLE F-2

In Cooperation with the Federal Highway Administration, U.S. Department of Transportation

Date JANUARY 1, 1977

County JACKSON

ROAD AND STREET MILEAGES									
STATE HIGHWAY SYSTEM									
		VEHICLE MILES	Concrete	Bituminous		Gravel	Graded	Unimproved	TOTAL
				High Type	Low Type				
RURAL	INTERSTATE								
	F.A. PRIMARY	188,947	1.27	45.45					46.72
	F.A. SECONDARY	27,156		12.92	25.00	3.08			41.00
	NON-FEDERAL AID	52,600		49.18	47.32	13.95		.09	110.54
	TOTAL RURAL	268,703	1.27	107.55	72.32	17.03		.09	198.26
MUNICIPAL	INTERSTATE								
	F.A. PRIMARY	35,868		5.47					5.47
	F.A. SECONDARY	2,399		1.52					1.52
	NON-FEDERAL AID	5,324		3.44	3.77				7.21
	TOTAL MUNICIPAL	43,591		10.43	3.77				14.20
URBAN	INTERSTATE								
	F.A. PRIMARY	74,413	.54	7.76					8.30
	F.A. SECONDARY	3,502		1.21	.33	.69			2.23
	NON-FEDERAL AID	5,303	.14	3.55	.35				4.04
	TOTAL URBAN	83,218	.68	12.52	.68	.69			14.57
TOTAL STATE HIGHWAYS		395,512	1.95	130.50	76.77	17.72		.09	227.03

LOCAL ROAD SYSTEM

COUNTY FEDERAL AID	2,045			.40	19.78			20.18
COUNTY NON-FEDERAL AID	30,411			8.81	472.44	103.00	13.21	597.46
TOTAL COUNTY ROADS	32,456			9.21	492.22	103.00	13.21	617.64
FOREST HIGHWAYS F.A.S.								
FOREST DEVELOPMENT F.A.S.								
FOREST DEVELOPMENT N.A.								
FEDERAL RESERVATION								
TOTAL FEDERAL ROADS								
CITY STREETS F.A.S. EXTENSIONS	61				.46			.46
CITY STREETS NON F.A.S.	2,091	.06		3.41	8.04	.96		12.47
OTHER CITY STREETS	29,187	7.13	1.71	42.92	30.15	4.26	.25	86.42
TOTAL CITY STREETS	31,339	7.19	1.71	46.33	38.65	5.22	.25	99.35
ROADS NOT PUBLICLY MAINTAINED	4					.24		.24
TOTAL LOCAL ROADS	63,799	7.19	1.71	55.54	530.87	108.46	13.46	717.23

TOTAL ROAD SYSTEM

TOTAL ALL ROADS	34	459,311	9.14	132.21	132.31	548.59	108.46	13.55	944.26
-----------------	----	---------	------	--------	--------	--------	--------	-------	--------

TABLE F-3
In Cooperation with the Federal Highway Administration, U.S. Department of Transportation

Date JANUARY 1, 1977

County STATE TOTAL

ROAD AND STREET MILEAGES									
STATE HIGHWAY SYSTEM									
		VEHICLE MILES	Concrete	Bituminous		Gravel	Graded	Unimproved	TOTAL
				High Type	Low Type				
RURAL	INTERSTATE	4,488,854	404.27	9.54					413.81
	F.A. PRIMARY	10,046,580	104.44	3,668.85	495.42	37.40		1.09	4,307.20
	F.A. SECONDARY	2,133,582	6.30	1,009.29	1,803.75	301.51	11.21	1.11	3,133.17
	NON-FEDERAL AID	3,692,464	37.98	1,773.20	3,153.52	1,045.22	17.21	4.46	6,031.59
	TOTAL RURAL	20,361,480	552.99	6,460.34	5,452.69	1,384.13	28.42	6.66	13,885.77
MUNICIPAL	INTERSTATE	175,234	17.51	.03					17.59
	F.A. PRIMARY	1,415,988	16.84	394.86	23.36				435.06
	F.A. SECONDARY	410,626	5.23	134.58	68.77	2.07			210.65
	NON-FEDERAL AID	534,019	14.16	215.01	139.83	21.53	.36		390.89
	TOTAL MUNICIPAL	2,535,867	53.74	744.55	231.96	23.60	.36		1,054.19
URBAN	INTERSTATE	1,861,140	89.12	.81					89.93
	F.A. PRIMARY	4,004,104	64.48	354.11	3.79				422.38
	F.A. SECONDARY URBAN	1,507,937	8.69	234.82	32.10	1.66	.58		277.85
	NON-FEDERAL AID	605,883	7.09	151.62	30.13	4.85	.88		194.57
	TOTAL URBAN	8,039,064	169.38	741.36	66.02	6.51	1.46		984.73
TOTAL STATE HIGHWAYS		30,926,411	776.11	7,946.77	5,750.67	1,414.24	30.24	6.66	15,924.69

LOCAL ROAD SYSTEM

COUNTY FEDERAL AID	511,092	5.38	245.11	755.62	1,411.21	25.79			2,439.11
COUNTY NON-FEDERAL AID	3,133,042	46.42	513.27	5,239.24	30,969.51	8,814.33		888.17	44,520.95
TOTAL COUNTY ROADS	3,644,134	51.81	758.38	4,042.86	32,380.72	8,838.12		888.17	46,960.06
FOREST HIGHWAYS F.A.S.	2,887			12.23	.83	7.41			20.30
FOREST DEVELOPMENT F.A.S.	3,583			5.91	86.28				92.19
FOREST DEVELOPMENT N.A.	41,490			27.03	931.06	484.95	39.95		1,482.99
FEDERAL RESERVATION	15,695		16.58	112.06	46.64	8.65	2.57		187.50
TOTAL FEDERAL ROADS	64,055		16.58	158.23	1,064.64	501.01	42.52		1,782.98
CITY STREETS F.A.S. EXTENSIONS	23,417	.70	15.51	27.75	5.84				50.80
CITY STREETS NON F.A.S.	490,945	20.40	107.72	371.10	409.01	53.30	1.71		943.24
OTHER CITY STREETS	4,942,267	438.13	1,772.14	3,384.92	1,531.92	179.08	46.28		7,352.47
TOTAL CITY STREETS	5,456,649	459.23	1,895.37	3,783.77	1,947.77	212.38	47.99		8,346.51
ROADS NOT PUBLICLY MAINTAINED	159,511		53.57	111.50	3,363.20	813.79	94.54		4,438.40
TOTAL LOCAL ROADS	6,324,345	511.64	2,725.70	8,096.36	38,756.33	10,365.30	1,073.22		61,525.95

TOTAL ROAD SYSTEM

TOTAL ALL ROADS	40,280,780	1,267.15	10,670.47	13,847.03	40,170.57	10,393.54	1,079.88		77,450.64
-----------------	------------	----------	-----------	-----------	-----------	-----------	----------	--	-----------

181

APPENDIX F

ARKANSAS STATE HIGHWAY DEPARTMENT
Division of Planning and Research
in Cooperation with the
U.S. Department of Transportation
Federal Highway Administration

AVERAGE ANNUAL TRAFFIC VOLUMES

POINT FERRY

Year	Passenger Cars -	Pickup Trucks	Single Unit Trucks	Truck & Trailer Units	Total ^a Vehicles	Adjusted A.D.T.	Days Not Oper. ^b			
							1	2	3	4
1969	33	29	7	0	69	69	159	0	0	0
1970	32	27	5	0	64	64	29	4	0	82
1971	57	47	7	0	111	111	11	10	3	0
1972	121	74	6	1	202	202	32	0	14	0
1972*	125	80	7	0	212	212	23	0	12	0
1973	121	66	4	0	191	191	210	0	29	19
1974	100	72	6	0	179	177	110	0	44	
1975	106	70	5	0	181	181	0	0	55	
1976	77	49	2	0	129	129	0	0	65	

^a Annual average daily traffic for each day of operation

^b 1 - High water
2 - Repairs
3 - Unknown
4 - Inspection - 19
Construction - 82

EXHIBIT I
Wastewater Treatment Facilities, 1974

Service Area One

Service Area Number One includes population centers which exceed or are expected to approach or exceed 5,000 population by 1990.

Batesville Region

Batesville has an interceptor pumping station with a capacity of about 12 million gallons per day (M.G.D.). The main pumping station could be considered to have a capacity of 3.0 M.G.D. There are three oxidation ponds with a total surface area of 126.8 acres. Present oxidation pond design criteria allows a loading of 30 lbs. of BOD per acre per day, plus a second pond with 30 days detention time. The present pond capacity has a population equivalent of about 22,400 people assuming 0.17 lbs. of BOD per person per day. The present BOD loading of the oxidation ponds equates to a population equivalence of 40,300 people. It is obvious that the treatment capacity is overtaxed and improvement is needed. This condition has come about due to the high industrial use of the waste disposal system.

Newport Region

Sewage treatment in the City of Newport consists of two 30-acre oxidation ponds. These ponds have adequate capacity to serve a population of 10,500. It has been recommended to the City that a 20-acre oxidation pond be added due to the fact that population of the City is expected to exceed the capacity of the existing treatment facility within the next five years. The 20-acre pond would have adequate capacity to serve 3,500 people. Plans are also being made to add a pumping station and outfall.

Service Area Two

Service Area Two includes population centers of 500 or more in 1970, but are not considered urban or urbanizing.

Newport Airbase

Sewage from the Newport Airbase is pumped from the collection sump into an open drainage ditch. There is a sewage treatment plant available with adequate capacity to serve the airbase area; however, the plant is currently in a state of disrepair.

Service Area Three

Service Area Three includes population centers of less than 500 people in 1970 and rural areas which are expected to remain stable. The majority of this area is served by individual septic systems. There is a large variance in the type of individual systems used. Effectiveness of the systems is as varied as the many types within the District. A discussion of these and other systems is to follow.

Swifton Region

The Town of Swifton has an oxidation pond of about 5 acres with lift stations and a pump station. Currently, the pond has adequate capacity for a town the size of Swifton. At this time, there are no plans to expand in the next 3-4 years. There are 295 service connections to the system.

Tuckerman Region

The Town of Tuckerman has a small oxidation pond with a main pumping station. The system serves approximately 770 connections and has a capacity of about 2,000,000 gallons per day and will serve more than 5,000 residents. This is more than adequate for the next 10 years.

Use of Individual Septic Systems

The most widely used sewage disposal system within the District is the individual septic tank. The magnitude of the waste water treatment problem in rural areas is on par with urban areas except for the much lower densities in the rural area. The types and variety of systems is as varied as the range of effectiveness that can be found in rural systems. Many serve as designed--functioning extremely well, but almost as many are constructed in areas where the basic design features of the system cannot function. The result is sewage that surfaces or finds its way into water resources.

Source: Overall Economic Development Program, 1977, White River Development District, Batesville, Arkansas, 1977.

APPENDIX G
TAXES AND REVENUE

TABLE G-1

SELECTED ARKANSAS TAXES COLLECTED
IN INDEPENDENCE AND JACKSON COUNTIES, AND THE STUDY AREA
FOR YEARS 1970 THROUGH 1976

	1970	1971	1972	1973	1974	1975	1976
Independence County							
Sales & Use Tax	\$ 875,767	\$1,053,722	\$1,238,854	\$1,476,816	\$1,543,492	\$1,730,675	\$2,294,742
Personal Income Tax	n.a.	n.a.	n.a.	n.a.	n.a.	1,211,585	1,580,317
Total	n.a.	n.a.	n.a.	n.a.	n.a.	2,942,226	3,875,059
Jackson County							
Sales & Use Tax	916,434	1,105,216	1,206,852	1,320,829	1,567,736	1,657,904	1,718,583
Personal Income Tax	n.a.	n.a.	n.a.	n.a.	n.a.	1,289,733	1,682,273
Total	n.a.	n.a.	n.a.	n.a.	n.a.	2,947,637	3,400,856
Study Area							
Sales & Use Tax	1,792,201	2,158,938	2,445,796	2,797,645	3,111,228	3,388,579	4,013,325
Personal Income Tax	n.a.	n.a.	n.a.	n.a.	n.a.	2,501,318	3,262,590
Total	n.a.	n.a.	n.a.	n.a.	n.a.	5,889,897	7,275,915

Source: Department of Finance and Administration, State of Arkansas.

TABLE G-2

PROPERTY TAX RATES WITHIN THE STUDY AREA

1977

Incorporated Areas	Rate (Mills)
Independence County:	
Batesville	78.0
Southside	62.4
Moorefield	72.4
Floral	74.4
Sulphur Rock	74.4
Charlotte	61.4
Pleasant Plains	61.4
Newark	61.4
Cave City	72.4
Desha	71.4
Cushman	71.4
Magness	61.4
Oil Trough	64.4
Jackson County:	
Newport	71.4
Swifton	61.9
Tuckerman	60.9
Grubbs	65.9
Beedeville	61.9
Average for Study Area	67.2

Source: Mrs. P. Crawford, Tax Collector's Office,
 Jackson County, Arkansas.
 Mrs. J. Moser, Tax Collector's Office,
 Independence County, Arkansas.

EXHIBIT I

GENERAL ACTS

OF THE

Sixty-Ninth General Assembly

OF THE

State of Arkansas

Volume II

Book 2

Passed at the Regular Session held at the Capitol in the City of Little Rock, Arkansas, convening on the 8th day of January, 1973, and recessed on the 24th day of April, 1973.

INCLUDING ACTS OF THE FIRST

EXTRAORDINARY SESSION

OF THE

SIXTY-EIGHTH GENERAL ASSEMBLY

February 7, 1972 — February 16, 1972

this Act being necessary for the preservation of the public peace, health and safety shall take effect and be in full force from and after July 1, 1973.

