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A Study of the Cherokee Nuclear Station: Projected Impacts, Monitoring Plan, and Mitigation Options for Cherokee County, South Carolina

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A STUDY OF THE CHEROKEE NUCLEAR STATION: PROJECTED IMPACTS, MONITORING PLAN, AND MITIGATION OPTIONS FOR CHEROKEE COUNTY, SOUTH CAROLINA

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ABSTRACT

This report inventories Cherokee County's capabilities (Chapter 2) and CNS project characteristics (Chapter 3), projects expected impacts from the interaction of the two (Chapter 4), defines four options for Cherokee County decision makers, and presents a range of possible mitigation and monitoring plans (Chapter 5) for dealing with the problems identified in Sect. 5 '. The fo r options and general implementation guidelines for each are presented after reviewing pertinent features of other mitigation and monitoring plans. The four options include 1) no action, 2) preventing impacts by preventing growth, 3) selective growth in designated areas as services can be supplied, and 4) maximum growth designed to attract as many in-movers as possible through a major program of capital investments in public and private services. With the exception of the "no action" option, all plans deal with impacts according to some strategy determined by how the County wishes to manage growth. Solutions for impact problems depend on which growth strategy is selected and what additional resources are secured during the impact period. A monitoring program deals with the problems of data and projections uncertainty, while direct action is proposed to deal with the institutional problems of delay of the needed access road, timing and location problems from the tax base mismatch, and lack of local planning capability.

IMPACTS OF THE CHEROKEE NUCLEAR STATION UPON THE PEOPLE AND OPTIONS OF CHEROKEE COUNTY

1. INTRODUCTION AND ACKNOWLEDGMENTS

Construction of the three 1280 MWe units of the Cherokee Nuclear Station began in July 1976. According to a timetable issued in March 1978 by Duke Power, the entire project is to be completed in early 1989. Unit 1 is scheduled for commercial operation in January 1985, Unit 2 between July 1986 and January 1988, and Unit 3 in January 1989. A workforce of more than 3500 will be employed to construct the plant over a 13-year period. Figure 1.1 shows the general location of the CNS near Gaffney, South Carolina. This study assesses the impacts and evaluates possible mitigation plans for Cherokee County from the construction and operation of the Cherokee Nuclear Station.

This document is the product of a unique inter-agency agreement which involves cooperation among every geographical level of government from a city and county in South Carolina to the federal government, and includes a major private utility as well. How this assessment came about is an interesting story. Sometime after the USNRC had issued its Final Environmental Statement in 1975 which projected very little socioeconomic impact from the proposed Cherokee Nuclear Station (CNS) (FES), local and state officials in South Carolina became concerned that more substantial impacts, perhaps of a "boom-town" nature, might be forthcoming in Cherokee County. They approached the Appalachian Regional Commission (ARC) whose southernmost jurisdiction ends with the six-county planning region in the northwest corner of South Carolina where Cherokee County is located. In due course, a $40,000 grant from ARC's Energy Impact Fund was made to the Appalachian Council of Governments (Headquarters, Greenville, S.C.) to assess the Cherokee County impacts afresh in the light of Duke Power Company's changed schedules and workforce plans at the CNS. The SCACOG and ARC in turn sought to tap the technical expertise of the Department of Energy (DOE) in assessing local impacts of large energy facilities. Thus, the Social Impact Assessment Group of Oak Ridge National Laboratory became involved

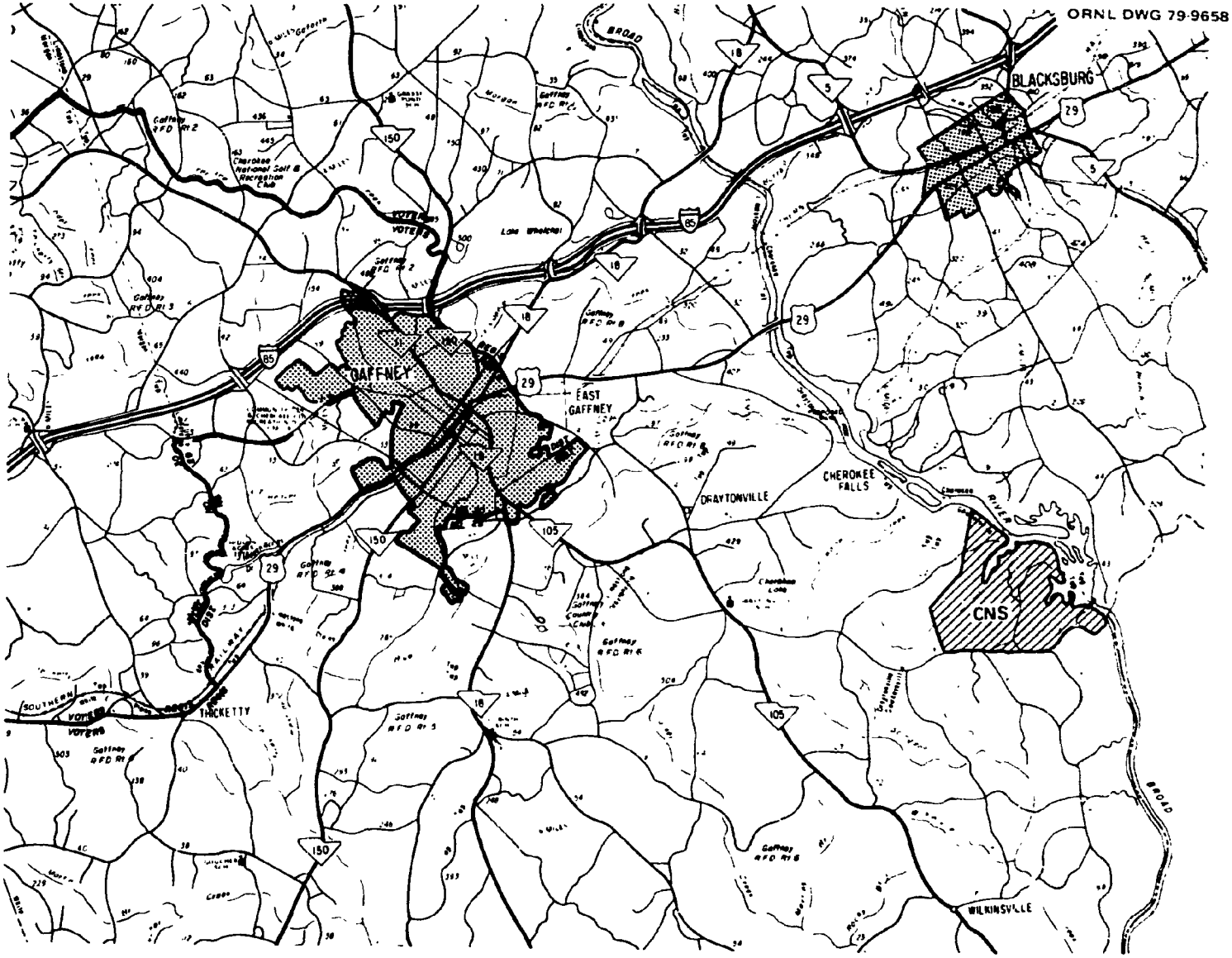

Fig. 1.1. Cherokee Nuclear Station location map.
Source: Champion Map Corp., Charlotte, N.C. as revised by P. Scharre

(supported by DOE) and has conducted this technical assessment of actual and potential CNS impacts in Cherokee County. This assessment of impacts and monitoring and mitigation options for impact management will be input to decision making and possible action by the Cherokee County Council and other South Carolina authorities. Any implementation of findings will be entirely the responsibility of the Cherokee County authorities with possible support through the ARC grant administered by John Fort of SCACOG.

The data used in the assessment was supplied by SCACOG, Duke Power Company, citizens and officials in Gaffney, Blacksburg, and Cherokee County, the State of South Carolina, and the Department of Geography, University of North Carolina at Charlotte. We are indebted to all of them for their active support of the project and their contributions of time and effort. The selection and interpretations of data and conclusions herein are of course the responsibility of the authors.

The scope of the assessment was influenced by the past experience of the ORNL Social Impacts Group (see Post Licensing I and II studies, and Hartsville studies, and numerous environmental impact statements for ERDA, DOE, AEC, and NRC) and the practical needs of the users. We present here a social profile and impact projections for the area, concentrating on those areas where impacts will be most intense, such as housing, schools, public services, and land use. The qualitative Social Impact Model of the ORNL SIA Group guided the analysis, but more quantitative models as of in-movers were not used after evaluation of data and assumptions. The new inputs to the local social and economic systems caused by the construction and operation of the CNS are detailed in Chapter 3, with special attention to construction schedules, taxes, workforce projections, and Duke's employee moving policy. Chapter 4 covers the range of projected impacts of the plant through the construction period in 1989 revealing a major gap between impacts and economic resources (primarily taxes). Choices for Cherokee County created by the impacts, and what others have done when faced with similar impacts, are reviewed in the process of devising a series of options and mitigation strategies tailored to fit Cherokee

County's particular problems and resources (Chapter 5). The appendix summarizes cost, scope, monitoring and other information about selected monitoring and mitigation programs at the Hartsville, Wheatland, Skagit, and Susquehanna stations.

REFERENCES — CHAPTER 1

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2. SOCIAL AND ECONOMIC PROFILE OF CHEROKEE COUNTY

2.1 HISTORY[1]

Though Cherokee County is one of the most recently formed of the 46 counties of South Carolina, it has a proud and varied history.

There was much evidence of Indian use but no Indian settlements in the area when the first white men arrived in the eighteenth century; this land between the Pacolet and Broad Rivers was considered "no man's land", dividing the lands of the Cherokee and Catawba Indians. It is estimated that 1500 white settlers had arrived by 1775, when the quiet and prosperous area was upset by virtual civil war between Tories and Whigs. By late 1780, most of South Carolina was under British control. The most important of the battles and skirmishes fought in the area included defeats for the British at King's Mountain (1780), a turning point in the Revolutionary War, and at Cowpens (1781). Both sites are now national historic battlegrounds.

The City of Gaffney takes its name from an Irish settler, Michael Gaffney, who arrived in 1804, but plans for the city were not drawn up until 1873 when a railroad line was completed. Blacksburg, the other incorporated town in the Cherokee County, was also organized around a railroad, being established in the mid-1880's where the Charleston-Cincinnati line crossed the Atlanta-Richmond line. The impetus for the formation of Cherokee County itself developed around the new town of Gaffney, and in 1893, Cherokee County was formed from portions of three adjacent counties: Spartanburg, Union, and York.