APPROVED: April 16, 1973.

ACT 750

AN ACT to Provide for the Distribution of All State Taxes, Licenses and Fees After the Same Have Been Deposited into the State Treasury; to Define and Describe Various Funds and Fund Accounts to Be Established and the Purposes for Which They May Be Used; and for Other Purposes.

Be It Enacted by the General Assembly of the State of Arkansas:

SECTION 1. Short Title. This Act shall hereafter be known and cited as the "Revenue Stabilization Law" of Arkansas of 1973.

SECTION 2. Declaration of Policy. Because of the many revenue laws of the State providing for the levying and collecting of taxes, licenses and fees for the support of state government and its agencies and enacted by this General Assembly or by the General Assembly in the past, it is hereby declared to be the policy of the General Assembly with respect to all such revenues and other State income which are required by law to be deposited in the State Treasury to provide for the handling and deposit of the

same in the manner provided in the Revenue Classification Law of this State and in this Act in the following manner:

(A) To declare the objects and purposes for which the General Revenue as defined in the Revenue Classification Law and other incomes individually and collectively are to be used. It is the intent and purpose of this Section and other provisions of this Act relating thereto to comply with the provisions of the Constitution, including Section 11 of Article 16 thereof.

(B) Because of the fact that the constitutional and fiscal agencies of the State and certain other defined agencies or programs, either individually or collectively, render services to every state department, board, commission, institution, agency, or activity supported from revenues deposited in the State Treasury, it is declared to be the policy of the General Assembly that all taxes, licenses, and fees defined as "general revenues" and "special revenues" under the provisions of the Revenue Classification Law shall contribute to the support of such constitutional and fiscal agencies and other defined agencies in the proportion and for the purposes as provided by law for the payment of such services.

(C) As to the taxes, licenses and fees, and other revenues contributing to the "general revenues" as defined in the Revenue Classification Law, it is not the purpose of this Act to levy or to change the amount or rate of such taxes, but to state the purpose for which such "general revenues" are to be used; and this Act shall not be construed as amending any of the provisions of the law with respect to such taxes

defined to be "general revenues" except for the purpose of providing for the distribution of the same and defining the purposes for which such revenues are raised and collected.

(D) As to the special taxes, licenses, fees, and other revenues contributing to the special revenues as provided in the Revenue Classification Law, it is not the intent of said Revenue Classification Law, or of this Act to levy or change the amount or rate of such taxes, nor to change the purposes for which such special revenues are to be used as provided for by law; and this Act shall not be construed as amending any of the provisions of the law with respect to the "special revenues" as defined herein, except for the purpose of providing for the distribution of the same and providing that the purposes for which such revenues are collected, shall also include the services rendered to the constitutional and fiscal agencies and other defined agencies in the manner provided in the Revenue Classification Law and herein.

SECTION 3. Fiscal Year Established. The fiscal year of the State, for the conduct of its financial affairs, shall commence on July 1st and end on June 30th of the following year.

SECTION 4. STATE APPORTIONMENT FUND CREATED. There is hereby created on the books of the State Treasurer, the State Auditor and the Chief Fiscal Officer of the State, a fund to be known as the "State Apportionment Fund". From and after the effective date of this Act all "General Revenues" and all "Special Revenues", as defined in the "Revenue Classification Law of Arkansas", shall be deposited by the State Treasurer into the

to be deposited into the State Treasury by law.

(11) There is hereby established on the books of the State Treasurer, State Auditor, and Chief Fiscal Officer of the State, a fund to be known as the "State College of Arkansas Fund". Such fund shall be used for the maintenance, operation, and improvement of the State College of Arkansas, and shall consist of such general revenues as may be provided by law and any other funds made available for the support of the State College of Arkansas and which are required to be deposited into the State Treasury by law.

(12) There is hereby established on the books of the State Treasurer, State Auditor, and Chief Fiscal Officer of the State, a fund to be known as the "Community Junior Colleges Fund". Such fund shall be used for the maintenance, operation, and improvement of the various Community Junior Colleges, and shall consist of such general revenues as may be provided by law and any other funds made available for the support of the various community junior colleges and which are required to be deposited into the State Treasury by law.

SECTION 7. MISCELLANEOUS FUNDS CREATED. (A) Administration Revolving Fund. There is hereby established on the books of the State Treasurer, State Auditor, the Chief Fiscal Officer of the State, a fund to be known as the "Administration Revolving Fund". Such fund shall consist of non-revenue receipts derived from services purchased and rentals *received by the Department of Finance and Administration from* various agencies of the

federal, state, county, and city government and approved business concerns, balance of the State Administration Department Revolving Fund on June 30, 1973, federal funds as may become available for the support of the various programs of the Department of Finance and Administration supported from such fund. Such fund shall be used for personal services, maintenance, operation and improvement of only those activities or programs of the Department of Finance and Administration which are responsible for providing the services as provided by Act 45 of 1968 (First Extraordinary Session), and all laws amendatory thereto.

(B) Municipal Aid Fund. There is hereby established on the books of the State Treasurer, State Auditor, and the Chief Fiscal Officer of the State, a fund to be known as the "Municipal Aid Fund".

(1) Such fund shall consist of such general revenues as may be made available to such fund by the *Revenue Stabilization Law*, and those special revenues derived from highway user imposts, known as "Highway Revenues" as may be made available to such fund for the benefit of municipalities by the Arkansas Highway Revenue Distribution Law.

(2) All of the "general revenues" and the "special revenues" shall be distributed within ten (10) days after the close of each calendar month to the respective cities of the first and second class and incorporated towns on the basis of population according to the most recent federal census, with the amount to be apportioned to each such city or incorporated town to be in the proportion that each population bears to the total population of all such cities

and incorporated towns. Provided that the monies received by the respective cities and incorporated towns under this Act shall be revenues of the year in which received by them, and shall not be revenues of the year which such monies were collected and paid into the State Treasury. Of the monies so received by the respective cities and incorporated towns, the "general revenues" shall be used for general purposes of municipal government and the "special revenues" derived from highway revenues shall be used as provided by the Arkansas Highway Revenue Distribution Law. Provided, however, that in the event the Workmen's Compensation Commission has paid claims from the Miscellaneous Revolving Fund on account of any municipal employee covered under Workmen's Compensation, such amount is to be deducted from *General Revenue turn-back as provided by Act 470 of 1973 and Act 469 of 1973*. Such monies so deducted are to be transferred to the Miscellaneous Revolving Fund, there to be used as provided by law.

(3) If any city or incorporated town shall fail to levy the full five-mill general tax on property for collection during the calendar year next preceding the date of distribution of any such "general revenues" and "special revenues", then the amount of general revenues otherwise distributed to any such city or incorporated town as aforesaid shall be reduced in the same proportion that its general tax millage rate levied for such preceding calendar year represents a reduction from said full five-mill rate.

(4) It shall be unlawful for the State Treasurer to distribute any "general revenues" and "special

revenues" to any cities or incorporated towns in this State that have expended funds belonging to such city or town for the payment of annual membership dues to, or for the purchase of services rendered by the Arkansas Municipal League or any other league or association of cities in this State, unless the books, affairs and records of such Arkansas Municipal League or any other league or association of cities and towns of this State receiving monies from cities or towns has been audited by the Division of Legislative Audit, or consent for such audit by the Division of Legislative Audit has been given by any such league or association. The Division of Legislative Audit is hereby authorized to audit the books, affairs and records of the Arkansas Municipal League or any other league or association of cities or incorporated towns in this State, upon request thereof by the appropriated officials of such league or association.

(C) County Aid Fund. There is hereby established on the books of the State Treasurer, State Auditor, and the Chief Fiscal Officer of the State, a fund to be known as the "County Aid Fund".

(1) Such fund shall consist of the "general revenues" as may be provided by the *Revenue Stabilization Law* to such fund; those special revenues derived from highway user imposts, known as Highway Revenues, as may be provided by the Arkansas Highway Revenue Distribution Law; those special revenues as set out in Subsection (75) of Section 8 of the Revenue Classification Law; and 25% of all severance taxes other than those imposed upon saw timber and timber products as set out in Subsec-

tion (19) of Section 8 of the Revenue Classification Law.

(2) All of the "general revenues" and "special revenues" shall be distributed within ten (10) days after the close of each calendar month to the respective counties as follows:

(a) The general revenues made available to the County Aid Fund by the *Revenue Stabilization Law* shall be distributed seventy-five percent (75%) divided equally among the seventy-five (75) counties of this State and twenty-five percent (25%) on the basis of population according to the most recent decennial federal census with each county to receive the proportion that its population bears to the total population of the State. The monies so received by the County Treasurer shall be credited to the County General Fund to be used for general county purposes unless otherwise appropriated by the Quorum Court.

(b) The special revenues to be distributed to the respective counties shall be as may be authorized by law.

(c) All monies received by the respective counties under this section shall be revenues of the year which received by them, and shall not be revenues of the year in which such monies were collected and paid into the State Treasury.

(d) Provided, however, that in the event the Workmen's Compensation Commission has paid claims from the Miscellaneous Revolving Fund on account of any county employee covered under Work-

so deducted are to be transferred to the Miscellaneous Revolving Fund, there to be used as provided by law. by Act 470 of 1973 and Act 469 of 1973. Such monies so deducted are to be transferred to the Miscellaneous Revolving Fund, there to be used as provided by law.

(3) It shall be unlawful for the State Treasurer to distribute any "general revenues" to any county in this State or any "special revenues" to any county in this State that has expended funds belonging to such county for the payments of annual membership dues to, or for the purchase of services rendered by, the Arkansas Association of Counties to other league or association on counties in this State, unless the books, affairs, and records of such Arkansas Association of Counties or other league or association of counties in this State receiving monies from the counties has been audited by the Division of Legislative Audit, or consent for such audit by the Division of Legislative Audit has been given by any such association or league of counties. The Division of Legislative Audit is hereby authorized to audit the books of the Arkansas Association of Arkansas Counties or any other league or association of counties of this State, upon request thereof by the appropriate official of such association or league.

(D) State Budget Revolving Fund. There is hereby established on the books of the State Treasurer, State Auditor, and the Chief Fiscal Officer of the State, a fund to be known as the "State Budget Revolving Fund".

(1) The State Budget Revolving Fund shall consist of funds made available and transferred to it

EXHIBIT II



HELPING BUILD ARKANSAS

ARKANSAS POWER & LIGHT COMPANY

P.O. BOX 551 LITTLE ROCK, ARKANSAS 72203 • (501) 371-4000

August 3, 1977

Mr. Robert T. Mott
Dames & Moore
500 Sansome Street
San Francisco CA 94111

Dear Mr. Mott:

In response to your memorandum of June 29 to Mr. Joel Patterson requesting information for the socio-economics section of the Independence Environmental Impact Statement, I am enclosing my estimate of property taxes on the plant from initiation of construction through the first full year of operation.

As the basis of my estimate I have used 60% of the estimated Total Construction Expenditures which were furnished by our Construction Budget and Forecast Section. An assessment rate of 20%, and the current tax rates for Newark School District and Independence County were used.

I believe you are familiar with the Arkansas system of assessing and paying taxes, but to refresh your memory, expenditure made prior to 1977 are the basis of our 1977 assessment and the taxes will be paid in 1978. Expenditures made through 1977 will be the basis of our 1978 assessment and the taxes will be paid in 1979. Taxes during the years following completion of construction will be assessed in the same manner as during construction.

If you should have any questions regarding the procedure I have used, please let me know.

Sincerely yours,

Roy H. Smith
Manager, Corporate Records

RHS:dsw

Enclosures

cc: Mr. Joel Patterson



ESTIMATE OF PROPERTY TAXES ON
INDEPENDENCE STEAM ELECTRIC STATION
FROM INITIATION OF CONSTRUCTION THROUGH**
FIRST YEAR OF OPERATION
(All Figures in Thousands of Dollars)

	<u>Expenditures</u>		<u>Total Expenditures By Years</u>	<u>Total Expenditures To Date</u>	<u>Assessed Valuation @ 20%</u>	<u>Newark School District Tax @ 45 Mills</u>	<u>Independence County Tax @ 11.4 Mills</u>	<u>Total Taxes</u>
	<u>Unit 1</u>	<u>Unit 2</u>						
1979	26,520	1,620	28,140	35,653	7,131	320.9	81.3	402.2
1980	57,960	9,120	67,080	102,733	20,547	924.6	234.2	1,158.8
1981	78,120	27,720	105,840	208,573	41,715	1,877.2	475.6	2,352.8
1982	36,840	68,760	105,600	314,173	62,835	2,827.6	716.3	3,543.9
1983	2,160	51,720	53,880	368,053	73,611	3,312.5	839.2	4,151.7
1984		33,180	33,180	401,233	80,247	3,611.1	914.8	4,525.9
1985		1,200	1,200	402,433	80,487	3,621.9	917.6	4,539.5

** Figures represent AP&L 40 percent share only. All owners are assumed to pay prorata share of property taxes.

INDEPENDENCE STEAM ELECTRIC STATION
TOTAL CONSTRUCTION EXPENDITURES
(NOT REDUCED FOR AECC/JONESBORO PARTICIPATION)

Millions of Dollars

	<u>Unit 1</u>	<u>Unit 2</u>	<u>Total</u>
Prior to 1977	2.3	.7	3.0
1977	2.9	2.3	5.2
1978	4.9	1.2	6.1
1979	44.2	2.7	46.9
1980	96.6	15.2	111.8
1981	130.2	46.2	176.4
1982	61.4	114.6	176.0
1983	3.6	86.2	89.8
1984		55.3	55.3
1985	<u> </u>	<u>2.0</u>	<u>2.0</u>
Total	346.1	326.4	672.5