2.2 GEOGRAPHY AND LAND USE

Cherokee County lies in the upper Piedmont area of South Carolina, above the "fall line" where textile mills traditionally developed, and within the southernmost extension of the Appalachian Mountains. Elevations range

from 500 to 1100 feet. Its 395 square miles of hill and valley terrain are bordered by the Broad River, Pacolet River, three South Carolina counties, and the State of North Carolina. It is located in the northwest corner of the state, halfway between the major urban centers of Greenville-Spartanburg, and Charlotte, North Carolina.

The existing land use pattern of Cherokee County is a result of a lack of zoning and subdivision regulations. The land use pattern of Cherokee County is scattered and haphazard, with much recent concentration of development in unincorporated parts of the county. The most significant characteristics of land use development in the county involve, generally, the change from rural agricultural to rural non-farm and, specifically, the great influx of mobile homes scattered throughout the county.[2]

Such a development pattern magnifies several problems such as the lack of suitable soils to build on. As designated by the U.S. Soil Conservation Service, most of the soil in Cherokee County is not suitable for septic tanks. However, given the high cost of sewer extension throughout the county and the lack of development regulations, septic tanks have been extensively utilized, despite potential health problems.

Other problems associated with uncontrolled growth far from the urban centers which provide services include the inefficient or inadequate provision of public services, traffic congestion on substandard roads, and environmental and aesthetic problems. Most importantly, the lack of planning and zoning means that there is no mechanism to prevent such problems from developing.

2.3 POPULATION

2.3.1 Past Growth and Current Estimates

Cherokee County has maintained a consistently slow rate of population growth. Table 2.1 compares Cherokee County's recent growth rates with

Table 2.1. Population Change 1940-1977

	Cherokee County	Cherokee County (less Gaffney)	Gaffney	Appalachian Region	South Carolina
1940	33,290	25,654	7,636	459,938	1,899,804
1950	34,992	26,869	8,123	523,265	2,117,027
% Change	5.1	4.7	6.4	13.8	11.4
1960	35,205	25,770	10,435	586,523	2,382,594
% Change	0.6	-7.8	28.5	12.1	12.5
1970	36,791	23,538	13,253	656,219	2,590,516
% Change	4.5	-9.4	27.0	11.9	8.7
1977[a]	42,100	24,223[b]	15,777[b]	730,100	2,894,700
% Change	14.4	2.9	19.0	11.2	11.7

Sources: 1940-1970 data, U.S. Census of Population.

[a]1977 estimates provided by South Carolina Manpower Research and Analysis, May 1978.

[b]1975 estimates, South Carolina Statistical Abstract, 1977.

Gaffney, the region, and the state. Since 1940 the county has increased in population from 33,290 to 36,791 in 1970. This increase of 3,500 or 10.5%, is only one-fourth of the nation's growth rate during that time (see Table 2.2).

No estimates have been made for the 1978 population of Cherokee County. Estimates provided by the state of South Carolina indicate a population of 42,100 in 1977 (see Table 2.1). This estimated increase of 5,309, or 14.4% is greater than the total population increase over the previous three decades.

As Table 2.1 indicates, Gaffney has experienced a higher rate of population growth than the county as a whole as well as the region and state. From 1940 to 1970 Gaffney's population has increased by 5,617, or 74%. The 1975 estimated population of Gaffney is 15,777.

The town of Blacksburg has experienced slow population growth since 1940. As Table 2.3 indicates, Blacksburg's population actually declined between 1960 and 1970 by 9.1%. Between 1940 and 1970 the population of Blacksburg increased by 60, or 3.1%. The 1975 estimated population of Blacksburg is 2,153.

2.3.2 Projections

Cherokee County is expected to continue its current accelerated growth rate. Table 2.4 shows the projected population for Cherokee County through 1990. County population is projected to increase from 36,791 in 1970 to 52,200 in 1990. This is an increase of 15,409, or 41.8%. The major increase, 21.2%, will occur by 1980.

Gaffney is continuing its steady growth rate. The estimated 1975 population of 15,777 for Gaffney is in excess of a projection for 1980 of 14,901.[3] The 1970-1975 growth rate of 19%, while lower than the previous decade, is still greater than that of the county between 1970 and 1977

Table 2.2. Population Rate Change
U.S. and Cherokee County

	U.S. (%)	Cherokee (%)
1940-50	14.5	5.1
1950-60	18.5	0.6
1960-70	13.0	4.5

Source: U.S. Census of Population, 1940-1970.

Table 2.3. Blacksburg Population Change

1940	1,919
1950	2,056
% Change	7.3
1960	2,174
% Change	5.7
1970	1,977
% Change	-9.1
1975*	2,153
% Change	8.9

Source: U.S. Census of Population, 1940-1970.
*South Carolina Statistical Abstract, 1977.

Table 2.4. Population Projections — Cherokee County

1970	36,791
1980	44,600
% Change	21.2
1985	48,100
% Change	7.8
1990	52,200
% Change	8.5
% Change from 1970	41.8

Source: U.S. Census of Population, 1970.

Projections by South Carolina Division of Research and Statistical Services, December 1976.

(see Table 2.1). It is evident, however, that Gaffney's share of the county population is dwindling. Future population growth for Gaffney depends primarily upon annexation policies.

Although Blacksburg's growth rate from 1970 to 1975 has been modest, its 1975 estimate of 2,153 also exceeds a previous projection for 1980 of 2,126[4] (see Table 2.2).

It is evident that Cherokee County has not experienced a rapid population expansion for the past several decades. Although Gaffney's population has doubled since 1940, it has been a rather steady increase. Therefore, past trends are characterized by a slow growth for the entire county and a steady, substantial growth for Gaffney. Current estimates and projections indicate a continued steady growth for Gaffney and Cherokee County with an increasing percentage of people residing in unincorporated areas of the county.

2.3.3 Population Characteristics

Out-migration has had a great effect on the composition of the population of Cherokee County in terms of race, sex, and age. Between 1950 and 1970 over 9,000 persons emigrated from Cherokee County. As shown in Table 2.5, over 6,000 persons emigrated between 1950 and 1960 alone. The county's overall population growth rate during that decade was only 0.6% (see Table 2.1).

Table 2.6 shows the changes in the age composition of Cherokee County from 1950 to 1970. The percentage of persons under age 18 has dropped from 40.2% in 1950 to 35.6% in 1970. The percentage of persons 18 to 65 years old dropped between 1950 and 1960 as a result of out-migration but rose again by 1970 to 55.6%. Persons over 65 years of age have continually gained as a percentage of the total county population. This increase is primarily due to a low level of out-migration by elderly persons. By

Table 2.5. COMPONENTS OF POPULATION CHANGE, CHEROKEE COUNTY, 1950-60 AND 1960-70

	White	Negro	Total
Population: April 1, 1950	27,244	7,748	34,992
Change: April 1950 to March 1960			
Births	5,920	3,260	9,180
Deaths	1,812	994	2,806
Subtotal	(4,108)	(2,266)	(6,374)
Net Migration*	-3,617	-2,544	-6,161
Total Change	(491)	(-278)	(213)
Population: April 1, 1960	27,735	7,740	35,205
Change: April 1960 to March 1970			
Births	5,552	2,320	7,872
Deaths	2,645	687	3,332
Subtotal	2,907	1,633	(4,540)
Net Migration*	-978	-1,976	-2,954
Total Change	(1,929)	(-343)	(1,586)
Population: April 1, 1970	29,664	7,127	36,791

* Minus sign denotes net out-migration, plus sign denotes net in-migration

Source: U.S. Censuses of Population 1950, 1960, and 1970; South Carolina Department of Public Health; and estimates by Hammer Greene, Siler Associates.

Table 2.6. CHANGES IN AGE PROFILE OF POPULATION, CHEROKEE COUNTY, 1950-60 AND 1960-70

	Under 18 Years	18 to 65 Years	65 Years And Over	Total All Ages
Number of Persons:				
1950	14,073	18,885	2,034	34,992
1960	14,097	18,516	2,592	35,205
1970	13,105	20,454	3,232	36,791
Changes in Number:				
1950-60	24	- 369	558	213
1960-70	- 992	1,938	640	1,586
Changes in Percent:				
1950-60	0.2%	-2.0%	27.4%	0.6%
1960-70	-7.0%	10.5%	24.7%	4.5%
Percent Distribution:				
1950	40.2%	54.0%	5.8%	100.0%
1960	40.0%	52.6%	7.4%	100.0%
1970	35.6%	55.6%	8.8%	100.0%

Source: U.S. Censuses of Population, 1950, 1960 and 1970.

1980 it is estimated that 13.5% of the county population will fall in this category.[5] The median age in Cherokee County in 1970 was 27.06 years.

Table 2.7 shows the decrease in the proportion of the county's population that is male. This reduction from 48.8% in 1950 to 47.6% in 1970 is primarily due to the large number of male out-migrants.

The number of blacks in Cherokee County decreased by over 600 between 1950 and 1970. As shown in Table 2.8, the percentage of the county's black population dropped from 22.1% to 19.4%. By 1980 it is estimated that 16.5% of the county's population will be black.[6] This reduction since 1950 is due to the large number of black out-migrants. Table 2.5 shows the total components of population change since 1950.

In 1976 it was estimated that 41.6% of families in Cherokee County had incomes less than $10,000. By 1980 it is projected that 32.2% of the county's families will earn less than $10,000. The median income for Cherokee County in 1976 was $11,500. It was estimated for 1976 that an annual income of $13,855 was required for a family of four in a Southern non-metropolitan area to have an average standard of living. In 1976, 62.8% of the county's families and 57.9% of the region's families made less than was required to maintain this average standard of living.[7] Total personal income for Cherokee County rose 69.6% between 1970 and 1975, from 102 million to 173 million.[8]

The percentage of county residents over 25 years of age with a high school degree increased between 1960 and 1970. Educational characteristics for Cherokee County, the state, and nation are shown in Table 2.9. In 1960 18.5% of county males over 25 and 24.5% of county females over 25 had high school degrees. In 1970 these figures increased to 26% and 27.7%, respectively. Despite the improvement, Cherokee County lagged far behind state and national averages. In 1970 the proportion of males and females over 25 in South Carolina with a high school degree were 38 and 52.8%,

Table 2.7. CHANGES IN POPULATION BY SEX, CHEROKEE COUNTY, 1950, 1960 AND 1970

	Male	Female	Total
Number of Persons:			
1950	17,077	17,915	34,992
1960	17,020	18,185	35,205
1970	17,510	19,281	36,791
Percent Distribution:			
1950	48.8%	51.2%	100.0%
1960	48.3%	51.7%	100.0%
1970	47.6%	52.4%	100.0%

Source: U.S. Censuses of Population, 1950, 1960 and 1970.

Table 2.8. RACIAL COMPOSITION OF POPULATION, CHEROKEE COUNTY, 1950, 1960 AND 1970

	White	Negro	Total
Number of Persons:			
1950	27,244	7,748	34,992
1960	27,735	7,470	35,205
1970	29,664	7,127	36,791
Percent Distribution:			
1950	77.9%	22.1%	100.0%
1960	78.8%	21.2%	100.0%
1970	80.6%	19.4%	100.0%

Source: U.S. Censuses of Population, 1950, 1960 and 1970.

Table 2.9. Educational characteristics for persons over 25 years of age
United States, South Carolina, and Cherokee County

	1960			1970		
Male 25 years +	U.S.	South Carolina	Cherokee	U.S.	South Carolina	Cherokee
% High School graduates	39.5	28.4	18.5	51.9	38.0	26.0
% College graduates	9.7	7.4	2.9	13.5	10.2	5.7
Median completed	10.3	8.4	7.3	12.1	10.3	8.8
Female 25 years +						
% High School graduates	42.5	32.1	24.5	52.8	37.6	27.7
% College graduates	5.8	6.4	7.8	8.1	7.9	6.8
Median completed	10.7	9.1	4.8	12.1	10.6	9.2

Source: U.S. Census of Population, 1960 and 1970.

respectively. As Table 2.9* indicates, other significant educational characteristics for Cherokee County have improved although the county still lags behind the state and the nation.

The population of Cherokee County is characterized by an increasing proportion of older residents and a decreasing proportion of younger and black residents. Out-migration has been the primary reason for this shift in composition. While the majority of the population of Cherokee County does not have a high standard of living, the county is by no means impoverished.

2.3.4 Summary

Cherokee County has experienced relatively slow population growth in previous decades. Only recently, since 1970, has the rate of growth accelerated to greater than the three previous decades combined.

Most of the population increase has occurred in Gaffney. Gaffney, however, is reaching its growth limit unless annexation occurs. The county will, therefore, receive most of any future population expansion. This expansion, while not expected to be phenomenal, will continue at a greater rate than was experienced before 1970.

2.4 ECONOMY AND EMPLOYMENT

2.4.1 Past Growth Trends

The economy of Cherokee County, as well as the region and the state, has been characterized by a traditional dependence upon textile manufacturing and agriculture. Since 1950, however, the significance of agriculture has decreased. Textiles and apparels remain as the dominant industry while manufacturing as a whole is becoming increasingly diversified. Table 2.10 shows the changes in employment for Cherokee County since 1950.

Table 2.10. Employment changes, Cherokee County, 1950 — 1977

	Number of workers				Change	% Change
	1950	1960	1970	1977	1950-1977	1950-1977
Total non-agricultural	6,700	8,210	10,200	13,980	7,280	108.6
Manufacturing	4,200	4,880	5,600	6,850	2,650	63.0
Textile mill products	3,300	3,929	4,300	4,390	1,090	33.0
Apparel and other products	600	568	800	770	170	28.3
Other manufacturing	300	383	500	1,690	1,390	463.3
Construction	200	260	400	920	720	360.0
Transportation and Public Utilities	200	210	300	950	750	375.0
Wholesale and retail trade	800	920	1,400	1,950	1,150	143.8
Finance, Insurance, and Real estate	100	180	300	270	170	170.0
Services	400	840	800	1,070	670	167.5
Mining	100	100	100	NA	-	-
Government	700	820	820	1,880	1,180	168.6
Total Other	4,200	3,200	2,300	90	-	-
Agriculture	2,900	1,600	900	NA	-	-
Self employed	1,300	1,600	1,400	NA	-	-
Other nonmanufacturing	NA	NA	NA	90	-	-
Total employment	10,900	11,410	12,400	14,070	3,170	29.0

Sources: 1977 data, South Carolina Manpower in Industry, June 1978, S. C. Employment Security Commission.

1950-70 data in The Economy of Cherokee County, November 1971, Hammer, Greene, Siler Associates, data compiled by South Carolina Employment Security Commission.

As Table 2.10 indicates, total non-agricultural employment has steadily risen in Cherokee County. Between 1950 and 1970 the county was dependent primarily on textile and apparel manufacturing. In 1950 64% of total non-agricultural employment was in manufacturing, of which 93% was textile-related. In 1970 55% of total non-agricultural employment was in manufacturing, of which 91% was textile-related. This slight decline in the proportion of manufacturing was the result of increases in other employment sectors. Textile related manufacturing actually rose 30% during that time. Other employment sectors with large gains were construction; services; finance, insurance, and real estate; and wholesale and retail trade.

The most significant change in county employment between 1950 and 1970 was in agriculture. The number of persons employed in agriculture declined from 2,900 in 1950 to 900 in 1970 (see Table 2.10). This loss of employment is the result of many agricultural workers and small farmers finding better employment opportunities in other sectors of the economy. This decline has not led to a reduction in cash receipts from farm marketings. Cash receipts have risen from 5.2 million in 1957 to 7.0 million in 1975.[9]

The past growth of the Cherokee County economy has been characterized by great decline in agricultural employment and modest increases in other sectors. Manufacturing, particularly textiles and apparel, have continued to dominate the economy although a slight decline is evident. Despite the loss of 2,000 agricultural jobs, total employment increased by 13.8% between 1950 and 1970.

2.4.2 Recent Trends

Recent trends in labor force, employment, and unemployment are shown in Table 2.11. This data is estimated by place of residence, that is, these persons live in Cherokee County and are employed, although not necessarily in Cherokee County. This distinction is important if Table 2.11 is

Table 2.11. Cherokee County Labor Force Characteristics
1972 - 1978

	Annual Average						
	1972	1973	1974	1975	1976	1977	1978
Civilian labor force	17,720	18,490	18,480	18,260	19,840	21,240	21,920
Employment, Total	16,980	17,700	17,160	16,250	18,440	19,850	20,700
Unemployment	740	790	1,320	2,010	1,400	1,390	1,220
Percent of labor force	4.2	4.3	7.1	11.0	7.1	6.5	5.6

Source: Labor Force Estimates for January 1973 - May 1978, July 7, 1978, South Carolina Employment Security Commission.

compared to Table 2.12 which is based on place of work and excludes agricultural employment. Although the total employment figures of Tables 2.11 and 2.12 cannot be directly compared, significant trends are identifiable.

As Table 2.11 indicates, total employment has increased from 16,980 in 1972 to 20,700 in mid-1978. The unemployment rate also rose during that period from 4.2 to 5.6% of the civilian labor force. The highest unemployment rates during this period were recorded in 1975 when 11.0% were unemployed. These rates are higher than the average regional, state, and national trends of that time. Table 2.13 compares unemployment rates from the county, region, state, and nation from 1972 to mid-1978. In general, Cherokee County's unemployment rate was higher than the region, state, and nation. Recently the county's rate has been closer to the region's, higher than the state's, and lower than the nation's.

The most significant changes in employment since 1970 occurred in manufacturing, construction, and transportation and public utilities (see Table 2.12). Contrary to past trends, textile-related manufacturing employment declined slightly between 1970 and 1977. However, this loss was offset by a dramatic (238%) increase in other types of manufacturing employment. Included are the manufacture of twist drills, roller bearings, and molded plastics.[10]

The shifts in types of manufacturing and increases in other employment sectors indicate an increasingly diversified economy although textile manufacturing continues to dominate. In 1977, 49% of total non-agricultural employment was in manufacturing, of which 75% was textile related. This shows a great decrease from the previously mentioned dependence on manufacturing, particularly textiles, in earlier decades. As mentioned, in 1950 64% of total non-agricultural employment was in manufacturing, of which 93% was textile related.

Cherokee County's continued dependence on textile related employment is evident when the county is compared to the region and state. In 1977,

Table 2.12. Cherokee County nonagricultural wage and salary employment[a]

	Annual average					
	1972	1973	1974	1975	1976	1977[b]
Total	11,850	12,680	12,450	11,520	12,760	13,970
Manufacturing	6,620	6,990	6,730	5,710	6,540	6,850
Textile mill products	4,650	4,710	4,540	3,520	4,150	4,390
Apparel & other textile products	D	630	660	720	860	770
Other manufacturing	1,970	1,650	1,530	1,470	1,530	1,690
Construction	870	880	640	470	630	920
Transportation & Public Utilities	270	290	280	460	590	950
Wholesale & Retail Trade	1,640	1,830	1,820	1,760	1,800	1,950
Finance, Insurance & Real Estate	230	270	280	260	260	270
Services	850	910	900	860	960	1,070
Government	1,290	1,420	1,710	1,900	1,900	1,880
Other nonmanufacturing	80	90	90	80	70	90

[a]Employment by establishment or place-of-work basis.

[b]Preliminary: 1977 data will be revised in the next addition.

NOTE: Totals may not add due to rounding.

Source: South Carolina Manpower in Industry, June 1978.
South Carolina Employment Security Commission.

Table 2.13. Comparative annual average unemployment rates

	1973	1974	1975	1976	1977	1978
Cherokee	4.3	7.1	11.0	7.1	6.5	5.6
South Carolina Appalachian Region	2.9	5.3	9.8	6.5	6.3	5.3
South Carolina	3.6	4.8	8.7	6.4	5.0	4.4
United States	4.9	5.6	8.5	7.7	7.0	6.3

Source: Labor Force Estimates for January 1973 - May 1978, July 7, 1978, South Carolina Employment Security Commission.

44% of the region's non-agricultural employment was in manufacturing, of which 61% was textile related. Thirty-five percent of the state's non-agricultural employment was in manufacturing, of which 50% was textile related.

2.4.3 Economic Relationship to Surrounding Area

Commuting patterns for Cherokee County, based on 1970 census data, are shown in Table 2.14. From this data it is obvious that Cherokee County has great economic ties with the surrounding area. Cherokee County had 3,535 workers commuting out of the county and only 723 workers commuting into the county. Forty-eight percent of those workers commuting out of the county went to Spartanburg County. This difference between out-going and in-coming workers represents a lack of employment opportunities within the county. It should be noted that the growth of non-textile-related manufacturing since 1970 may have altered this trend.

Another measure of Cherokee County's economic relationship with the surrounding area is the slow growth and low proportion of the service sector of the economy in relation to the faster growth of the basic sector. (Basic economy activities are those which sell products or services outside the county, thereby bringing in new revenue. Non-basic activities recirculate existing revenue within the county.) Cherokee County, therefore, relies greatly on services provided outside the county, most likely in Spartanburg County. If Cherokee County did not rely on the surrounding area, the county's service employment would have risen in response to new growth in population and basic employment.