**EXHIBIT III
ARKANSAS PERSONAL INCOME TAX
WITHHOLDING SCHEDULE**

Monthly Pay Period

WAGES		Single and You Claim Your Exemption	Married and You Claim One Exemption	Married and You Claim Both Exemptions	Single and You Claim Your Exemption	Married and You Claim One Exemption	Married or Head of Family and You Claim Both Exemptions	Single and You Claim Your Exemption	Married and You Claim One Exemption	Married or Head of Family and You Claim Both Exemptions	Single and You Claim Your Exemption	Married and You Claim One Exemption	Married or Head of Family and You Claim Both Exemptions	Single and You Claim Your Exemption	Married and You Claim One Exemption	Married or Head of Family and You Claim Both Exemptions	Single and You Claim Your Exemption	Married and You Claim One Exemption	Married or Head of Family and You Claim Both Exemptions	Single and You Claim Your Exemption	Married and You Claim One Exemption	Married or Head of Family and You Claim Both Exemptions
From	Through	With No Dependents			With 1 Dependent			With 2 Dependents			With 3 Dependents			With 4 Dependents			With 5 Dependents			With 6 Dependents		
\$.01	\$150.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	\$.00	
150.01	176.00	.13	.13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
176.01	184.00	.20	.20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
184.01	192.00	.27	.27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
192.01	200.00	.34	.34	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
200.01	208.00	.41	.41	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
208.01	216.00	.49	.49	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
216.01	226.00	.53	.53	.00	.08	.08	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
226.01	236.00	.67	.67	.00	.17	.17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
236.01	246.00	.76	.76	.00	.26	.26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
246.01	256.00	.85	.85	.00	.35	.35	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
256.01	266.00	.94	.94	.00	.44	.44	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
266.01	286.00	1.23	1.23	.00	.73	.73	.00	.23	.23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
286.01	306.00	1.68	1.68	.22	1.18	1.18	.00	.68	.68	.00	.18	.18	.00	.00	.00	.00	.00	.00	.00	.00	.00	
306.01	326.00	2.13	2.13	.67	1.63	1.63	.17	1.13	1.13	.00	.63	.63	.00	.13	.13	.00	.00	.00	.00	.00	.00	
326.01	346.00	2.58	2.58	1.12	2.08	2.08	.62	1.58	1.58	.12	1.08	1.08	.00	.58	.58	.00	.08	.08	.00	.00	.00	
346.01	366.00	3.03	3.03	1.57	2.53	2.53	1.07	2.03	2.03	.57	1.53	1.53	.07	1.03	1.03	.00	.53	.53	.00	.03	.03	
366.01	386.00	3.48	3.48	2.02	2.98	2.98	1.52	2.48	2.48	1.02	1.98	1.98	.52	1.48	1.48	.02	.98	.98	.00	.48	.48	
386.01	406.00	3.93	3.93	2.47	3.43	3.43	1.97	2.93	2.93	1.47	2.43	2.43	.97	1.93	1.93	.47	1.43	1.43	.00	.93	.93	
406.01	426.00	4.38	4.40	2.92	3.88	3.90	2.42	3.38	3.40	1.92	2.88	2.90	1.42	2.38	2.40	.92	1.88	1.90	.42	1.38	1.40	
426.01	446.00	4.83	4.90	3.37	4.33	4.40	2.87	3.83	3.90	2.37	3.33	3.40	1.87	2.83	2.90	1.37	2.33	2.40	.87	1.83	1.90	
446.01	466.00	5.28	5.40	3.82	4.78	4.90	3.32	4.28	4.40	2.82	3.78	3.90	2.32	3.28	3.40	1.82	2.78	2.90	1.32	2.28	2.40	
466.01	500.00	6.04	6.25	4.58	5.54	5.75	4.08	5.04	5.25	3.58	4.54	4.75	3.08	4.04	4.25	2.58	3.54	3.75	2.08	3.04	3.25	
500.01	540.00	6.94	7.25	5.48	6.44	6.75	4.98	5.94	6.25	4.48	5.44	5.75	3.98	4.94	5.25	3.48	4.44	4.75	2.98	3.94	4.25	
540.01	580.00	8.06	8.63	6.60	7.56	8.13	6.10	7.06	7.63	5.60	6.56	7.13	5.10	6.06	6.63	4.60	5.56	6.13	4.10	5.06	5.63	
580.01	620.00	9.32	10.03	7.86	8.82	9.53	7.36	8.32	9.03	6.86	7.82	8.53	6.36	7.32	8.03	5.86	6.82	7.53	5.36	6.32	7.03	
620.01	660.00	10.58	11.43	9.12	10.08	10.93	8.62	9.58	10.43	8.12	9.08	9.93	7.62	8.58	9.43	7.12	8.08	8.93	6.62	7.58	8.43	
660.01	700.00	11.84	12.83	10.38	11.34	12.33	9.88	10.84	11.83	9.38	10.34	11.33	8.88	9.84	10.83	8.38	9.34	10.33	7.88	8.84	9.83	
700.01	740.00	13.10	14.23	11.64	12.60	13.73	11.14	12.10	13.23	10.64	11.60	12.73	10.14	11.10	12.23	9.64	10.60	11.73	9.14	10.10	11.23	
740.01	780.00	14.36	15.63	12.90	13.86	15.13	12.40	13.36	14.63	11.90	12.86	14.13	11.40	12.36	13.63	10.90	11.86	13.13	10.40	11.36	12.63	
780.01	820.00	15.62	17.32	14.16	15.12	16.82	13.66	14.62	16.32	13.16	14.12	15.82	12.66	13.62	15.32	12.16	13.12	14.82	11.66	12.62	14.32	
820.01	860.00	17.24	19.12	15.78	16.74	18.62	15.28	16.24	18.12	14.78	15.74	17.62	14.28	15.24	17.12	13.78	14.74	16.62	13.28	14.24	16.12	
860.01	900.00	19.04	20.92	17.58	18.54	20.42	17.08	18.04	19.92	16.58	17.54	19.42	16.08	17.04	18.92	15.58	16.54	18.42	15.08	16.04	17.92	
900.01	940.00	20.84	22.72	19.38	20.34	22.22	18.88	19.84	21.72	18.38	19.34	21.22	17.88	18.84	20.72	17.38	18.34	20.22	16.88	17.84	19.72	
940.01	950.00	22.64	24.52	21.18	22.14	24.02	20.68	21.64	23.52	20.18	21.14	23.02	19.68	20.64	22.52	19.18	20.14	22.02	18.68	19.64	21.52	

SOURCE: STATE OF ARKANSAS, DEPARTMENT OF
FINANCE AND ADMINISTRATION.

Monthly Pay Period—Continued

WAGES		Single and You Claim Your Exemption	Married and You Claim One Exemption	Married and You Claim Both Exemptions	Single and You Claim Your Exemption	Married and You Claim One Exemption	Married or Head of Family and You Claim Both Exemptions	Single and You Claim Your Exemption	Married and You Claim One Exemption	Married or Head of Family and You Claim Both Exemptions	Single and You Claim Your Exemption	Married and You Claim One Exemption	Married or Head of Family and You Claim Both Exemptions	Single and You Claim Your Exemption	Married and You Claim One Exemption	Married or Head of Family and You Claim Both Exemptions	Single and You Claim Your Exemption	Married and You Claim One Exemption	Married or Head of Family and You Claim Both Exemptions	Single and You Claim Your Exemption	Married and You Claim One Exemption	Married or Head of Family and You Claim Both Exemptions
From	Through	With No Dependents			With 1 Dependent			With 2 Dependents			With 3 Dependents			With 4 Dependents			With 5 Dependents			With 6 Dependents		
0.01	1,020.00	24.44	26.32	22.98	23.94	25.82	22.48	23.44	25.32	21.98	22.94	24.82	21.48	22.44	24.32	20.98	21.94	23.82	20.48	21.44	23.32	19.98
0.01	1,060.00	26.24	28.12	24.78	25.74	27.62	24.28	25.24	27.12	23.78	24.74	26.62	23.28	24.24	26.12	22.78	23.74	25.62	22.28	23.24	25.12	21.78
0.01	1,100.00	28.04	29.92	26.58	27.54	29.42	26.08	27.04	28.92	25.58	26.54	28.42	25.08	26.04	27.92	24.58	25.54	27.42	24.08	25.04	26.92	23.58
0.01	1,140.00	29.84	31.72	28.38	29.34	31.22	27.88	29.84	30.72	27.38	28.34	30.22	26.88	27.84	29.72	26.38	27.34	29.22	25.88	26.84	28.72	25.38
0.01	1,180.00	31.64	33.52	30.18	31.14	33.02	29.68	30.64	32.52	29.18	30.14	32.02	28.68	29.64	31.52	28.18	29.14	31.02	27.68	28.64	30.52	27.18
0.01	1,220.00	33.44	35.32	31.98	32.94	34.82	31.48	32.44	34.32	30.98	31.94	33.82	30.48	31.44	33.32	29.98	30.94	32.82	29.48	30.44	32.32	28.98
0.01	1,260.00	35.24	37.12	33.78	34.74	36.62	33.28	34.24	36.12	32.78	33.74	35.62	32.28	33.24	35.12	31.78	32.74	34.62	31.28	32.24	34.12	30.78
0.01	1,300.00	37.04	39.04	35.58	36.54	38.54	35.08	36.04	38.04	34.58	35.54	37.54	34.08	35.04	37.04	33.58	34.54	36.54	33.08	34.04	36.04	32.58
0.01	1,340.00	38.94	41.44	37.48	38.44	40.94	36.98	37.94	40.44	36.48	37.44	39.94	35.98	36.94	39.44	35.48	36.44	38.94	34.08	35.94	38.44	34.48
0.01	1,380.00	41.34	43.84	39.88	40.84	43.34	39.38	40.34	42.84	38.88	39.84	42.34	38.38	39.34	41.84	37.88	38.84	41.34	37.38	38.34	40.84	36.98
0.01	1,420.00	43.74	46.24	42.28	43.24	45.74	41.78	42.74	45.24	41.28	42.24	44.74	40.78	41.74	44.24	40.28	41.24	43.74	39.78	40.74	43.24	39.28
0.01	1,460.00	46.14	48.64	44.68	45.64	48.14	44.18	45.14	47.64	43.68	44.64	47.14	43.18	44.14	46.64	42.68	43.64	46.14	42.18	43.14	45.64	41.68
0.01	1,500.00	48.54	51.04	47.08	48.04	50.54	46.58	47.54	50.04	46.08	47.04	49.54	45.58	46.54	49.04	45.08	46.04	48.54	44.58	45.54	48.04	44.08
0.01	1,540.00	50.94	53.44	49.48	50.44	52.94	48.98	49.94	52.44	48.48	49.44	51.94	47.98	48.94	51.44	47.48	48.44	50.94	46.98	47.94	50.44	46.48
0.01	1,580.00	53.34	55.84	51.88	52.84	55.34	51.38	52.34	54.84	50.88	51.84	54.34	50.38	51.34	53.84	49.88	50.84	53.34	49.38	50.34	52.84	48.88
0.01	1,620.00	55.74	58.24	54.28	55.24	57.74	53.78	54.74	57.24	53.28	54.24	56.74	52.78	53.74	56.24	52.28	53.24	55.74	51.78	52.74	55.24	51.28
0.01	1,660.00	58.50	61.00	57.04	58.00	60.50	56.54	57.50	60.00	56.04	57.00	59.50	55.54	56.50	59.00	55.04	56.00	58.50	54.54	55.50	58.00	54.04
0.01	1,700.00	60.54	63.04	59.08	60.04	62.54	58.58	59.54	62.04	58.08	59.04	61.54	57.58	58.54	61.04	57.08	58.04	60.54	56.58	57.54	60.04	56.08
0.01	1,740.00	62.94	65.44	61.48	62.44	64.94	60.98	61.94	64.44	60.48	61.44	63.94	59.98	60.94	63.44	59.48	60.44	62.94	58.98	59.94	62.44	58.48
0.01	1,780.00	65.34	67.84	63.88	64.84	67.34	63.38	64.34	66.84	62.88	63.84	66.34	62.38	63.34	65.84	61.88	62.84	65.34	61.38	62.34	64.84	60.88
0.01	1,820.00	67.74	70.24	66.28	67.24	69.74	65.78	66.74	69.24	65.28	66.24	68.74	64.78	65.74	68.24	64.28	65.24	67.74	63.78	64.74	67.24	63.28
0.01	1,860.00	70.14	72.64	68.68	69.64	72.14	68.18	69.14	71.64	67.68	68.64	71.14	67.18	68.14	70.64	66.68	67.64	70.14	66.18	67.14	69.64	65.68
0.01	1,900.00	72.54	75.04	71.08	72.04	74.54	70.58	71.54	74.04	70.08	71.04	73.54	69.58	70.54	73.04	69.08	70.04	72.54	68.58	69.54	72.04	68.08
0.01	1,940.00	74.94	77.44	73.48	74.44	76.94	72.98	73.94	76.44	72.48	73.44	75.94	71.98	72.94	75.44	71.48	72.44	74.94	70.98	71.94	74.44	70.48
0.01	1,980.00	77.34	79.84	75.88	76.84	79.34	75.38	76.34	78.84	74.88	75.84	78.34	74.38	75.34	77.84	73.88	74.84	77.34	73.38	74.34	76.84	72.88
0.01	2,020.00	79.74	82.24	78.28	79.24	81.74	77.78	78.74	81.24	77.28	78.24	80.74	76.78	77.74	80.24	76.28	77.24	79.74	75.78	76.74	79.24	75.28
0.01	2,060.00	82.14	84.64	80.68	81.64	84.14	80.18	81.14	83.64	79.68	80.64	83.14	79.18	80.14	82.64	78.68	79.64	82.14	78.18	79.14	81.64	77.68
0.01	2,083.00	83.54	86.04	82.03	83.04	85.54	81.58	82.54	85.04	81.08	82.04	84.54	80.58	81.54	84.04	80.08	81.04	83.54	79.58	80.54	83.04	79.08

7% of excess over \$2,083.00 plus last amount above. For all dependents over 0 deduct 0.50 for each.