2.4.4 Summary

Although Cherokee County's economy and employment is still dominated by textile-related manufacturing, many changes have occurred. The dependence on textiles has lessened as other employment opportunities have arisen, particularly since 1970. The county unemployment rate is no longer above

Table 2.14. Worker commuting patterns for Cherokee County, S.C., 1973

IN-COMMUTING FROM		OUT-COMMUTING TO	
County	Number	County	Number
Greenville	4	Chester	7
Spartanburg	277	Greenville	115
Union	29	Lexington	7
York	116	Richland	21
Cleveland, N. C.	242	Spartanburg	1,682
Gaston, N. C.	11	Union	23
Rutherford, N. C.	44	York	120
		Buncombe, N. C.	6
Total	723	Cleveland, N. C.	827
		Gaston, N. C.	136
		Mecklenburg, N. C.	154
		Polk, N. C.	6
		Rutherford, N. C.	129
		Elsewhere	302
		Total	3,535
		Worked in county of residence	10,478
		Place of work not reported	1,025
		Total number of workers residing in county	15,038

Source: Commuting Patterns for South Carolina Counties, South Carolina Employment Security Commission, 1973.

national averages in recent years but has been consistently higher than six-county or state averages. In general, the economy of Cherokee County has been characterized by increasingly diversified employment opportunities.

2.5 HOUSING

Unless otherwise noted, data in this section is based on the 1970 Census of Housing and is taken from the *Regional Housing Element, Vol. III,* published June 1977 by the South Carolina Appalachian Council of Governments.

2.5.1 Current Housing Characteristics

2.5.1.1 Quantity by ownership and type of housing

Table 2.15 shows housing occupancy trends for Cherokee County from 1950 to 1970. Significant shifts toward greater owner occupancy are evident. The number of owner occupied units increased by 4,394 between 1950 and 1970, or from 48.4 to 67.6% of total occupied units. Renter occupied units increased by only 356, and proportionately decreased from 51.6 to 32.4% of total occupied housing units.

As indicated in Table 2.15, the percentage of non-white owner occupied housing units has increased from 26.5% in 1950 to 47.8% in 1970. The majority of non-white housing, however, is still renter occupied.

There was a total of 593 multi-family units in Cherokee County as of March 1978. Over three-fourths, or 461, of these units are subsidized. In the region as a whole only one-third of multi-family housing is subsidized.[11] The overall vacancy rate for multi-family units in Cherokee County was 1.5%.

Housing production for Cherokee County between 1970 and 1976 has followed the above mentioned trends of the past two decades (see Fig. 2.1). An

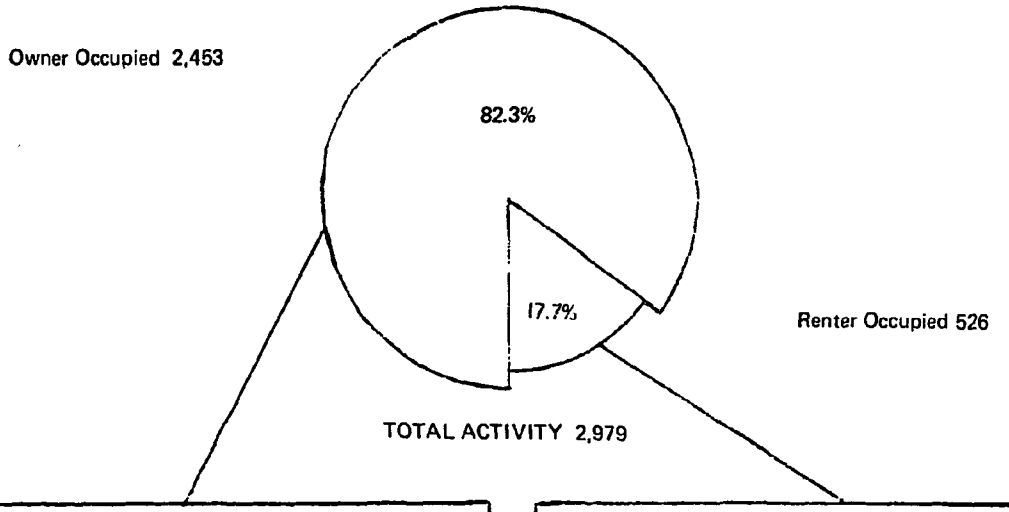
Table 2.15. Ownership trends in housing occupancy

Cherokee County

	1950	1960	1970
Total occupied units	6,131	9,290	10,881
Owner occupied	2,970	5,482	7,364
Percent	48.4	59.0	67.6
Renter occupied	3,161	3,808	3,517
Percent	51.6	41.0	32.4
White occupied units	4,961	7,655	9,176
Owner occupied	2,660	4,844	6,549
Percent	53.6	63.3	71.4
Renter occupied	2,301	2,811	2,627
Percent	46.4	36.7	28.6
Non-white occupied units	1,170	1,635	1,705
Owner occupied	310	638	815
Percent	26.5	39.0	47.8
Renter occupied	860	997	890
Percent	73.5	61.0	52.2

Source: U.S. Census of Housing, 1950, 1960, 1970.

Fig. 2.1. Housing activity in Cherokee County — 1970-1976



TYPE OF UNIT		
*Unsubsidized Single-Family Dwellings	613	25.0
HUD 235 Mortgage Insurance and Assist. Prog.	162	6.6
FmHA 502 Basic Home Ownership Program	403	16.4
Condominiums	0	0.0
Mobile Homes	1,275	52.0
TOTAL	2,453	100.0

TYPE OF UNIT	No.	%
Unsubsidized Apartments	36	6.8
FmHA 515 Rural Rental Program	48	9.1
HUD 236 and BMIR Mortg. Int. Reduction/Rental Assist. Prog.	189	35.9
Public Housing Authority	28	5.3
Mobile Homes	225	42.9
TOTAL	526	100.0

*Building permit data for single-family dwellings was only available for the City of Gaffney. County housing growth was determined by a ratio or the City of Gaffney's population growth to building permit activity applied to the County population growth.

Sources: U.S. Bureau of Census, Construction Reports – Housing Authorized by Building Permits and Public Contracts, 1970–1976; Dept. of Housing and Urban Development – Columbia office; Farmers Home Administration – District office; Cherokee County Health Department, Cherokee County Multi-Family Housing Survey – 1976.

estimated 2,979 units were built between 1970 and 1976, of which 2,543, or 82.3%, were owner occupied. The most significant characteristic of this growth has been the great amount of mobile home emplacement. Over half of the owner-occupied housing units and 42.9% of renter-occupied units built between 1970 and 1976 were mobile homes. Also, one-half of the rental units built during this time were subsidized.

The majority of recent housing construction has occurred in the unincorportated area of Cherokee County. Of the 2,979 units built between 1970 and 1976, two-thirds, or 1,968, were built in unincorporated areas. Most of this construction consists of single family units and mobile homes. It is estimated that 95% of mobile home emplacement takes place in unincorporated areas of the county.

According to the septic tank permit data collected by the county health department (not including Gaffney), the total of new (stick-built) homes and mobile homes was 589 in 1976, 658 in 1977, and 665 in 1978. Though the totals for the last two years are the same, 100 more stick-built homes were constructed in 1978, for a subtotal of 364 homes and 301 mobile homes.

2.5.1.2 Quality

The 1970 Census of Housing defines a substandard housing unit as one which lacks one or more plumbing units. As shown in Table 2.16, in 1970 in Cherokee County 2,247, or 20.7%, of the total occupied housing units were substandard. Almost half of these substandard units were vacant. In comparison, 15.5% of Gaffney's and 11.6% of the six-county region's total occupied housing units were substandard in 1970.

The problem of substandard housing conditions is particularly great for non-whites. In 1970 non-whites occupied 38.9% of the county's substandard housing. In Gaffney 67% of the substandard housing was occupied by non-whites. Half of all non-white housing is substandard. Also, 59% of the county's and 70% of Gaffney's substandard housing was renter occupied.

Table 2.16. Substandard housing units
Gaffney, Cherokee County, South Carolina Appalachian Region
1970

	Gaffney	Cherokee	Region
Total housing units	4,325	11,643	216,866
Total occupied housing units	4,055	10,881	201,572
Substandard units	627	2,247	23,403
Percent	15.5	20.7	11.6
Percent renter occupied	70	58.8	62.8
Percent owner occupied	30	41.2	37.2
Percent minority occupied	67	38.9	45.6

Source: 1970 U.S. Census of Housing.

The highest proportion of substandard housing is in the two census county divisions that make up the southern half of the county. The largest single concentration of substandard housing is located in the census division near Gaffney.

Overcrowding is also a contributor to poor housing conditions. According to Department of Housing and Urban Development criteria, a housing unit is overcrowded if there are more than 1.01 persons per room. In Cherokee County 12% of the housing units are overcrowded, the highest proportion in the six-county region. Thirty-five percent of these units are occupied by non-whites.

The median value of owner-occupied housing in 1970 was $10,800. This amount ranks below the regional and state median values of $11,720 and $13,200, respectively. Only Oconee County has a lower median value in the region.

2.5.2 Codes

There are six types of codes related to housing activities. They are building, plumbing, electrical, housing, fire, and gas. Greenville County is the only county in the region that has adopted any codes. Gaffney has codes relating to all the above areas and is one of the few cities in the region to employ a full-time inspector. As the amount of housing construction escalates in unincorporated areas of Cherokee County, the need for codes and code enforcement will increase.[12]

2.5.3 Future Needs

The estimated housing needs in this section are based partially on population projections that are different from those contained in Section 2. However, significant trends and characteristics are still evident and useful in assessing future housing needs.

The housing need for 1976 was estimated to be 5,406 units. By 1980 this need will increase by 2,581 to 7,981. It is projected that 40% of housing needs will be owner occupied while 60% will be renter occupied. This projection does not reflect the trend encountered between 1970 and 1976 in which 82% of the units constructed were owner occupied (Sect. 2.5.1.1). Either the projection is incorrect and the county's needs are being met, or the county is experiencing a shortage in the construction of rental units.

Lower income groups will be most affected by housing needs for 1980. According to projections, households in Cherokee County earning less than $8,000 a year will require 676 owner-occupied units and 1,285 rental-occupied units. As a result of increased housing costs most of these families will require government subsidies in order to obtain adequate housing.

2.5.4 Summary

The housing stock of Cherokee County has changed from a majority of renter-occupied units to one that is increasingly dominated by owner-occupied units. The more significant characteristics of this trend are the large numbers of mobile homes and the predominance of housing construction in unincorporated areas of the county, where zoning and building codes do not exist. In general, the housing stock of Cherokee County can be characterized as having a high proportion of substandard units, one out of every five. Other significant characteristics include the large proportion of multi-family and rental housing that is subsidized and the continued demand for subsidies in the future.

2.6 PUBLIC SERVICES

2.6.1 Education

Enrollment in Cherokee County public schools has not drastically changed since 1960. Although modest increases and decreases have occurred, the

absolute growth has been small. In 1960 there were approximately 8,591 pupils enrolled in the county's public schools.[13] Enrollment reached a peak in 1969 with 8,966 pupils, then decreased to 8,426 in 1974. In 1978 there were 8,619 pupils enrolled in Cherokee County's 19 public schools, a modest absolute increase of 28 since 1960.[14] The 1979 enrollment total was 8603, essentially unchanged. Enrollment increases have not reflected other significant increases in population, housing, and employment. Public school enrollment in Cherokee County, as well as the state, is expected to decline in the near future. By 1983, enrollment in Cherokee County is to decline to 8,138,[15] though retention of a greater proportion of current high school dropouts could result in increases in high school enrollment.