EXHIBIT IV



HELPING BUILD ARKANSAS

ARKANSAS POWER & LIGHT COMPANY

PO BOX 551 LITTLE ROCK, ARKANSAS 72203 • (501) 371-4000

July 5, 1977

Mr. Robert T. Mott
Dames & Moore
500 Sansome Street
San Francisco, California 94111

SUBJECT: Power Plant Data
Independence Steam Electric Station

REF: Ltr. #AC3 to Mr. Ron Kear

Dear Mr. Mott:

In accordance with our conversation last Wednesday, June 29, I have recalculated the ad valorem taxes and sales and use taxes associated with Independence Steam Electric Station.

I have also recalculated the following items so they will all be on a consistent basis, one which shows the average annual or levelized cost of operation over thirty years.

a) Operations & Maintenance (excl. fuel)	\$ 11,863,000
b) Fuel Cost	171,751,000
c) Ad Valorem or Sales & Use Taxes	14,397,000
d) Capital Recovery	<u>78,818,000</u>
TOTAL	\$276,829,000

Attached for your convenience and review is our revised answer to those items previously questioned; also attached are my calculations showing how I obtained the amounts listed above. If you should have any comments or questions, please call me.

Very truly yours,

James L. Hanson
James L. Hanson
Production Cost &
Budget Administrator

JLH:aw

cc: Messrs: Joel Patterson (w/a)
George Eubanks { " }
Attachment Ron Kear { " }

	<u>000's OMITTED</u>			
	<u>1983 Dollar \$000</u>	<u>Total Payment for 30 Yr Est. at X%</u>	<u>Present Worth @ 11½%</u>	<u>Capital Recovery @ 11½%</u>
O&M	6,937	548,426	101,146	11,863
Taxes				14,397
Fuel	111,133	7,383,548	1,464,336	171,751
Capital Recovery	672,000			<u>78,818</u>
				276,829

O&M Estimated to Escalate at 6% per year.

Fuel Estimated to Escalate at 5% per year.

Sales Tax on fuel used annually estimated to increase at 5% per year.

	<u>TAXES</u>			
	<u>1983 Dollar \$000</u>	<u>Total Payment for 30 Yr Est. at 4%</u>	<u>Present Worth @ 11½%</u>	<u>Capital Recovery @ 11½%</u>
Ad Valorem-Plant	8,064			8,064
Ad Valorem- Coal Stockpile	337	10,110	2,873	337
Sales Tax - Coal Stockpile	843	25,290	7,187	843
Sales Tax - Fuel Used	3,334	221,507	43,930	<u>5,153</u>
				14,397

D&M - Estimated taxes created by the plant, rail line, transmission lines, and fuel for the life of the plant, per year if available.

AP&L- Ad Valorem Taxes

- a) Plant cost (\$672,000,000) X assumed assessment rate (20%) X assumed millage (60) equals \$8,064,000

b) Coal stockpile (\$28,105,488) X 20% X 6¢ equals \$337,000

Sales/Use Taxes

a) Annual fuel requirement for 1983 (\$111,133,000) X tax rate (3%) equals \$3,333,990.

b) Coal stockpile (\$28,105,488) X (3%) equals \$843,165.

D&M - Cost of the plant over its lifetime including:

a) Capital investment

b) Operating cost

c) Total cost

AP&L - All values shown below are in 1983 dollars, assuming an 11½% present worth value:

Operating Cost	\$ 11,863,000
Fuel Cost	171,751,000
Ad Valorem & Sales or Use Taxes	14,397,000
Capital Recovery	<u>78,818,000</u>
TOTAL	\$ 276,829,000



HELPING BUILD ARKANSAS

ARKANSAS POWER & LIGHT COMPANY

5TH & LOUISIANA STREETS • LITTLE ROCK, ARKANSAS 72203 • (501) 372-4311

August 18, 1977

Mr. Robert T. Mott
Dames & Moore
500 Sansome Street
San Francisco, CA 94111

Dear Mr. Mott:

Enclosed is a schedule showing estimated sales taxes and income taxes associated with Arkansas Coal Units 1 and 2. This is in response to items 2 and 3 of your June 29 memorandum to Mr. Joel Patterson.

If you have any questions concerning the figures or the method of development, please advise us.

Sincerely,


J. H. Flynn

JHF/skw

cc: Messrs. John Harton
Joel Patterson
Jim Hanson
Nathan Langston

Enclosure



SOCIO-ECONOMIC EVALUATION-ARKANSAS COAL UNITS 1 & 2

1. Estimated sales tax on sales of energy from plant in first full year of operation:

1983 - Unit 1	\$ 4,044,000
1985 - Unit 2	3,407,000

Based on 65% load factor for 700 MW unit. Energy priced at average rate per KWH in projected year for sales to ultimate customers. Three percent sales tax rate applied.

2. Estimated State and Federal Income Taxes generated:

1983 - Unit 1	\$ 9,427,000
1984 - Unit 1	9,324,000
1985 - Unit 2	8,812,000

Based on 40% ownership by AECC and Jonesboro with no income taxes payable by them.

8/18/77
CORPORATE PLANNING

APPENDIX H
COMMUNITY COHESION

Arkansas State University

DIVISION OF GENERAL BUSINESS AND ECONOMICS
COLLEGE OF BUSINESS
P. O. DRAWING
STATE UNIVERSITY, ARKANSAS 72467
TELEPHONE 501/972 3037 JONESBORO

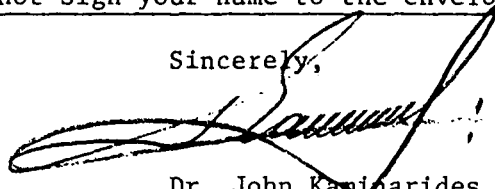
August 16, 1977

We are currently involved in a research project to determine the possible effect of building the proposed Arkansas Power & Light generating plant in your area. The enclosed questionnaire is designed to gather information about your opinion on certain quality of life factors. The success of the project depends on your cooperation.

The questionnaire that we are asking you to complete is divided into eight basic areas. Each question is considered to be important to the overall results of the study. Please read each question carefully and record your answer as you see fit--there are no right or wrong answers.

We will appreciate you giving up a small amount of your time to complete the questionnaire and return it to us in the enclosed envelope that requires no postage. No one individual will be identified in the results of this study and any identification on your part is not necessary. Please do not sign your name to the envelope or form.

Sincerely,



Dr. John Kaminarides
Professor of Economics

EXHIBIT II
QUESTIONNAIRE

APPENDIX H

1. Do you hold an elective or appointed office in your town, county or area?

NO _____
YES _____ (If yes, give title: _____)

2. Please give the name of your city or town:

Located in _____ County.

3. In your opinion, will your community welcome the construction of the AP&L generating plant at the proposed location in your area?

YES _____ NO _____ NO OPINION _____

4. Do you believe that the population of your area favors industrial development?

YES _____ NO _____ NO OPINION _____

5. Have new residents in your community been generally well accepted in the past?

YES _____ NO _____ NO OPINION _____

6. Do you think that the relatively large number of new residents associated with the construction and operation of the proposed AP&L facility will be accepted by the members of your community?

YES _____ NO _____ NO OPINION _____

7. How would you rate the residents of your area on their local pride and support of civic activities that lead to community improvement?

(PLEASE CHECK ONLY ONE ANSWER)

- _____ a. Generally not interested in any improvements.
- _____ b. Some effort is given to improvements in the community.
- _____ c. Some people or groups are generally seeking improvements in the community.
- _____ d. Extremely active in seeking any improvement for the community.

8. The points included in the following list contribute to the quality of life. If the proposed AP&L plant is constructed in your area, and accepted environmental standards are followed, how do you think each of the listed factors will be effected?

(PLEASE PLACE A CHECK AT THE SIDE OF EACH STATEMENT)

<u>Positive</u>	<u>No</u>	<u>Harmful</u>	<u>No</u>
<u>Effect</u>	<u>Effect</u>	<u>Effect</u>	<u>Opinion</u>

- | | | | | |
|-------|-------|-------|-------|---|
| _____ | _____ | _____ | _____ | 1. Water (Rivers, streams, lakes) |
| _____ | _____ | _____ | _____ | 2. Air (Smoke, pollutants, odors) |
| _____ | _____ | _____ | _____ | 3. Noise levels |
| _____ | _____ | _____ | _____ | 4. Sources of Energy |
| _____ | _____ | _____ | _____ | 5. Natural resources of the area |
| _____ | _____ | _____ | _____ | 6. Traffic on area roads and highways |
| _____ | _____ | _____ | _____ | 7. Recreation sites or wildlife areas |
| _____ | _____ | _____ | _____ | 8. Safety of the community |
| _____ | _____ | _____ | _____ | 9. Cultural or historical factors of the area |

EXHIBIT III
QUESTIONNAIRE

APPENDIX H

1. Do you hold an elective or appointed office in your town, county or area?

NO
YES (If yes, give title:)

2. Please give the name of your city or town:

Newark

Located in Independence County.

3. In your opinion, will your community welcome the construction of the AP&L generating plant at the proposed location in your area?

YES 8 NO 2 NO OPINION --

4. Do you believe that the population of your area favors industrial development?

YES 8 NO 2 NO OPINION --

5. Have new residents in your community been generally well accepted in the past?

YES 10 NO -- NO OPINION --

6. Do you think that the relatively large number of new residents associated with the construction and operation of the proposed AP&L facility will be accepted by the members of your community?

YES 8 NO 1 NO OPINION 1

7. How would you rate the residents of your area on their local pride and support of civic activities that lead to community improvement?

(PLEASE CHECK ONLY ONE ANSWER)

- a. Generally not interested in any improvements.
-- b. Some effort is given to improvements in the community.
8 c. Some people or groups are generally seeking improvements in the community.
2 d. Extremely active in seeking any improvement for the community.

8. The points included in the following list contribute to the quality of life. If the proposed AP&L plant is constructed in your area, and accepted environmental standards are followed, how do you think each of the listed factors will be effected?

(PLEASE PLACE A CHECK AT THE SIDE OF EACH STATEMENT)

Positive Effect	No Effect	Harmful Effect	No Opinion	
<u>1</u>	<u>4</u>	<u>2</u>	<u>3</u>	1. Water (Rivers, streams, lakes)
<u>--</u>	<u>5</u>	<u>2</u>	<u>3</u>	2. Air (Smoke, pollutants, odors)
<u>--</u>	<u>5</u>	<u>2</u>	<u>3</u>	3. Noise levels
<u>6</u>	<u>1</u>	<u>--</u>	<u>3</u>	4. Sources of Energy
<u>1</u>	<u>5</u>	<u>2</u>	<u>2</u>	5. Natural resources of the area
<u>2</u>	<u>3</u>	<u>3</u>	<u>2</u>	6. Traffic on area roads and highways
<u>2</u>	<u>4</u>	<u>2</u>	<u>2</u>	7. Recreation sites or wildlife areas
<u>1</u>	<u>5</u>	<u>2</u>	<u>2</u>	8. Safety of the community
<u>2</u>	<u>4</u>	<u>1</u>	<u>3</u>	9. Cultural or historical factors of the area

EXHIBIT IV
QUESTIONNAIRE

APPENDIX H

1. Do you hold an elective or appointed office in your town, county or area?

NO _____
YES _____ (If yes, give title: _____)

2. Please give the name of your city or town:

Batesville

Located in Independence County.

3. In your opinion, will your community welcome the construction of the AP&L generating plant at the proposed location in your area?

YES 18 NO 3 NO OPINION --

4. Do you believe that the population of your area favors industrial development?

YES 20 NO 1 NO OPINION --

5. Have new residents in your community been generally well accepted in the past?

YES 21 NO -- NO OPINION --

6. Do you think that the relatively large number of new residents associated with the construction and operation of the proposed AP&L facility will be accepted by the members of your community?

YES 19 NO 2 NO OPINION --

7. How would you rate the residents of your area on their local pride and support of civic activities that lead to community improvement?

(PLEASE CHECK ONLY ONE ANSWER)

-- a. Generally not interested in any improvements.

-- b. Some effort is given to improvements in the community.

9 c. Some people or groups are generally seeking improvements in the community.

12 d. Extremely active in seeking any improvement for the community.

8. The points included in the following list contribute to the quality of life. If the proposed AP&L plant is constructed in your area, and accepted environmental standards are followed, how do you think each of the listed factors will be effected?

(PLEASE PLACE A CHECK AT THE SIDE OF EACH STATEMENT)

<u>Positive</u> <u>Effect</u>	<u>No</u> <u>Effect</u>	<u>Harmful</u> <u>Effect</u>	<u>No</u> <u>Opinion</u>	
<u>3</u>	<u>14</u>	<u>2</u>	<u>2</u>	1. Water (Rivers, streams, lakes)
<u>--</u>	<u>12</u>	<u>4</u>	<u>5</u>	2. Air (Smoke, pollutants, odors)
<u>--</u>	<u>17</u>	<u>1</u>	<u>3</u>	3. Noise levels
<u>13</u>	<u>4</u>	<u>--</u>	<u>4</u>	4. Sources of Energy
<u>2</u>	<u>14</u>	<u>4</u>	<u>1</u>	5. Natural resources of the area
<u>6</u>	<u>4</u>	<u>9</u>	<u>2</u>	6. Traffic on area roads and highways
<u>3</u>	<u>14</u>	<u>1</u>	<u>3</u>	7. Recreation sites or wildlife areas
<u>2</u>	<u>14</u>	<u>2</u>	<u>3</u>	8. Safety of the community
<u>8</u>	<u>11</u>	<u>1</u>	<u>1</u>	9. Cultural or historical factors of the area

EXHIBIT V
QUESTIONNAIRE

APPENDIX H

1. Do you hold an elective or appointed office in your town, county or area?

NO _____
YES _____ (If yes, give title: _____)

2. Please give the name of your city or town:

_____ Oil Trough _____

Located in _____ Independence _____ County.

3. In your opinion, will your community welcome the construction of the AP&L generating plant at the proposed location in your area?

YES 9 NO 1 NO OPINION --

4. Do you believe that the population of your area favors industrial development?

YES 9 NO 1 NO OPINION --

5. Have new residents in your community been generally well accepted in the past?

YES 9 NO -- NO OPINION 1

6. Do you think that the relatively large number of new residents associated with the construction and operation of the proposed AP&L facility will be accepted by the members of your community?

YES 9 NO -- NO OPINION 1

7. How would you rate the residents of your area on their local pride and support of civic activities that lead to community improvement?

(PLEASE CHECK ONLY ONE ANSWER)

1 a. Generally not interested in any improvements.

3 b. Some effort is given to improvements in the community.

4 c. Some people or groups are generally seeking improvements in the community.

2 d. Extremely active in seeking any improvement for the community.

8. The points included in the following list contribute to the quality of life. If the proposed AP&L plant is constructed in your area, and accepted environmental standards are followed, how do you think each of the listed factors will be effected?

(PLEASE PLACE A CHECK AT THE SIDE OF EACH STATEMENT)

Positive Effect	No Effect	Harmful Effect	No Opinion	
<u>2</u>	<u>6</u>	<u>2</u>	<u>--</u>	1. Water (Rivers, streams, lakes)
<u>--</u>	<u>8</u>	<u>1</u>	<u>1</u>	2. Air (Smoke, pollutants, odors)
<u>1</u>	<u>9</u>	<u>--</u>	<u>--</u>	3. Noise levels
<u>7</u>	<u>2</u>	<u>--</u>	<u>1</u>	4. Sources of Energy
<u>3</u>	<u>6</u>	<u>1</u>	<u>--</u>	5. Natural resources of the area
<u>3</u>	<u>6</u>	<u>1</u>	<u>--</u>	6. Traffic on area roads and highways
<u>--</u>	<u>8</u>	<u>2</u>	<u>--</u>	7. Recreation sites or wildlife areas
<u>--</u>	<u>8</u>	<u>--</u>	<u>2</u>	8. Safety of the community
<u>3</u>	<u>6</u>	<u>--</u>	<u>1</u>	9. Cultural or historical factors of the area

EXHIBIT VI
QUESTIONNAIRE

APPENDIX H

1. Do you hold an elective or appointed office in your town, county or area?

NO _____
YES _____ (If yes, give title: _____)

2. Please give the name of your city or town:

Newport

Located in Jackson County.

3. In your opinion, will your community welcome the construction of the AP&L generating plant at the proposed location in your area?

YES 23 NO -- NO OPINION --

4. Do you believe that the population of your area favors industrial development?

YES 23 NO -- NO OPINION --

5. Have new residents in your community been generally well accepted in the past?

YES 21 NO 1 NO OPINION 1

6. Do you think that the relatively large number of new residents associated with the construction and operation of the proposed AP&L facility will be accepted by the members of your community?

YES 22 NO -- NO OPINION 1

7. How would you rate the residents of your area on their local pride and support of civic activities that lead to community improvement?

(PLEASE CHECK ONLY ONE ANSWER)

-- a. Generally not interested in any improvements.

2 b. Some effort is given to improvements in the community.

12 c. Some people or groups are generally seeking improvements in the community.

9 d. Extremely active in seeking any improvement for the community.

8. The points included in the following list contribute to the quality of life. If the proposed AP&L plant is constructed in your area, and accepted environmental standards are followed, how do you think each of the listed factors will be effected?

(PLEASE PLACE A CHECK AT THE SIDE OF EACH STATEMENT)

<u>Positive</u> <u>Effect</u>	<u>No</u> <u>Effect</u>	<u>Harmful</u> <u>Effect</u>	<u>No</u> <u>Opinion</u>	
<u>4</u>	<u>16</u>	<u>2</u>	<u>1</u>	1. Water (Rivers, streams, lakes)
<u>--</u>	<u>18</u>	<u>--</u>	<u>5</u>	2. Air (Smoke, pollutants, odors)
<u>--</u>	<u>22</u>	<u>--</u>	<u>1</u>	3. Noise levels
<u>15</u>	<u>3</u>	<u>--</u>	<u>5</u>	4. Sources of Energy
<u>6</u>	<u>12</u>	<u>1</u>	<u>4</u>	5. Natural resources of the area
<u>5</u>	<u>13</u>	<u>--</u>	<u>4</u>	6. Traffic on area roads and highways
<u>7</u>	<u>14</u>	<u>--</u>	<u>2</u>	7. Recreation sites or wildlife areas
<u>5</u>	<u>15</u>	<u>--</u>	<u>3</u>	8. Safety of the community
<u>7</u>	<u>13</u>	<u>--</u>	<u>3</u>	9. Cultural or historical factors of the area

EXHIBIT VII

THE TRI COUNTY JOURNAL

Volume 2 — Number 19 Newark, Arkansas 72562

Thursday, June 30, 1977

Location Still Uncertain

Arch P. Pettit, president of Arkansas Power and Light Co., speaking on a Jonesboro television program, said the decision on the location of the proposed plant should be made by AP&L officials within 90 days. He said the decision is crucial because AP&L is "running out of time."

Pettit strongly denied reports Sunday that a decision has been made on the location of a proposed \$700 million power plant.

A Memphis newspaper reported earlier this week that AP&L will announce next month that the plant will be constructed at Newark in Independence county, one of five sites under consideration by the utility.

Pettit denied that report.

"I can assure you that as of this point in time, we have not made a final determination as to the exact location of that facility," Pettit said.

Further, Pettit did not rule out the possibility that AP&L would use Arkansas lignite as fuel for the new facility. He said if AP&L chooses to use lignite, then the best location for a new power plant would be along the Ouachita River in south Arkansas. AP&L is studying two possible sites in that area.

Pettit said, however, that a review of AP&L's fuel resources shows that a coal-fired plant probably would be the best alternative as a fuel source for the new plant. In that case, Pettit said the Newark location was "essentially" a good location for a power plant because coal for the plant would be shipped to Arkansas from Wyoming.

"If that becomes the case, then the facility will be located in the north part of the state," Pettit said.

The Tri County Journal made a telephone survey this week, in order to sample the feelings of the people in this area regarding the proposed electric generating plant that Arkansas Power & Light Company is planning to construct. Newark is one of five sites in the state being considered. The proposed local site is four miles southeast of Newark on Ark. Hwy. 69 S., in the vicinity of Swan Pond.

The question asked was: "Are you in favor of the proposed AP&L electric generating plant being built in this area?"

Of the 200 persons contacted by phone, this was the finding: 142 were in favor of the plant being built, 32 were opposed, and 26 did not have an opinion.

EXHIBIT VIII
 "Commercial Appeal" - Memphis, TN
 August 24, 1977

Restaurantless Newark Views Future Boom With Mixed Emotion

By ELIZABETH FAIR

From The Commercial Appeal
 Jonesboro, Ark., Bureau

NEWARK, Ark. — Newark has 849 citizens, four gas stations, two grocery stores, a general store, drug store, furniture store, laundromat and no restaurant — its hopes of getting a Dairy Queen only recently were dashed.

Plus in a few years — a \$672 million, 1,600 megawatt, coal-burning power plant and even sooner the people, problems and profits from its construction.

"They made a joke about us the other day in the Batesville Guardian (newspaper)," said Rosemary Williams, the mayor of Newark.

"Twenty-seven restaurants in Batesville and not a place to get a cup of coffee in Newark. Well, we thought we were going to get a Dairy Queen, but they backed out on us."

Tuesday in the Newark High School cafeteria Arkansas Power and Light officials directed a coffee and doughnut hoopla to officially announce their choice of the Newark site. (The Commercial Appeal reported the selection June 21.)

For the city, the new site will mean as many as 1,000 new workers from the time the plant begins construction in 1979 to its operation in 1983, earning a total of \$64

million. A fifth of those workers will stay indefinitely, earning \$4 million each year.

The Newark School District, located across two city blocks, will receive \$8 million each year in ad valorem taxes — more than 10 times its current budget.

All of which indicates a booming future for a town without a restaurant and a tiny high school, a future that some are viewing a little skeptically, Mayor Williams said.

"Each resident you talk with will feel a little bit different about the plant," she said. "I think the banker's quite pleased with the deal and I'm sure the businesses are. But a few people with asthma and the like — they aren't real pleased."

Mayor Williams, who at 58 decided to run for mayor and get a college education, described the problem the city faces in having the energy plant.

"We are mostly retired and elderly people at the present time. A lot of people come here from Michigan and Illinois, and this would sort of spoil the retirement-village idea they have," she said.

"But we can't mess up progress for a few people. There are those who are making their living here that were born and raised here — and their ancestors were here — and they need something, too.

"They feel their children are growing up and going to college and then going somewhere else to live," she said.

"Why, my three boys don't live here because they have better jobs elsewhere."

EXHIBIT IX
 "Commercial Appeal" - Memphis, TN
 August 24, 1977

Pettit Tells Newark Power Plant Plans

From The Commercial Appeal
 Jonesboro, Ark., Bureau

NEWARK, Ark. — The new Independence steam electric station to be built near here will burn low-sulfur Wyoming coal, but Arkansas lignite, a low-grade coal, could be the fuel source for a future power plant, the president of Arkansas Power and Light Co. said here Tuesday.

Arch Pettit, speaking at the official announcement of the Newark site for the \$672-million power plant, said AP&L is continuing to look for sites for future plants.

Lignite "will obviously be one of the things we look at," Pettit said. "Now that this plant is located and sited, you move right on to look where the next one is going to go."

However, Pettit said such a plant would have to be built near the lignite source. Most of the lignite in the state is in South and Central Arkansas.

AP&L representatives were joined by officials of the Arkansas Electric Cooperative Corp. and the Jonesboro city Water and Light Department.

The cooperative will own 35 per cent of Independence station and Jonesboro 5 per cent. The three utilities will file joint applications with the state Public Service Commission to build the plant.

The station to be built on a 3,000-acre site on the White River near here will be nearly identical in size and design to the White Bluff station currently under construction at Redfield near Pine Bluff.

If the PSC gives its approval, construction of the first unit at the Independence station would begin in 1979. It would go into operation in 1983. The second unit is scheduled for operation in 1985.

Pettit said Newark was chosen as the best of five acceptable sites because Newark was both economically and environmentally suited for the type of station needed.

AP&L said the only water discharged into the White River from the station will be from the cooling tower. The water will contain only the normal minerals that are in the original river water, officials said.

The Newark plant would not use "scrubbers," expensive devices that remove some of the pollutants before entering the atmosphere, Pettit said. Scrubbers could be added at a later date.

Water to the cooling towers will be pumped indirectly from the nearby White River.

Fly ash and solid wastes generated from the plant would be placed in special disposal areas.

"When you recognize that the money you are spending is going to intangible things, which I'm in agreement with — we need clean air and clean water — that is a problem," Pettit said.

"We've seen the point of view of taking an area that had some pollution in it and taking it back to a pristine area overnight.

"The money that's involved in time frame and ecology available to us just doesn't lend itself to doing that," he said.

Power Answers Given

By RUSTY STARR

Jonesboro's next electrical power question may have been answered today in the small town of Newark in Independence County.

Arkansas Power and Light officials, in conjunction with the Arkansas Electric Cooperative Corp. (AECC) and Jonesboro's City Water and Light (CW&L) officially announced plans to construct a \$672 million coal-fired generating station with a 1,600 megawatt capacity. The two-unit station is scheduled to go on-line in 1983 with 800 megawatts and in 1985 with 1,600.

The plant will be constructed on the White River, off Arkansas 69, a few miles east of Newark.

Although CW&L recently agreed to purchase 70 megawatts from AP&L's White Bluff plant, a question was still unanswered. In 1985, Jonesboro's contract with the Southwestern Power Administration (SPA) runs out. The SPA is expected to convert Jonesboro's 54 megawatts of firm power to peaking power. That would give Jonesboro 80 megawatts of peaking power from SPA, but would leave CW&L looking for firm power sources.

Purchased power from AP&L would far exceed the cost of present SPA hydro-electric power. The White Bluff project was designed to help alleviate the problem, but Jonesboro's continued growth will require even more power.

William R. Stuck, chairman of the CW&L Board of Directors, explained that Jonesboro's electrical needs were growing by 10 per cent each year when he spoke this morning at AP&L's announcement meeting in the high school auditorium at Newark.

Part of the White Bluff arrangement allows for CW&L to purchase five per cent of all future AP&L generating plants. Marion Ulmer, manager of CW&L, didn't say whether or not Jonesboro would commit to purchase five per cent of the Independence County plant, but noted that the completion date "dovetails with the SPA proposal to convert."

He added, "All the financing we have done so far was done with future projects in mind."

At this point, CW&L would turn the question of joining the Independence plant over to their consulting engineers — R. W. Beck and Associates. Ulmer said the firm will probe the financial situation and the future electrical needs of Jonesboro.

Reeves Ritchie, chairman of the AP&L Board, said after today's meeting that the AECC and CW&L financial help at White Bluff expedited the announcement of the Independence plant.