Enrollment for the 1977-78 school year is shown in Table 2.17. Also shown on Table 2.17 are the number of mobile classrooms. Cherokee County schools are currently operating at overcapacity. There is currently a certified staff of 450 employed by the public schools. It is estimated that as a result of revisions in state capacity standards an additional 44 classrooms will be needed in the near future.[16]

Funding for Cherokee County public schools comes from three sources. The majority, 46.4%, is funded by the state. The local contribution totaled 37.2% while the remaining 16.4% is from the federal government.[17] The average teacher's salary in 1978 was $11,000.[18]

2.6.2 Utilities[19]

The Gaffney Board of Public Works has the responsibility of providing electrical, sewer, and water services within the city limits and to much of Cherokee County. Other responsibilities include maintenance of meters, traffic signals, and street lights. The Board has recently undertaken much expansion and modernization of facilities and services.

In 1972 a new electrical substation was built in response to increasing demands. The new 40,000-kW substation doubled the electrical capacity of the city. In 1977 the demand on the station was 25,000 kW thereby

Table 2.17. Cherokee County Enrollment
Grades 1 - 12

School	Mobile Classrooms*	1977-78	Change 1976-1977 to 1977-1978
Blacksburg High	0	740	+3
Cherokee High	1	172	+172
East Junior High	0	920	-11
Gaffney High	0	1365	+72
West Junior High	1	971	-6
Alma	2	219	-6
B. D. Lee	0	497	-6
Blacksburg No. 1	2	367	+4
Blacksburg No. II	1	388	-3
Central	2	294	-1
Corinth	4	413	+20
Daniel Morgan	2	142	-11
Draytonville	2	357	-1
Goucher	0	155	+19
J. Paul Beam	2	153	+7
Limestone	1	277	-16
Luther L. Vaughan	0	363	-33
Macedonia	2	160	+21
Mary Bramlett	0	666	+11
TOTALS	23	8619	+235

*Mobile classroom data obtained from Dr. Gosnell, Assistant Superintendent of the Gaffney Public School System.

Remaining data were obtained from the Cherokee County Attendance Officer, Mr. Patterson.

leaving much excess electrical capacity, a positive inducement to growth. The number of electrical customers has not increased significantly during the past several years. In 1971, the Board served 6,631 customers and in 1977 served 7,387 customers. The Board purchases electric power from the Duke Power Company and the Southeastern Power Administration. The remainder of Cherokee County is served by the Broad River Electric Cooperative.

The water system of the Gaffney Board of Public Works has undergone major expansion and now serves 90% of Cherokee County. In 1972 the Draytonville section of the county formed a water district and began to purchase water from the Board. In 1973 service was begun to Blacksburg after completion of a water line. The capacity of the water plant was increased in 1974 when the Goucher community began to purchase water. Another addition to the plant in 1977 increased capacity again. The Appalachian Regional Commission provided funding for half of the 1.4 million dollar project. As of June 1978 the Board served 4,497 water customers in the city, 2,157 outside the city, and 2,418 in four water districts and Blacksburg for a total of 9,072 customers.[20]

As a result of a 201 Wastewater Facilities Study in 1975, planning for a new sewage treatment plant was started. The plant is scheduled to begin operation in late 1978 and will have a reserve capacity for future growth. Besides construction of the plant itself, 13 miles of sewer lines were also installed. The new plant was primarily funded by an Environmental Protection Agency grant for 75% of the total cost. The Board funded the remainder of the $5.8 million project.

Improvements in the operations of the Board include a computer system which began operation in 1972 to handle administrative and billing operations more efficiently. Many other communities have used this system as a model for their own. Other operations improvements include new facilities and equipment, and reorganization of personnel.

Future expansion projects of the Board include the following. Applications for funds will be made to appropriate agencies for the dredging of Lake Whelchel to increase capacity lost as a result of silting. A Cherokee County Metropolitan Sewer Commission will be formed to deal with wastewater problems on a countywide basis and to be eligible for EPA funds. The Providence Creek and the Peoples Creek Waste Treatment Plants are to be expanded, also. Other improvements include a new water storage tank, upgrading of downtown Gaffney's electrical supply, and eventually a new water plant on the Broad River.

The Gaffney Board of Public Works has increased its services significantly in recent years. Needed improvements and expansion have taken place in water, sewage treatment, and electrical services. The operations of the Board have also been upgraded and made more efficient. The current under capacity usage of facilities along with future planned expansion of facilities should serve both to stimulate and accommodate growth.

2.6.3 Public Safety

2.6.3.1 Law enforcement

Cherokee County is served by four separate law enforcement agencies: the police departments of Gaffney and Blacksburg, the county sheriff's office, and the State Highway Patrol.

As indicated in Table 2.18, in 1976 the county as a whole had 1.11 sworn officers per 1000 citizens, .12 officers per square mile or one officer for each 8.33 square miles. There were a total of 46 sworn law enforcement officers, six correctional officers, and no juvenile, narcotics, burglary and robbery, or crime prevention officers,[21] (not including the state police who have responsibility for traffic enforcement outside the city).

Table 2.19 shows comparative crime rates for Cherokee County, the six-county region, and the state. Cherokee County ranks lower than regional

Table 2.18. Law Enforcement Profile
Cherokee County

	Total officers	Staff sworn officers	Correctional	Other
Cherokee County (total)	63	46	6	11
Blacksburg	6	5	0	1
Gaffney	26	17	3	6
Cherokee County sheriff	31	24	3	4

Source: Criminal Justice System in the Appalachian Region, 1976 Statistical Abstract.

Table 2.19. Comparative crime rates, 1977

	Murder	Rape	Robbery	Aggravated assault	Breaking and Entering	Larceny	Motor vehicle theft
Anderson	0.9	1.3	5.4	34.8	128.4	190.6	23.7
Cherokee	1.5	1.5	6.9	28.3	100.0	126.8	15.0
Greenville	1.0	4.7	15.6	61.4	207.5	346.3	41.9
Oconee	1.2	1.6	3.2	29.0	108.1	98.8	10.1
Pickens	0.7	1.6	3.5	27.3	84.2	159.2	10.7
Spartanburg	1.1	2.8	8.0	36.8	174.8	280.7	32.0
South Carolina Appalachian Region	1.1	2.3	7.1	36.3	133.8	200.4	22.2
South Carolina	1.2	3.3	10.6	48.5	161.3	233.8	24.5

Source: Crime in South Carolina 1977, South Carolina Law Enforcement Division.

and state averages in all categories except murder. As of October, 1975 the Cherokee County Correctional Center (city jail with overnight facilities) had 65 inmates, with a capacity of 76. The county jail is seriously overcrowded now with an average daily census of 40 prisoners in 12 cells and limited space for other functions or separation of prisoners by age or sex. Proposed new state standards for July 1979 will limit the jail to 12 prisoners.

2.6.3.2 Fire protection

The City of Gaffney provides fire protection by contract to all of Cherokee County west of the Broad River, with the exception of the Macedonia area which maintains its own volunteer force. The Volunteer fire protection unit in Blacksburg is responsible for areas east of the Broad River. Mutual aid agreements exist between county volunteer fire units and other towns.

Gaffney currently has six fire fighting vehicles, 22 firemen, and approximately 20 volunteers. Of these six vehicles, four are pumpers, another is a four-wheel drive vehicle, and another is a ladder truck. There is one main station and one substation in Gaffney. Blacksburg owns four vehicles — three pumpers and one tank truck, maintained by 45 volunteers. Seven other volunteer fire units are being formed throughout the county. The Macedonia volunteer fire unit was formed before this county-wide action.[22]

Gaffney has a fire rating of class V while Blacksburg has a rating of class VII. These ratings are used to determine fire insurance rates and range from the best, class I, to the worst, class X.

2.6.4 Land Use Controls

Subdivision regulations and a zoning ordinance were enacted in Gaffney in 1969 and 1970, respectively. However, these ordinances were enacted after most of the land in Gaffney had been developed. Such ordinances

are most effective in developing land and preventing problems, but are still essential in the continuing redevelopment of land. Blacksburg adopted a land use plan and zoning ordinance in 1977, but relies on the county for building permit inspection and enforcement. The rest of Cherokee County has neither zoning or subdivision regulations. Adoption and implementation of these measures help to ensure an efficient and rational use of land. The current county land use pattern, as discussed in Sect. 2.2, is evidence of the lack of such an approach. The existing zoning and subdivision regulations in Gaffney are in need of revision in response to the 1977 update of the Gaffney Land Use Plan.

2.6.5 Local Government and Finance

Local government is relatively new to Cherokee County. In 1974 South Carolina passed legislation which allowed counties to establish governments. Previously, a delegation to the state legislature had performed local government functions. Currently, a nine member council serves as the main governing body of the county. In 1981 re-districting will reduce the number of council members to seven.

Cherokee County has the second lowest tax rate in ~~the~~ state. Currently, the rate is set at 190 mills per one dollar of assessed value. The rate for the Macedonia area of the county is eight mills higher as a result of fire protection services.[23]

Current tax assessment ratios are the result of state legislation in 1975 that provided for statewide equal and uniform property classification and assessment. Assessment ratios include 10.5% of fair market value on manufacturers and utilities, 6% on business establishments, 2.5% rising to 4% on residences, and 6% on mobile homes.[24] Cherokee County is currently in the process of re-appraisal, mapping, and re-assessment of all property, the first such comprehensive effort in its history.

The 1976-77 budget for Cherokee County amounted to $12.6 million. Approximately one-third of the budget, or 4.1 million, was collected through

property taxes. The majority of the remaining portion was derived from state and federal funds. Other local sources included fees, licenses, permits, and fines. The largest appropriation was 9.3 million for schools.[25]

Gaffney is governed by a six member council and a mayor, each having four-year terms. The city levies a property tax of 115 mills per one dollar of assessed value. The 1978-79 budget for Gaffney amounted to 2.2 million. Over half of this budget was collected through taxes and federal revenue sharing. Approximately two-thirds of the budget is spent on police and fire protection, public improvements, and sanitation.[26]

Blacksburg is governed by a four-member council and a mayor, each having a four-year term. The 1978-79 budget for Blacksburg amounted to $270,020. Over two-thirds of the budget was collected through property taxes, public service employment (PSE) income, and federal revenue sharing. The great majority of the budget went to police and fire protection and streets.[27]

2.6.6 Public Health

The Cherokee County Health Department has the responsibility of enforcing state rules and regulations concerning water supply and waste disposal for subdivisions. The state requires that all new developments be served by sewerage systems, if feasible. If service by a sewerage system is found unfeasible, a permit for a septic tank must be issued by the Health Department. These regulations also pertain to service for mobile homes. As discussed earlier, Cherokee County is experiencing a great increase in the number of mobile homes. The issuance of a septic tank permit provides the only method of regulation over the location of mobile homes.[28]

2.6.7 Roads

Cherokee County has a total of 690.0 miles of paved state and federal highways. State secondary roads total 519.6 miles, or 75% of the county

system. State primary roads total 148.5 miles and Interstate 85 comprises 22.8 miles.[29]

The two major roads in the county, I-85 and U.S. 29, traverse the county in an east-west direction. Gaffney is the main crossroads in the county with U.S. 29, state roads 11, 18, 150 and 105 all intersecting there.