"It obviously helped.... We were in a cash flow crunch," said Ritchie. He added that the announcement would have eventually been made, because AP&L's financial condition was slowly improving after a recent rate increase.

Arch Pettit, president of AP&L, told local residents that his firm would do everything it could to satisfy the community and regulatory agencies and "have a plant we can be proud of." The plant will burn low-sulfur Wyoming coal and is designed along the same lines as the White Bluff plant. Pettit noted that the two Independence units were scheduled to be at White Bluff. A Public Service Commission ruling changed those plans. The plant will have 215 permanent employees and numerous construction personnel.

Stuck and Harry Oswald, general manager of AECC, said there would be a scramble for power in the mid-1980s and expressed confidence in their ability to buy into future AP&L ventures. Pettit noted that other cooperatives and municipal systems may be added to the ownership list before 1979, when the construction is due to start.

A Newark town meeting will be held Aug. 31 at 7 in the evening in the high school auditorium. Specifics of the construction and environmental impact of the plant will be discussed. CW&L officials are scheduled to attend.

AP&L officials were hounded all weekend for an early release and some

members of the news media speculated correctly. However, the name of the proposed plant was not unveiled until today. It will be called the Independence Steam Electric Station.

Ritchie said the name means more than just a location. It indicates another move to reduce dependence on foreign fuel supplies for American energy.

If Jonesboro buys another 80 megawatts, it will own 150 megawatts by 1985. Jonesboro is also on the road to energy independence.

EXHIBIT XII
 "Commercial Appeal" - Memphis, TN
 August 22, 1977

Newark Mayor Happy About AP&L Decision

NEWARK, Ark. (AP) — Mayor Rosemary Williams of Newark said Sunday she was happy with Arkansas Power & Light Co.'s decision to build a \$700-million, coal-fired generating plant here because it will help develop the locality.

Ms. Williams said the plant would help the schools and "it will probably get us better roads."

"We hadn't solicited it at all," she said. "They chose their own site. In 1975 they asked what our opinion would be on building the plant here and to have a public meeting."

She said persons attending the meeting were split "about 50-50" on whether the plant should be built here.

(The Commercial Appeal reported earlier this summer that AP&L had selected the Newark site among five others, but company officials steadfastly refused to confirm they had made the selection until Saturday.)

A company spokesman would not give specifics Saturday of the utility's decision to build the plant on the banks of the White River about three miles southeast of here and 14 miles southeast of Batesville.

Construction will be a joint effort by AP&L, the Arkansas Electric Cooperative Corp. which serves several Arkansas municipalities, and the City of Jonesboro Light & Water Department.

AP&L, the cooperative, and the Jonesboro utilities will hold a news conference Tuesday at Newark to announce the site and financing and operating agreements between the three to construct the plant.

The agreement called for the cooperative to supply 35 per cent of the financing for the new plant and the City of Jonesboro to supply 5 per cent of the financing.

AP&L began looking for a site for another coal-fired plant in 1974 after the state Public Service Commission approved only 2 of 4 proposed 800-megawatt units at the utility's Redfield plant.

The utility earlier this year entered into financial agreements in which the cooperative would finance and own 35 per cent and Jonesboro 5 per cent of the Redfield plant, which is to be completed by 1982.

Ms. Williams said AP&L officials told her "there would be a definite unveiling of the project Tuesday and asked me if I would be there."

The other four sites under consideration were on the White River near Des Arc, at Devil's Bend on the Arkansas River in Faulkner County and Tate's Bluff and Miller's Bluff on the Ouachita River in Ouachita County.

EXHIBIT XI
 "The Wall Street Journal" - Southwest Edition
 August 23, 1977

Middle South Unit Plans \$672 Million Plant in Arkansas

Special to THE WALL STREET JOURNAL

LITTLE ROCK -- Arkansas Power & Light Co., a unit of Middle South Utilities Inc., said it plans to build a \$672 million power plant consisting of two 800,000-kilowatt generating units on the White River near Newark in north central Arkansas.

A spokesman said the utility already has agreed to buy 150 million tons of low-sulphur Wyoming coal from a joint venture of a unit of Peabody Coal Co. and a unit of Panhandle Pipe Line Co. to fire the new plant during its 30-year life. He wouldn't disclose the value of the contract. A company source estimated the average price of coal over the life of the contract at \$15 a ton, including escalation but excluding transportation.

Arch P. Pettit, Arkansas Power president, said the company plans to file an application with the Arkansas Public Service Commission before year-end for permission to build the plant. The utility said it hopes construction can begin by the fall of 1978. The plant's first unit is scheduled to start up in 1983, the second in 1985.

The utility originally sought permission for the two units in 1974 when it asked the commission for authority to build four 800,000-kilowatt units at White Bluff on the Arkansas River about 30 miles south of Little Rock. At that time, citing environmental reasons, the commission granted authority for only two units at White Bluff. "The two units proposed for Newark are essentially the third and fourth units planned for White Bluff," Mr. Pettit said.

The Newark site was one of five studied by Dames & Moore, an Atlanta environmental consulting firm, in a report filed in 1975 during the company's three-year search for a second plant site.

The spokesman said details of the financing plans for the two units won't be announced until the utility gets a hearing with the commission on the proposal. However, the utility said the financing plan probably will include a proposal to sell part of the Newark plant's generating capacity to Arkansas Electric Cooperatives Corp. and the city of Jonesboro, a device used in financing the White Bluff plant. Other municipal power companies also are negotiating for a percentage of the plant's generating capacity.

APPENDIX I

FOOTNOTES

¹White River Planning and Development District, Overall Economic Development Program 1977 (Batesville; 1977), p. 44, and Independence County Industrial Park Location Plan (Batesville, 1976), p. 16.

²Ibid., pp. 44,16.

³Ibid., pp. 45, 17.

⁴Ibid., pp. 45, 17.

⁵Arkansas State Highway and Transportation Department, Division of Planning and Research.

⁶Manager, Newport Bus Depot and Wells Bus Line and Depot, Batesville.

⁷A. Harvey, City Manager, Newport.

⁸Ibid.

⁹Federal Aviation Administration Flight Service Station, Jonesboro.

¹⁰Tom Manning, Director, News Bureau, Arkansas State University.

¹¹Ibid.

¹²County Sheriffs, Independence and Jackson Counties.

¹³Gail Collier, Planner, White River Planning and Development District, Batesville.

¹⁴White River Planning and Development District, Overall Economic Development Program 1977, Appendix H.

¹⁵U.S. Department of Commerce, Bureau of the Census, Population Estimates and Projections, (Washington: Government Printing Office), Series P-25, No. 40, p. 12.

¹⁶John M. Mattila and Wilbur R. Thomson, "The Measurement of the Economic Base of the Metropolitan Area, (Land Economics, Vol. XXXI Number 3, August, 1955), pp. 215-228.

¹⁷Ibid. pp. 215-216.

¹⁸Source of those writing on the economic base concept:

Andrews, Richard B., "Comment re: Criticisms of the Economic Base Theory," Journal of the American Institute of Planners, Vol. 24 (1958).

- Andrews, Richard B., "Mechanics of the Urban Economic Base," series of articles in Land Economics, Vols. 29 to 31 (May 1953 to Feb. 1956).
- Alexander, John W., "The Basic-Nonbasic Concept of Urban Economic Functions," Economic Geography, Vol. 30 (July 1954).
- Blumenfeld, Hans, "The Economic Base of the Metropolis," Journal of the American Institute of Planners, Vol. 21 (Fall 1955).
- Federal Reserve Bank of Kansas City, "The Employment Multiplier in Wichita," Monthly Review, Vol. 37 (Sept. 1952).
- Barford, Borge, Local Economic Effects of a Large-Scale Industrial Undertaking, Copenhagen, 1938.
- Daly, M. C., "An Approximation to a Geographical Multiplier," Economic Journal, Vol. 50 (June-Sept. 1940).
- University of New Mexico, Bureau of Business Research, and Federal Reserve Bank of Kansas City, The Economy of Albuquerque, New Mexico, Albuquerque, 1949.
- Cincinnati City Planning Commission, Economy of the Area, Cincinnati, Ohio, 1946.
- Hildebrand, George, and Arthur Mace, Jr., "The Employment Multiplier in an Expanding Industrial Market: Los Angeles County, 1940-47," Review of Economics and Statistics, Vol. 32 (Aug. 1950).
- Hoyt, Homer, The Economic Base of the Brockton, Massachusetts Area, Brockton, Massachusetts, 1949.
- Hoyt, Homer, and Weimer, Arthur M., Principles of Urban Real Estate, Ronald Press, Chapter 18, 3rd edition, 1954.
- Leven, Charles L., "Measuring the Economic Base," Papers and Proceedings of the Regional Science Association, Vol. 2 (1956).
- Leven, Charles L., Theory and Method of Income and Product Accounts for Metropolitan Areas, Including the Elgin-Dundee Area as a Case Study, Iowa State College, Ames, Iowa, 1958, mimeographed.
- Mattila, J. M., and W. R. Thompson, "Measurement of the Economic Base of the Metropolitan Area," Land Economics, Vol. 31 (Aug. 1955).
- Mayer, Harold M., "Urban Nodality and the Economic Base," Journal of the American Institute of Planners, Vol. 20 (Summer 1954).
- North, Douglass C., "The Spatial and Interregional Framework of the United States Economy: An Historical Perspective," Papers and Proceedings of the Regional Science Association, Vol. 2 (1956).

Pfouts, R. W., and E. T. Curtis, "Limitations of the Economic Base Analysis," Social Forces, Vol. 36 (May 1958).

Roterus, V., and W. Calef, "Notes on the Basic-Nonbasic Employment Ratio," Economic Geography, Vol. 31 (1955)

Steiner, Robert L., "Urban and Inter-Urban Economic Equilibrium," Papers and Proceedings of the Regional Science Association, Vol. 1 (1955).

Stolper, W. F., and Charles M. Tiebout, "The Balance of Payments of a Small Area as an Analytical Tool," 1950, mimeographed.

Thomas, Morgan D., "The Economic Base and a Region's Economy," Journal of the American Institute of Planners, Vol. 23, No. 2 (1957).

Tiebout, Charles M., "Exports and Regional Economic Growth," Journal of Political Economy, Vol. 64 (April 1956).

Tiebout, Charles M., "A Method of Determining Incomes and their Variation in Small Regions," Papers and Proceedings of the Regional Science Association, Vol. 1 (1955).

Ullman, Edward L., "The Basic-Service Ratio and the Area Support of Cities," 1953, mimeographed.

Wilson, Andrew W., "The Supporting-Dependent Analysis of Income Payments to Individuals," Arizona Business and Economic Review, University of Arizona, Aug., 1955.

¹⁹John Kaminarides, An Economic Base Study for East Arkansas - An Analysis of Regional Employment Specialization, Net Export Workers and Self Sufficiency, Annals 1975, Midsouth Academy of Economists.

²⁰Ibid., p. 3.

²¹Mattila, op. cit. p. 219.

²²Detailed methodology is shown in Walter Izard, Methods of Regional Analysis: An Introduction to Regional Science, (N.Y., John Wiley & Sons Inc. 1960) pp. 190-193. Werner Z. Hirsch, Urban Economic Analysis, (New York, McGraw-Hill Book Company) pp. 190-192.

²³Charles M. Tiebout, The Community Economic Base Study, Committee for Economic Development, Paper No. 16, 1962, p. 58.

²⁴Ibid., p. 58.

²⁵Ibid., p. 60.

²⁶White River Planning and Development District, Independence County Industrial Park Location Plan (Batesville, 1977), p. 12.

²⁷Ibid.

²⁸Arkansas State Highway and Transportation Department, Division of Planning and Research.

²⁹International City Management Association, The Municipal Yearbook 1977. (Washington, D. C.), p.p. 94.

³⁰Roland Mullins, Police and Fire Department Costs in Arkansas Municipalities. (North Little Rock, 1969), p. 2.

³¹International City Management Association, p. 95.

³²Arkansas State Health Department.

ENVIRONMENTAL MONITORING PROGRAM

TECHNICAL SUPPORT DOCUMENT
PART 9
ENVIRONMENTAL MONITORING PROGRAM

CONTENTS

	<u>Page</u>
9.0 ENVIRONMENTAL MONITORING PROGRAM.	9.0-1
9.1 AIR MONITORING PROGRAM.	9.1-1
9.1.1 Pre-Operational Phase.	9.1-1
9.1.1.1 Sulfur Dioxide.	9.1-1
9.1.1.2 Nitrogen Dioxide.	9.1-2
9.1.1.3 Suspended Particulates.	9.1-2
9.1.1.4 Meteorological Monitoring	9.1-2
9.1.1.5 Additional.	9.1-3
9.1.2 Post-Operational Monitoring Phase.	9.1-3
9.1.2.1 Performance Tests	9.1-3
9.1.2.2 Routine In-Stack Monitoring	9.1-4
9.1.2.3 Sulfur Retention Tests.	9.1-5
9.1.2.4 Ambient Air Monitoring.	9.1-5
9.1.2.5 Supplementary Control System.	9.1-6
9.2 AQUATIC MONITORING PROGRAM.	9.2-1
9.2.1 Pre-Operational Phase.	9.2-1
9.2.1.1 White River	9.2-1
9.2.1.2 Wells, Lakes, Ponds, and Streams.	9.2-4
9.2.2 Post-Operational Phase	9.2-5
9.3 TERRESTRIAL MONITORING PROGRAM.	9.3-1
9.3.1 Pre-Operational Phase.	9.3-1
9.3.1.1 Vegetation Monitoring	9.3-1
9.3.1.2 Soil Monitoring	9.3-2
9.3.1.3 Miscellaneous Monitoring.	9.3-3
9.3.2 Post-Operational Phase	9.3-4

TABLES

	<u>Page</u>
9.1-1 Summary of Pre-Operational and Post-Operational Ambient Air Monitoring	9.1-7
9.2-1 Chemical and Physical Test Parameters	9.2-6
9.3-1 Typical Vegetation	9.3-5

PART 9

ENVIRONMENTAL MONITORING PROGRAM

The major environmental areas potentially impacted by the operation of a power plant are air, water, and land use. The purpose of the following sections is to describe the monitoring program proposed for these three environmental areas at the Independence Steam Electric Station.