The Cherokee nuclear station is located in a relatively isolated section of the county with poor road access. From I-85 all traffic must travel through the main streets of Gaffney. This causes a great potential for congestion because of the poor conditions of many streets and the many turns necessary in traveling through the city. From Gaffney the route to the plant involves traveling southeast on Highway 105, a two-lane primary road, and east on Highway 13, a two-lane secondary road. These roads have experienced an increase in traffic since the start of plant construction in July, 1976.[30] Highway 13 is particularly susceptible to congestion and structural damage because of its size and because all plant bound traffic must travel on it.

A new two-lane access road to the plant is planned in an attempt to alleviate congestion on existing roads in the Gaffney area. This road is referred to as the Duke Access Road, or state route 329, and will be located east of Gaffney (see Fig. 2.2). The first section of this road will link 105 to 29 with extension to I-85 at a later date.

The access road is funded by the state and Appalachian Regional Commission and is to cost approximately $5-6 million. The ARC committed $1.7 million for this purpose in 1975. State funding was not authorized until 1978. Construction could start in the spring of 1979 now that a construction bid was accepted in late 1978 for the 29-105 portion. If construction proceeds on schedule, the first link will be completed in late 1980 and the second link in 1981.[31]

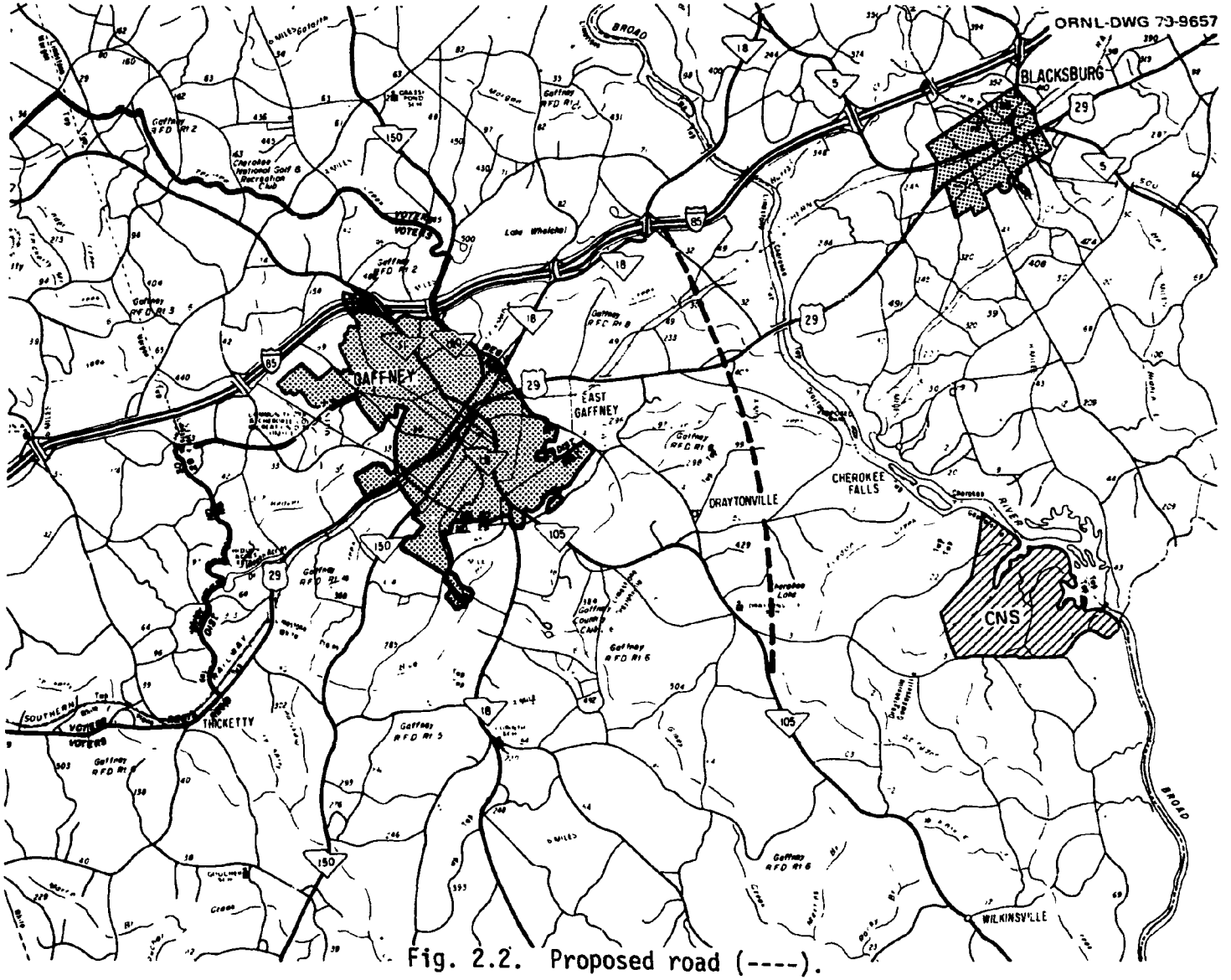


Fig. 2.2. Proposed road (----).

Source: Champion Map Corp., Charlotte, N.C. as revised by P. Scharre

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3. THE CHEROKEE NUCLEAR STATION AND WORKFORCE

3.1 STATION LOCATION AND CHARACTERISTICS[1]

The 3840 MWe Cherokee Nuclear Station is located on the Broad River in eastern Cherokee County about 21 miles northeast of Spartanburg and 8 miles southeast of Gaffney. The station is approximately 1000 yards west of the Ninety-Nine Islands Reservoir, an impoundment of the Broad River. The reservoir bounds the station on the north, east, and west sides (see Fig. 3.1).

The total area required for the station is 2263 acres within which a 1272-acre site will be fenced. Within the site boundary fence a total area of 751 acres will be required for facilities as well as three access roads and three ponds. The general public is restricted from access to this area, while some limited recreation will be permitted on the remaining acreage outside the boundary fence.

The station will consist of three identical 1280-MWe pressurized water reactors contained in separate domed buildings, each 160 feet high. Included near each reactor building will be a 110-feet-high turbine-generator building and an auxiliary building. The site will also contain nine mechanical draft cooling towers 74 feet in height, one central administration building, and one central equipment building. The station structures will be constructed on high ground and will be visible from several vantage points in the surrounding countryside.

Another aspect of station construction is transmission lines. Approximately 654 acres of right-of-way will be required to erect 20.5 miles of transmission lines. Of this total required acreage, 550 acres will be forest, while the rest is active or inactive pastureland. Also, 83 acres have been taken by the recent completion of a railroad spur for the station.

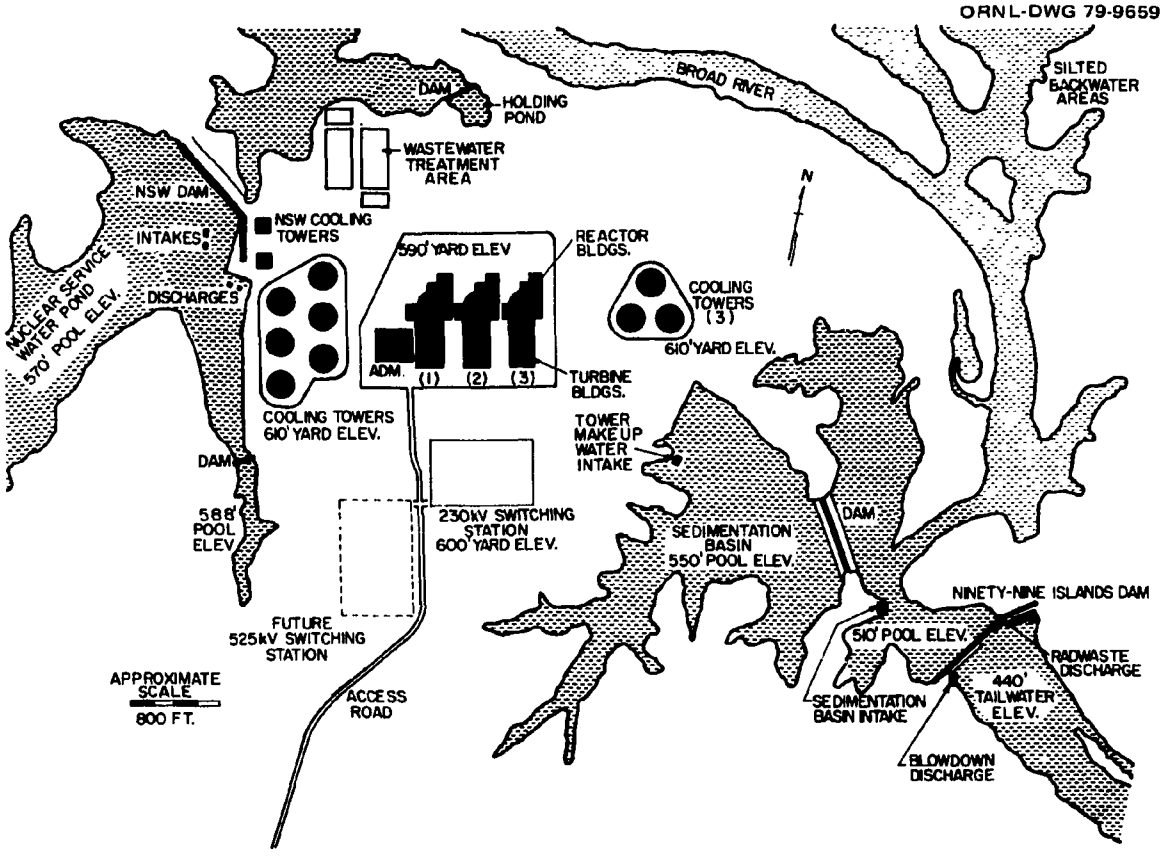

Fig. 3.1 Layout of principal features of Cherokee Nuclear Station. Source: Final Environmental Statement, Cherokee Nuclear Station.