Minor areas of environmental consideration normally include noise, aesthetics, and solid waste. For a coal-fired plant, such as the Independence Steam Electric Station, solid waste is likely to be of greater consideration. While the monitoring of solid wastes will not be undertaken specifically, the proposed monitoring of air and water will, to a great extent, detect the effects of any improper handling or disposal of solid wastes.

The environmental monitoring program will be organized into two phases: pre-operational and post-operational. During the pre-operational phase, air, aquatic, and terrestrial information will be collected to establish a baseline upon which future determinations concerning the environmental impact of the Independence Steam Electric Station may be based. Pre-operational monitoring will assist in the confirmation of preliminary assumptions concerning the baseline environment in the vicinity of the plant. Post-operational monitoring, following operation of Unit One and continuing beyond full operation of the plant, will provide:

- ° information from which a full assessment, in increments, of the environmental impact of the plant on the area can be developed.
- ° data whereby the atmospheric modeling program can be confirmed.
- ° information which will contribute to the determination of whether or not a supplemental control system will be required for operation of the plant under the most adverse meteorological conditions.

- ° reference information for the determination of effects of future coal-fired power plants on the environs in which they are sited. This information will contribute significantly to the future siting requirements relative to such plants.
- ° early warning of any unexpected, adverse effects which might occur, thereby permitting a rapid response to minimize such effect.

The environmental monitoring program described in the following sections is similar to that for the White Bluff Steam Electric Station, a coal-fired generating station being constructed by the applicant at Redfield, Arkansas. This program will be tested at White Bluff prior to implementation at the Independence site. The results of the evaluation of the elements of this monitoring program at White Bluff will provide experience upon which to update and/or modify the monitoring program proposed for the Independence Steam Electric Station. The applicant reserves the right to propose such modifications as are indicated from new information available prior to implementation of the Independence Steam Electric Station environmental monitoring program.

9.1 AIR MONITORING PROGRAM

9.1.1 Pre-Operational Phase

Although the monitoring requirements of the Arkansas Air Pollution Code and the Federal Standards of Performance for New Stationary Sources pertain to monitoring after emission source operation begins, the applicant proposes to begin ambient air quality monitoring before operation commences to provide assurance of a functioning monitoring network at the start of operation and to establish background conditions, both average and peak levels, occurring in the site area at the time operation begins. Monitoring activities will be oriented toward the three major pollutants recognized as being associated with coal-fired steam electric stations: sulfur dioxide, nitrogen oxides, and particulate matter. Pre-operational monitoring will be initiated to obtain at least one year of reliable background information for each of these pollutant classes prior to beginning operation of Unit One.

9.1.1.1 Sulfur Dioxide

Several methods of sulfur dioxide (SO_2) monitoring have been approved as equivalent methods. Among these are:

- ° Gas chromatographic separation with flame photometric detection
- ° Coulometric detection
- ° Colorimetric detection
- ° Molecular fluorescence with photometric detection.

The Philips analyzer uses the coulometric detection method. The Meloy analyzer uses a flame photometric detection method. An analyzer manufactured by Thermo Electron illustrates use of the fluorescence principle. These instruments are representative of the continuous monitors which will be employed to accomplish ambient sulfur dioxide monitoring. Selection of specific equipment will be finalized closer to the date of field deployment in order to insure that latest equivalency ratings are taken into consideration.

Four monitoring stations are proposed. The exact location of these stations will be based on a variety of considerations including atmospheric

modeling results, station accessibility, proximity of interfering sources such as vehicular traffic, power availability, land acquisition, and location of population centers and other sensitive receptor areas. It is anticipated that pre-operational stations will be located within a distance of 1 to 5 miles from the plant site. Final location selections will be made taking into account experience gained from the post-operational White Bluff monitoring program. Each monitoring station will be located in a controlled-environment trailer capable of being relocated as conditions and results may warrant.

Sulfur dioxide monitors will be equipped with recorders which will provide a continuous record of sulfur dioxide levels at each station. Records will be retained for future reference and will be made available to appropriate authorities on request.

9.1.1.2 Nitrogen Dioxide

Two of the four stations at which SO_2 is to be monitored will be equipped with continuous nitrogen oxides analyzers. These will be of a type designated as equivalent or reference methods. These instruments will be capable of monitoring both NO and NO_2 and will be equipped with strip chart recorders to provide a continuous record of concentrations. Records will be retained in storage for future reference.

9.1.1.3 Suspended Particulates

Mass flow controlled high volume samplers will be utilized to collect suspended particulates for measurement of total suspended particulates in micrograms per cubic meter. Selected filters will be retained for possible later chemical analysis. High volume samplers will be installed at each of the four monitoring sites. All records developed in the course of monitoring will be retained in storage for future reference.

9.1.1.4 Meteorological Monitoring

It is recognized that meteorological conditions should be measured concurrently with air quality data. The principal meteorological parameters to be measured are wind speed and direction, temperature, and humidity. A 210-foot meteorological tower and associated instrumentation will be installed at the Independence site. Information obtainable from

this tower will include wind speed and direction (three elevations), temperature (three elevations), and humidity (two elevations). Rainfall will also be measured. Recorded data will be retained for future reference.

9.1.1.5 Additional

In addition to the three pollutants normally associated with the operation of a coal-fired power plant, which are discussed above, there are other items of concern which will be monitored by periodic tests. These include trace element and sulfate concentrations in Hi-Vol particulate samples. Periodic tests of soil and vegetation will be performed to check for effects such as change in soil acidity and trace element content and changes in health of vegetation. Tests will, for the most part, be conducted in close proximity to the four pre-operational monitoring sites.

9.1.2 Post-Operational Monitoring Phase

The post-operational phase will commence with the operation of Unit One at the Independence site. The pre-operational monitoring system will continue to function in the manner described. Any augmentation of this system will be initiated early enough to insure operation coincident with the commercial operation of Unit One.

9.1.2.1 Performance Tests

At the time that Unit One becomes operational, tests will be conducted to measure (1) coal sulfur content, ash content, heating value, and consumption rate; (2) the quantity of sulfur dioxide and nitrogen oxides leaving the stacks; and (3) stack gas opacity. Test methods will be in conformance with those outlined in Standards of Performance for New Stationary Sources, 40 CFR 60. Specific monitoring requirements include:

1. Photoelectric or other type smoke detector and recorder (to monitor opacity).
2. Instrument for continuous monitoring and recording of sulfur dioxide emissions.

3. Instrument for continuous monitoring and recording of nitrogen oxides emissions.
4. Application of ASTM methods to determine coal sulfur content and heating value.

A file of all measurement records and reports will be retained for at least two years and will be available to the appropriate authorities on request.

In addition to the above tests, a field performance test for particulate removal efficiency will be run on each of the electrostatic precipitators within 60 days after achieving the maximum production rate, but not later than 180 days after initial startup of each unit. An additional performance test will be conducted on the electrostatic precipitators under normal operating conditions, 9 to 12 months after initial operation, without a shutdown to clean equipment prior to testing.

The collection of emission data, the continued operation of the four ambient air quality monitoring stations, and the collection of meteorological data will constitute an analytical program designed to accurately assess the effect of the plant on the local environment.

9.1.2.2 Routine In-Stack Monitoring

For continuous monitoring of nitrogen oxides, the measuring instruments will probably operate on the principal of absorption of electromagnetic radiation. The gas sample will be passed through the sampling cylinder of the monitor where it will be exposed to electromagnetic radiation of a particular wave length, depending upon the constituent to be measured. The amount of incident radiation absorbed by the gas is proportional to the concentration of the gas present. In this manner the amount of NO_x in the flue gases will be measured directly and on a continuous basis. These monitors will trigger alarms in the control room if concentration levels are too high.

For particulate monitoring, the test equipment will probably include some type of light source transmitting a beam through the stack gases and impinging upon a photoelectric device. Since the amount of light passing through varies directly in relation to the amount of

suspended particulate material present, such a system can be calibrated to continuously monitor the amount of particulates being emitted. This system will also trigger alarms in the plant control room if particulate emissions reach unacceptable levels.

Sample ports will be installed on the stack with provisions for power and safe access in accordance with accepted engineering practice. The sampling ports will permit the acquisition of additional data on sulfur oxide emissions to correlate with calculated emissions based on coal analysis.

9.1.2.3 Sulfur Retention Tests

Arkansas Power & Light Company has conservatively estimated that 10 percent of total sulfur will be retained in ash. Mass balance tests will be conducted to verify that 10 percent sulfur retention is, in fact, a conservative figure.

The mass balance procedure will involve determination of the sulfur content of coal, sulfur content of ash, and sulfur emitted in flue gases. This will provide accurate assessment of the amounts of sulfur dioxide which will be released to the atmosphere when burning the specific coal supplied to the Independence Steam Electric Station. Results of these tests will be submitted to the appropriate authorities.

9.1.2.4 Ambient Air Monitoring

If experience at White Bluff demonstrates the need for supplementary monitoring, the pre-operational ambient air monitoring program at Independence Steam Electric Station will be augmented prior to startup of the first unit by the addition of a monitoring station at a range of 10 to 15 miles, and the acquisition of portable SO_2 and NO_x instruments which can be operated in a vehicle. The portable instruments will permit a much greater flexibility for detection of concentrations of these two pollutants over a much broader area and in accordance with daily wind characteristics. In addition, high volume samplers will be placed on at least three sites along the plant boundary for the primary purpose of registering the effect of fugitive dust emissions. A summary of both pre-operational and post-operational ambient monitoring components

is shown in Table 9.1-1. Data collected from the post-operational program will be made available at any time upon request, and will be summarized and submitted routinely to appropriate agencies on a quarterly basis or more frequently as required.

9.1.2.5 Supplementary Control System

Based on available information concerning coal quality, on assumptions related to ash sulfur retention, and on reasonable modeling techniques and assumptions, it appears that the Independence Steam Electric Station as designed will meet all State and Federal standards without the need for a supplementary control system (SCS). Compliance with ambient standards will be thoroughly confirmed through operation of the post-operational monitoring program with its combination of fixed and portable measurement stations. Since modeling results for both units in operation indicate that the Arkansas 30-minute SO_2 standard will be approached more closely than other standards, particular attention will be paid to evaluation of compliance with this standard.

Should monitoring results obtained after one or both generating units are in operation indicate that an ambient standard is being exceeded on infrequent occasions, permission will be sought to implement a supplementary control system involving reduction in plant load during those periods determined to result in highest concentrations.

Since the need for an SCS does not appear pressing at this time, the details involved in such a system are not presented in this application. It is anticipated that equipment already planned for the post-operational monitoring program will be sufficient to provide the foundation for implementation of an SCS. Probably the only supplemental components needed will be a better means of monitoring upper air meteorological data at levels of interest and a means of telemetering ambient SO_2 measurements to a central location for timely automated data processing. Upper air data would most likely be collected from periodic balloon soundings.

Table 9.1-1

Summary of Pre-operational and
Post-operational Ambient Air Monitoring

<u>Pollutant</u>	<u>Tentative Monitor Locations</u>	<u>Sample Frequency</u>	<u>Pre- Operational Phase</u>	<u>Post- Operational Phase</u>
Sulfur Dioxide	2-5 mi	Continuous	X	X
Sulfur Dioxide	2-5 mi	Continuous	X	X
Sulfur Dioxide	2-5 mi	Continuous	X	X
Sulfur Dioxide	2-5 mi	Continuous	X	X
Sulfur Dioxide	Portable	Continuous		X
Sulfur Dioxide	12-15 mi	Continuous		X
Nitrogen Dioxide	2-5 mi	Continuous	X	X
Nitrogen Dioxide	2-5 mi	Continuous	X	X
Nitrogen Dioxide	Portable	Continuous		X
Particulates	2-5 mi	Weekly/24 hr. Sample	X	X
Particulates	2-5 mi	Weekly/24 hr. Sample	X	X
Particulates	2-5 mi	Weekly/24 hr. Sample	X	X
Particulates	2-5 mi	Weekly/24 hr. Sample	X	X
Particulates	Plant Boundary	Weekly/24 hr. Sample		X
Particulates	Plant Boundary	Weekly/24 hr. Sample		X
Particulates	Plant Boundary	Weekly/24 hr. Sample		X
Particulates	12-15 mi	Weekly/24 hr. Sample		X

Soil, vegetation, and precipitation samples will be collected and analyzed at random intervals during both the pre- and post-operational phases.

9.2 AQUATIC MONITORING PROGRAM

The needed onsite monitoring program is defined by the National Pollutant Discharge Elimination System (NPDES) permit. This permit defines the effluent limitations, onsite monitoring requirements, and compliance schedules. The following proposed aquatic monitoring program of the potentially impacted water bodies in the vicinity of the Independence site is voluntary and has the purpose of determining the operational effects of the Independence Steam Electric Station upon the natural hydrologic environs. Monitoring activities will be oriented toward the principal hydrologic elements: the White River, wells, lakes, ponds, and streams in the site vicinity.

9.2.1 Pre-Operational Phase

The pre-operational aquatic monitoring program will provide at least one year of reliable background information concerning the status of existing water systems within the vicinity of the Independence site. These data will be in addition to that collected previously and reported in the Environmental Impact Statement.