3.2 WORKFORCE PROJECTIONS AND CONSTRUCTION SCHEDULE[2]

Construction of the Cherokee Nuclear Station began in July 1976. According to a timetable issued in March 1978 by Duke Power, the entire project is to be completed in early 1989. Unit 1 is scheduled for commercial operation in January 1985, Unit 2 between July 1986 and January 1988, and Unit 3 in January 1989.

The construction workforce consists of two elements. The majority of workers will be directly employed by the Duke Power Company. The remainder will be subcontract employees. The average in-house construction employment is shown in Table 3.1. These figures do not include subcontractors. The estimated peak construction workforce of 3,056 will occur in the second quarter of 1984 as Unit 1 nears completion. Included in this peak force figure are 200 subcontractor employees.

The plant operating force will begin activities during the construction period (1982 with 50 workers), adding an additional group of employees to the overall workforce. By 1985 when the first generating unit is complete, the operating force will have grown to 550. The full operating workforce of 805 will be at work in 1987. This total will be maintained for the life of the plant. Figure 3.2 shows a breakdown of the three workforce elements throughout the period. The <u>total</u> workforce will thus reach a peak of 3,558 in mid-1985. The construction element of the workforce will be approximately 3000 at this time and will continue to decline steadily after that until only the operating workforce of 805 will remain. The combined workforce totals will be 2000 or more for seven years and 3000 or more for five years.

The total payroll for construction employment, excluding subcontractors, will be approximately $622 million. The plant is expected to be in operation for approximately 40 years. During this time the total operating payroll will be approximately $25 million annually. The effect of this new income on the county is assessed in Sect. 4.4.

Table 3.1. Cherokee Nuclear Station construction manpower requirements*

Year	Average construction employment
1976	20
1977	160
1978	628
1979	1,275
1980	2,024
1981	2,552
1982	2,742
1983	2,769
1984	2,781
(Second quarter 1984)**	2,856
1985	2,699
1986	2,330
1987	1,601
1988	854
1989	290

*Excluding sub-contract employees and operations workers who are on-site throughout.

**Peak construction.

Source: ER Revision, Sect. 8.1.2.2, Duke Power Company, March 1978.

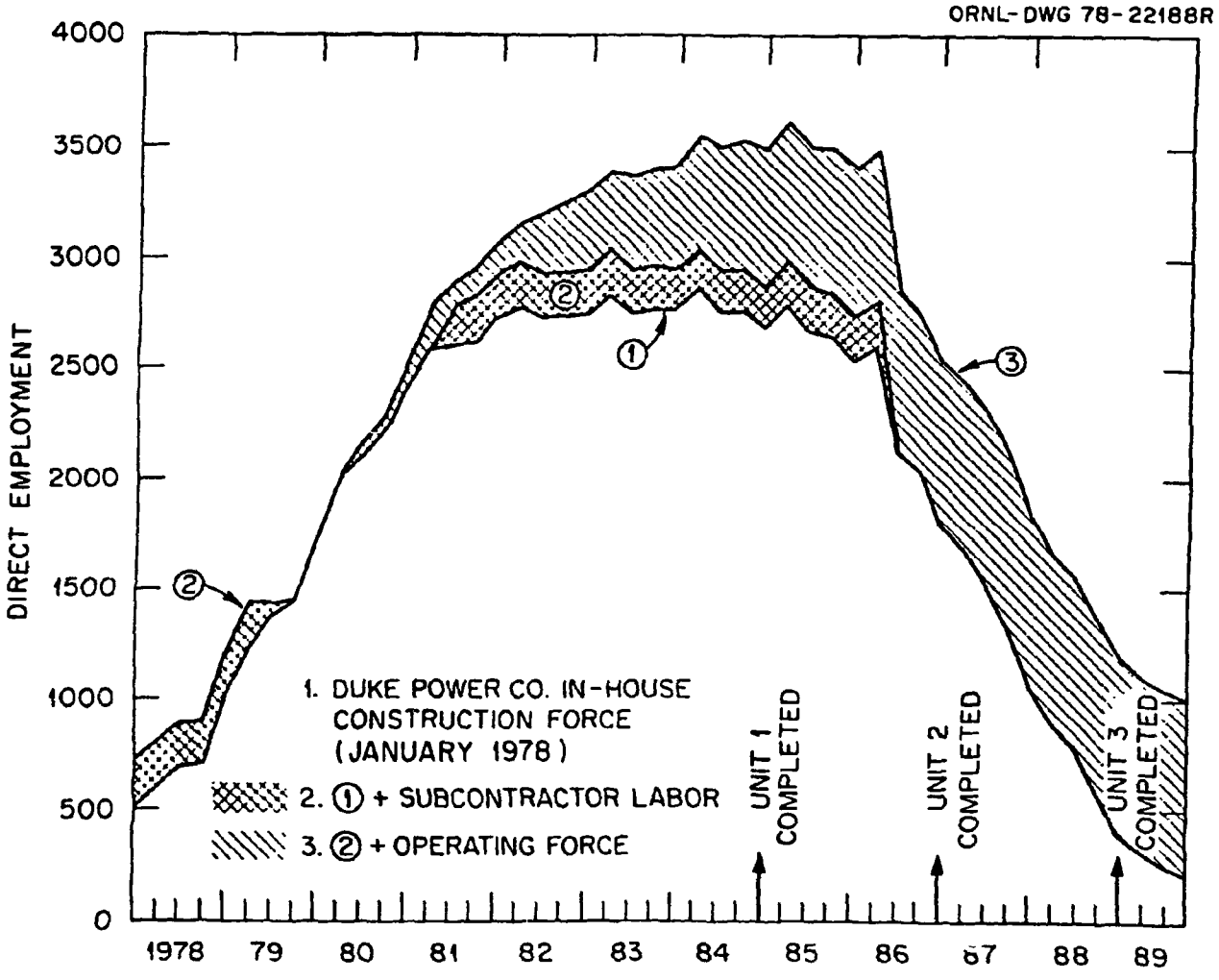

Fig. 3.2. Projections of direct employment, Cherokee Nuclear Station (March 1978).

3.3 TAXES[3]

The construction of the Cherokee Nuclear Station will have a tremendous fiscal impact on Cherokee County by increasing taxable property. The total assessed value of property in the county was $27 million in 1971. Based on 1977 criteria the assessed value of the plant will be $233 million. The amount of property taxes collected annually will rise from $4.1 million in 1977 to $42 million. Property tax is also collected during construction on the equipment brought into the county by subcontractors. This tax, totaling $41,000 in 1977, will decrease as site preparation is completed.

The increased property tax revenue is the only direct fiscal benefit to Cherokee County. All other state and local taxes go to the state through franchise tax, power tax, income tax, and several minor taxes. According to calculations done by Duke Power based on Federal Power Commission criteria, these taxes would total $51.2 million per year. The increase in the federal income tax, according to FPC criteria, will be $109.4 million per year. A total of $203.1 million per year in new tax revenues is expected.

Other similar fiscal impacts were experienced in nearby Oconee County subsequent to the construction of the three-unit 2632-MW Oconee Nuclear Station. The total county tax revenue has increased from $2.6 million in 1971 to $7.8 million in 1977, of which Duke Power paid 53%. While these amounts are much lower than those expected in Cherokee County, the dramatic increase is still evident.

The great increases in county property tax revenue may not necessarily occur as soon as the plant begins operation. Under state law, a utility is required to pay only school taxes during the first five years of operation. However, the utility only receives this exemption upon application for it. Duke Power waived this exemption when the Oconee plant became operable and began paying the full amount due. A decision by Duke Power on waiving this exemption for the Cherokee plant has not yet been made.

3.4 DUKE POWER COMPANY MOVER POLICY[4]

The Duke Power Company mover policy regarding expenses incurred by employees who are moved at company request deserves consideration here. Since most construction workers employed at the Cherokee site will be Duke employees, possible compensation and other facilitating arrangements may provide an incentive for them to move into the area instead of commuting.

Under Federal law some moving expenses are deductible if the new place of work is at least 50 miles farther from the employee's former residence than was his former place of work. However, if the employee does not meet the 50-mile requirement, moving expense reimbursements by Duke are adjusted to cover the increase in tax liability.

Major moving expenses of all existing and new employees are paid for by Duke. These expenses include the cost of moving household goods, packing and unpacking, and insurance. Other expenses paid for by Duke include up to four exploratory trips, gas mileage, penalty for cancellation of lease, and unexpired rent that has not been refunded by the landlord.

Duke employees have two options regarding the sale of their residences where they move. The residence may be either sold to Duke, based upon several appraisals, or it may be sold independently by the employee at his expense. Many employees take advantage of this "cushion" when moving and thus relieve themselves of the worry and details of house-selling.

Several moving expenses are paid by Duke Power for those new employees who are married or head of a household, or who are recruited from a school that is out of the area. These expenses include the cost of moving household goods, meals and lodging while household goods are being moved, and mileage for one vehicle during relocation. Those new employees who are not married or head of a household are eligible for reimbursement for meals and lodging, and gas mileage for one vehicle while enroute to the new residence.

REFERENCES — CHAPTER 3

1. Final Environmental Statement related to construction of the Cherokee Nuclear Station, Units 1, 2, and 3, U.S. Nuclear Regulatory Commission, October 1975. STN 50-491, -492, -493.

2. Environmental Report Revision, Cherokee County Nuclear Station, Duke Power Co., Sects. 4.1.1.2-5 and 8.1.2.3, March 1978. Personal communication between D. B. Blackmon, Duke Power Company, and E. Peelle, ORNL, May 17, 1978.

3. Environmental Report Revision, Cherokee County Nuclear Station, Duke Power Co., Sect. 8.1.2.2-3, March 1978.

4. *Duke Power Company Moving Expense Policy for Employees Transferred at Company Request*, 1972.

CHEROKEE POWER PLANT STUDY

CHAPTER 4 — IMPACTS

The construction and subsequent operation of the Cherokee Nuclear Station (CNS) is expected to impact a number of different aspects of Cherokee County's socio-economic organization. Housing, public service delivery, income, employment, land use, and public finance, among other things, will all feel the effects of the new facility. This chapter will discuss the specific impacts expected as a result of this project. It should be pointed out that the magnitude of these impacts and the extent to which they disrupt or benefit Cherokee County can be modified by carefully designed mitigation strategies, which will be the subject of this study's final chapter.

4.1 DEMOGRAPHY AND SETTLEMENT PATTERN

4.1.1 Population Increase from Direct Employment

Construction Period. An average of roughly 1700 workers will be involved in building the Cherokee Nuclear Station over the 13-year life of this endeavor, which began in 1976 and is scheduled to run through 1989. During the peak construction period, from 1982 through 1986, roughly 2900 workers will be employed here (Table 4-1). The number of these employees relocating in Cherokee County will be determined by several factors, including the size of the qualified work force living in the local area or within commuting distance and the availability of housing and services to accommodate potential in-movers.