9.2.1.1 White River

Aquatic monitoring programs conducted by electric utilities are usually designed to determine the effects upon aquatic ecosystems resulting from once-through circulating water systems. The Independence Steam Electric Station will use natural draft cooling towers and consequently, the concern regarding thermal discharges will be less significant. However, the blowdown from the cooling towers will be returned to the White River, and some slight changes in the chemical composition of the river water within this blowdown plume will result.

Runoff from the plant site will be collected and treated prior to entering the makeup stream, and ultimately the blowdown. Therefore, surface water pollution from this source is not expected to be significant. Should it occur, it would be detected in the results of the monitoring program conducted in the White River.

The aquatic monitoring program will be designed to obtain data on existing chemical, physical, and biological characteristics of that

stretch of the White River subject to influence by the Independence Steam Electric Station. It is proposed that three sample points be designated for observation, one of which will function as a control point during the post-operational phase of the monitoring program. Data collected would be identical for each site. The sites should be located to ascertain:

1. Existing and continuing ambient levels outside the influence of the plant. (upstream)
2. Levels in proximity to the plant discharge at a point which is anticipated to be at the 25 percent mixing zone.
3. Existing and continuing ambient levels following complete mixing of the plant effluent with the river (downstream).

Within the three major sampling classifications, the White River monitoring program may be defined as indicated below. Complete records of all tests will be maintained, and a semi-annual summary report prepared.

Chemical and Physical

Tests will be conducted at quarterly intervals for at least the first year to measure the naturally occurring levels of the parameters indicated in Table 9.2-1. Subsequent frequency of testing will be based on the results of this first-year program. In general, test procedures to be used will conform to the guidelines contained in Standard Methods for the Examination of Water and Wastewater, or similar references.

Instrumentation is prescribed under each test procedure.

The major physical consideration is temperature. A portable oxygen meter with an automatic temperature compensating oxygen probe will be used to measure dissolved oxygen, and will also provide the necessary temperature data. The Arkansas standards prescribe a sampling depth of 5 feet or middepth, whichever is less for determining compliance with the 93°F maximum and 5°F rise limits.

During these tests, additional observations will be made for unusual colors, odors, solids, floating material, oil, grease and/or deposits. These will be reported for the period.

Biological

Pre-operational biological sampling will be conducted to supplement data which were collected in conjunction with preparation of the EIS. The two sets of data, together with information available from the literature, will provide a good understanding of the types and abundance of aquatic organisms which occur in the site area.

Sampling activities during the pre-operational period will be conducted near the three stations at which water quality is to be monitored. These stations will be in the vicinity of stations monitored during the data collection surveys for the EIS in order to permit meaningful comparison of results. During the first year of the pre-operational program, sampling will be conducted once each during the fall, spring, and summer. After this period, an assessment of the sampling frequency will be made and the program adjusted, if appropriate, in light of results of the first year's data collection. Currently, it is anticipated that semiannual sampling will be sufficient after the first year.

The major components of the aquatic ecosystem which will be studied during the pre-operational program include: phytoplankton, periphyton, zooplankton, benthic macroinvertebrates, and fish. Each of these components, with the exception of periphyton, will be collected during each sampling effort; periphyton will be collected only once a year.

Collection methods for each component will be similar to those described in TSD Part 5 in order to facilitate comparison of the data collected during each sampling program. In addition, because of the gravel bottom, it is anticipated that pre-operational sampling for benthic macroinvertebrates will include the use of a Surber sampler whenever river conditions permit. It is likely that fish sampling techniques will be limited to seining and gill netting, as river level

conditions permit, since the previous use of fyke nets yielded only a very limited amount of additional information.

Identification of phytoplankton and zooplankton specimens collected during the spring period will be conducted to the lowest practicable taxonomic level; during other collection periods, classification will be made only among major groupings such as Chlorophyta and Cyanophyta for phytoplankton and Rotatoria and Copepoda for zooplankton. Periphyton identification will be made only to the generic level. However, benthic macroinvertebrate and fish specimens will be identified to the lowest practicable taxon during each collection period.

9.2.1.2 Wells, Lakes, Ponds, and Streams

The proposed utilization of holding, treatment, and disposal ponds at the Independence Steam Electric Station will present the potential for ground water contamination. Although preliminary studies indicate soil composition will restrict leachate from the various ponds from entering the ground water, a monitoring network will be established to provide early detection of the extent and nature of leaching, if any. Offsite wells will be sampled to provide a reference point for any future comparisons.

One of the mechanisms for removal of sulfur dioxide from the atmosphere is by rainout or washout. Although effects are expected to be virtually undetectable, it is considered prudent to obtain a broad range of chemical information on streams, lakes, and ponds in the vicinity of the plant to confirm the expectation of insignificant effects.

Sampling of selected wells, lakes, ponds, and streams within a 15-mile radius of the Independence site will be undertaken to define the existing chemical and physical quality of these existing offsite water systems. Effects of leaching, if any, are expected to occur in a southeasterly direction from the plant site. Ground water tests (wells) should be concentrated in this direction, and as close to the site boundary as possible. Wells tested on the right bank of the White River will not be exposed to any effect from leaching. Offsite surface water sample sources should be concentrated in the northeast quadrant and

within the radius of 15 miles. The maximum concentrations associated with the health and welfare related standards is predicted to occur within a radius of 25 miles.

Chemical and physical tests will be conducted to measure the naturally occurring levels of the parameters listed in Table 9.2-1. The practicality of conducting certain of these tests on ponds, as compared to streams or lakes, is subject to question and may warrant deletion of certain chemical parameters based on the characteristics of the sample source. Test procedures to be used will generally conform to the guidelines contained in Standard Methods for the Examination of Water and Wastewater, or similar references. Instrumentation is prescribed under each test procedure.

Initial chemical testing will be conducted on a quarterly basis. If a significant variation in specific chemical characteristics fails to develop for sample points after these tests, the sampling frequency may be reduced to semiannual. A semiannual summary report will be prepared analyzing the results of this test program, subject to inhouse review. Emphasis will be placed on a summation of comparative results.

9.2.2 Post-Operational Phase

The post-operational phase initiated with the operation of Unit One will utilize the same program described under the pre-operational phase. However, when this phase is initiated, sampling frequency should revert to the shortest duration specified under pre-operation. Frequency of sampling may be reduced as results become stabilized, but in no instance should sampling be less frequent than semiannual. The range of substances investigated under the pre-operational phase should also extend into the post-operational period.

The effluent monitoring program will augment the water monitoring program following start-up of Unit One. In addition, monitoring of deep wells and shallow test wells should be initiated during this phase. Water levels will be recorded and the records maintained during the life of the plant.

Table 9.2-1

Chemical and Physical Test Parameters

1. Aluminum	21. Pesticides
2. Ammonia	a. Treflan
3. Barium	b. Atrazine
4. BOD ₅	22. pH
5. Boron	23. Phenols
6. Cadmium	24. Radiological
7. Calcium	a. Radium 226
8. Chloride	b. Strontium 90
9. Chromium	c. Beta
10. COD	25. Silica
11. Copper	26. Specific Conductance
12. Dissolved Oxygen	27. Strontium
13. Fecal Coliforms	28. Sulfate
14. Iron	29. Temperature
15. Magnesium	30. Titanium
16. Mercury	31. Total Alkalinity
17. Nitrate	32. Total Dissolved Solids
18. Nitrite	33. Total Hardness
19. Organic Nitrogen	34. Total Phosphorus
20. Orthophosphorus	35. Total Suspended Solids
	36. Turbidity
	37. Zinc

9.3 TERRESTRIAL MONITORING PROGRAM

The purpose of the proposed monitoring program is to determine the operational effects of the Independence Steam Electric Station on the surrounding terrestrial environment. Of primary concern is the effect of plant emissions to the atmosphere; most noticeably sulfur dioxide (SO_2), on the vegetation and soil in the site vicinity.

9.3.1 Pre-Operational Phase

The pre-operational terrestrial monitoring program will provide at least one year of reliable background information concerning the status of the terrestrial environment. Vegetation monitoring and soil sampling will generally be conducted within a radius of 15 miles from the Independence site, with greatest emphasis at the range of 2 to 5 miles.

9.3.1.1 Vegetation Monitoring

The sensitivity of vegetation to pollutants characteristically emitted by a coal-fired power plant is related almost completely to sulfur dioxide. Methods of vegetation monitoring are consequently tempered by this fact. Effects, theoretically, would develop from the absorption of sulfur dioxide into the leaves or as sulfate from the soil; soil pH could also have an effect on growth and production.

Vegetation monitoring can be divided into two categories:

1. Controlled - various sensitive species planted specifically as indicators of air pollution damage.
2. Uncontrolled - species existing in the natural environment, or planted for production (e.g., crops, vegetables) or as an ornamental (e.g., trees, shrubs).

Within these two categories, the vegetation monitoring program may be defined as indicated below.

Controlled

Monitoring will be conducted in conjunction with the operation of the air monitoring stations, and sensitive species will be planted (e.g., alfalfa, lettuce, elm). Two types of data acquisition will be

conducted during the controlled monitoring. Observations by a trained plant pathologist will be made to determine the type and extent of plant injury. Photographs will be taken at the time of observation to document the condition of the vegetation. In addition, chemical analyses will be conducted to determine the sulfur and trace element contents of the plant residue, utilizing standard laboratory instruments.

The collection of vegetation monitoring data must be supported by narrative descriptions of conditions which may have a bearing on the validity of the sample or photograph, e.g., climatological conditions existing, lighting, filter used, fertilizers applied.

Uncontrolled

The objective of uncontrolled monitoring is to determine the effects of plant operation on the ambient vegetation in the site vicinity. A list of vegetation in the geographical area of the plant, which includes crops, pasture, typical garden vegetables and trees, is provided in Table 9.3-1.

Uncontrolled monitoring will be objective in the selection of "test plots" and cover a much broader range of vegetation species than controlled monitoring. Insofar as possible, "test plots" will be close to the air monitoring stations to permit correlation with levels of sulfur dioxide, but this is not the controlling criteria. "Test plots" will be identified by range and bearing from the plant site. The "test plots" will typify the vegetation in the area in which it is located.

Data acquisition at the "test plots" will utilize field observation (documented by photographs) and chemical analyses, as performed in the controlled monitoring. In addition, use will be made of false-color infrared aerial photography to provide a more widespread indicator of plant stress. These photographs may be taken semi-annually during the spring and summer when vegetation is actively growing and is most likely to exhibit signs of stress.

9.3.1.2 Soil Monitoring

Typical soil analyses contain information relating to the suitability of certain soil for a specific use. Similar information is

required in the background study, but emphasis will be placed on sulfur content (change) and periodic analysis for selected trace elements.

Agricultural land will normally be well mixed from tillage practices and is subjected to periodic treatment with agricultural chemicals, including fertilizers, herbicides, and insecticides. These factors will complicate the identification of any changes in elemental concentration due to discharge from the power plant. Samples will, therefore, be obtained from uncultivated as well as cultivated land.

Soil testing will normally be conducted by an independent laboratory using recognized procedures. Samples will be supplied by AP&L, and routinely analyzed for the following components:

Potassium	Calcium	pH
Organic Matter	Manganese	Mercury
Phosphorous	Sodium	Sulfur

Soil samples will be collected semiannually, one sample from each site during the height of the growing season and one during the dormant period. Periodic (annual) sampling for selected trace elements will also be included. Aluminum, arsenic, barium, cadmium, boron, chromium, nickel, selenium, and titanium will be considered.

Soil samples will be obtained within a radius of 15 miles, with greatest emphasis being placed on the acquisition of samples from the northeast and southeast quadrants, due to the prevailing meteorological conditions, and within a belt of 2 to 5 miles. Soil analyses will be tabulated and summarized in an annual report. Any pertinent observations relative to air and vegetation monitoring will be noted.

9.3.1.3 Miscellaneous Monitoring

It is considered appropriate under the heading of "Terrestrial Monitoring Program" to identify other monitoring routines which will be included to provide a well-rounded program.

Noise

Off-set noise surveys will be conducted near the plant boundary and population centers. Exact information concerning any ambient conditions which may have an effect on the results will be logged.

Materials

Static monitors will provide information concerning possible effects on materials. However, photographs of existing concrete or steel structures in the area (2 to 5 miles) will be considered, coupled with a narrative description of the inspection.

Wildlife and Domestic Animals

Resource material available from the Environmental Impact Statement and through State agencies and academic institutions will be compiled; but outside of statistical information compiled in this manner, no further monitoring is considered necessary.

9.3.2 Post-Operational Phase

The post-operational phase of the terrestrial monitoring program is identical to the pre-operational phase. Frequency of sampling, if reduced during pre-operation, will be re-established at the original interval when Unit One becomes operational. The needed frequency of sampling will then be evaluated based on operative data. The "test plots" concept will be incorporated into the additional post-operational air monitoring station.

Table 9.3-1
Typical Vegetation

CROPS

Cotton*	Oats	Corn	Wheat	Grain Sorghum
Soybeans*	Rice*	Peanuts	Rye	Barley

PASTURES

Lespedeza	Bahia	Alfalfa*
Dallas	Burmuda	Rye Grass
White Clover*	Fescue	Coastal

GARDEN VEGETABLES

Tomatoes*	Turnip Greens	Green Peas
Cucumbers	Sweet Potatoes	Field Peas
Okra	Squash*	Onions
Collards	Lettuce*	Potatoes
Southern Peas	Mustard	Lima Beans
Watermelons	Greenbeans	Beets
	Cabbage	

TREES

Oaks	Hickory	Sycamore
Pecan*	Cedar	Birch
Yellow Pine	Elm*	Elder
Maple	Sweetgum	Box Elder

* Designates recommended indicator species to be selected for monitoring.