The proportion of the total work force choosing to move to Cherokee County is currently unclear. The applicant has stated that only 13% of the construction force will relocate here (DES. p. 4-12), while a study conducted at the University of North Carolina at Charlotte concludes that 40% will migrate. It is our judgment that the number of in-movers will

Table 4-1. Population influx associated with construction and operation employment of the Cherokee Nuclear Station

	Construction		Operations	Construction PLUS Operations
	Average (1976-1984)	Peak (1982-86)	Peak (1987 →)	Peak (1983-86)
Direct Employment				
Total Workers	1700	2900	805	3350
In-Moving Workers[c]	450[a] (220-680)[b]	750[d] (350-1150)[b]	400[a] (280-520)[b]	975[a] (510-1940)[b]
Population Influx[d]	850 (400-1300)	1425 (675-2175)	1000 (700-1300)	2000 (1080-2920)
Indirect Employment				
Total Workers (Cherokee Co.)[e]	420 (280-560)	600 (360-840)	310 (240-380)	810 (530-1090)
In-Moving workers[f]	0 (0-60)	100 (0-340)	60 (0-130)	100 (0-340)
Population Influx[g]	0 (0-150)	250 (0-850)	150 (0-325)	250 (0-850)
Total				
Total Workers	2120 (1980-2270)	3500 (3260-3740)	1115 (1045-1185)	4160 (3880-4440)
In-Moving Workers	450 (220-740)	850 (350-1440)	460 (280-650)	1075 (510-1780)
Population Influx	850 (400-1450)	1675 (675-3025)	1150 (700-1625)	2250 (1080-3770)

[a] Represents most likely number

[b] Figures in parentheses represent possible range

[c] For Construction, assuming a most likely in-migration rate of 25% with a possible range of 13%-40%; For Operations, assuming a most likely in-migration rate of 50% with a possible range of 35%-65%.

[d] Based on 0.9 non-working dependents for each construction worker and 1.5 for each operations worker

[e] Assuming 0.6 indirect jobs for each direct job held by Cherokee residents (locals and in-movers)

[f] Assuming the availability of 500 local workers between Cherokee and York Counties during construction and 250 at start of operations

[g] Based on 1.5 non-working dependents for each worker

SOURCES: Personal communications between D. R. Blackmon, Duke Power Company and Elizabeth Peelle, ORNL, 3/31/78 and 5/17/78;
Cherokee Nuclear Station D.E.S.;

Robinson, David L., Socio-economic Impact Due to Construction and Operation of Duke Power Company Power Stations, With Applications to Cherokee Nuclear Station, University of North Carolina at Charlotte, 8/77;

Stenehjem, Erik J. & James E. Metzger, A Framework for Projecting Employment and Population Changes Accompanying Energy Development, Argonne National Laboratory, 8/76;

South Carolina Employment Security Commission, Labor Force Estimates, January 1973 - May 1978, Columbia, S.C., 7/7/78.

fall between these two projections and will be equivalent to roughly 25% of the total number of construction workers. Since some uncertainty does exist concerning this figure, however, the full range of projections is shown in Table 4-1 and will be discussed in the text.

Based on the figures discussed above, it is estimated that an average of 450 construction workers, plus or minus 230, will move into Cherokee County over the life of the project. Figures compiled at Argonne National Laboratory show that the typical construction worker is accompanied by 0.9 non-working dependents,[2] indicating that an average of roughly 850 new residents, plus or minus 450, will settle in Cherokee County as a direct result of construction. During the peak period, approximately 750 workers, plus or minus 400, will in-migrate, representing a total population influx of 1425, plus or minus 750 (Table 4-1).

Operations Period

The operations force will begin work in 1982 with roughly 50 workers. By 1985, when the first generating unit is complete, the number will have grown to 550. In 1987, the peak force of 805 will be reached and this will be maintained for the life of the station (Section 3.2). Because jobs will last much longer during operations than during the construction period, it is expected that more operations workers will choose to locate in Cherokee County. We estimate that approximately 50% of all those workers, plus or minus 15%, will relocate in Cherokee County. From 1987 on, this represents approximately 400 workers, plus or minus 120, for a total population influx of 1000, plus or minus 300, assuming 1.5 non-working dependents per worker[2] (Table 4-1).

It is evident from the dates listed above that the construction and operations periods are not distinct but rather overlap during most of the 1980's, reaching their cumulative peak in the years 1983-86. The total number of workers anticipated during that time is shown in the last column of Table 4-1 where cumulative worker totals equal 3350, with an expected population influx of 2000, plus or minus 420.

4.1.2 Population Increase from Indirect Employment

According to economic base theory, basic activities are those such as construction, manufacturing, and agriculture which drive the local economy by bringing in money from outside the immediate area. These revenues, in turn, are spent locally and over time stimulate the creation of new jobs in the non-basic, service-oriented sector. The number of non-basic, or indirect, jobs created in Cherokee County will be primarily determined by the number of basic employees residing there and purchasing local goods and services; it is expected that commuters will spend the bulk of their incomes in their home communities, thereby stimulating additional indirect employment outside the immediate impact area. Figures compiled by Argonne National Laboratory indicate that for each basic job in Cherokee County there are 0.6 non-basic jobs.[2] By applying this multiplier to the total number of direct workers living in Cherokee County, comprising both in-migrants and previous residents, the number of indirect jobs to be created in the county can be found.

Construction Period

As shown in Table 4-1, an average of 450 direct in-moving workers, plus or minus 230, are expected over the entire construction period. In addition to this, roughly 250 workers, equivalent to 20% of those unemployed in Cherokee during the first half of 1978, can be expected to come from the indigenous labor force. At 0.6 non-basic workers for each of these 700 direct workers living in Cherokee County, roughly 420 new indirect jobs, plus or minus 140, are expected. We estimate that approximately 250 of these jobs will be filled by local workers, the same number taking jobs in construction, and that another 250 can be filled by commuters from neighboring counties, primarily York. Subtracting these 500 employees from the total needed, it is found to be most probable that no indirect workers will relocate in Cherokee County although as many as 60 may move in for a total population influx of 150.

During the construction peak, about 1000 construction workers, plus or minus 400, are expected to live in Cherokee County; this includes both in-movers and previous residents. Table 4-1 shows that this will create approximately 600 new indirect jobs, plus or minus 240. Again assuming that 500 of these can be filled by residents and in-commuters, it is found that 100 jobs, give or take 240, will be taken by in-movers, representing an expected population increase of 250, though the figure may be as high as 850 or as low as zero. Because there is typically a lag between the creation of new direct jobs and subsequent indirect employment and since peak construction employment will be relatively short-lived, it is possible that the actual number of in-movers will be somewhat less than suggested here.

Operations Period

Of the 805 workers that will be directly employed by Duke Power Company during plant operations, roughly 400, plus or minus 120, are expected to move into the area. An additional 125, equivalent to 10% of the total number unemployed in Cherokee County will likely be previous residents. This is significantly lower than the number of indigenous workers expected to be involved in construction period activities, many of whom will still be working on construction-related jobs when operations commence. At 0.6 indirect workers for each direct worker living in Cherokee County, there will be approximately 310 new service-oriented jobs, plus or minus 70, created here (Table 4-1).

Assuming that 125 local residents will take indirect jobs during the operation period and the same number will commute in from neighboring counties, it is found that 60 new workers will move into Cherokee County, plus or minus 70, representing a total population influx of 150, with a possible range of from 0 to 325 (Table 4-1).

4.1.3 Total Population Increase

Over the entire construction period, the total number of construction-related in-moving workers is expected to average 450, with a possible range of from 220 to 740, for a total population influx of 850, with a range of from 400 to 1450. At the peak of construction activity, 850 workers are expected to relocate in Cherokee County, with a possible range of from 350 to 1490, representing 1675 new residents with a range between 675 and 3025. 460 new workers, plus or minus 190, will settle in Cherokee County during the peak operations period, representing a total influx of 1150 people, plus or minus roughly 450 (Table 4-1).

Because the construction and operations periods overlap somewhat, as noted earlier, the combined peak population increase will be higher than indicated by the above figures for construction and operations separately. As shown in the previous chapter (Fig. 3-1), total employment will build steadily between now and 1983, when it will reach a peak expected to last four years. During this period, approximately 4160 workers, plus or minus 280, will be employed in plant-related activities. It is most likely that 1075 of these workers will settle in Cherokee County, though the possible range extends from 510 to 1780. The total population influx this represents is expected to be 2250, with a range of 1080 to 3770 (Table 4-1). In late 1986, construction employment will begin to decline and by 1990, only the 1150 individuals associated with plant operations are expected to remain.

4.1.4 Distribution of In-movers within Cherokee County

A number of factors will combine to determine the exact locations within Cherokee County where the in-movers identified above will locate. The availability of developable land, the supply of housing, the existence of public services, the rate of property taxes, the stringency of land use regulations, and accessibility to the plant site will all contribute to the settlement pattern that will result from the expected population influx.

Gaffney is the largest city in Cherokee County and is considerably more accessible to the nuclear plant site than Blacksburg, the county's next most populated community. However, there is little vacant land left within Gaffney and most residential construction during this decade has taken place in the unincorporated areas, particularly in the southern half of the county. (Personal communication between Catherine Gibson, Cherokee County Treasurer and Elizabeth Peelle, ORNL, 4/4/78, and Section 2.5.1.1).

While the cities of Gaffney and Blacksburg are more completely served by public utilities than are the rural sections of the county, services are being increasingly provided in some unincorporated areas.[3] Septic tanks are still widely utilized outside the municipalities, however, despite the fact that most of the county has soils that are unsuitable for this use (Section 2.2).

Blacksburg has an ad valorem property tax of 75 mills per dollar of assessed value (personal communication between Bill Byars, Blacksburg City Administrator and Martin Schweitzer, ORNL, 10/23/78) and Gaffney property is subject to a 115 mill levy (Section 2.6.5). Finally, all property within the county, including that within these cities' corporate limits, is subject to a tax of 190 mills. In addition to having the highest property taxes in the county, Gaffney also has some land use controls. Both zoning and subdivision regulations are in effect here (Section 2.6.4) as well as a complete set of building regulations though these were adopted after most development had already occurred (Section 2.5.2). The rest of the county is without any such controls.

In light of the above information, we estimate that the majority of plant-induced in-migrants will locate in the unincorporated areas of southern Cherokee County with a much smaller number moving into Gaffney and fewer still settling in Blacksburg. Table 4-2 shows the magnitude of the expected growth in relation to the county's overall population and the population of the unincorporated areas. If all new residents were to locate outside of the major cities, the population of these rural areas

Table 4-2. Plant-Induced Population Relative to Existing Population in Cherokee County

	Existing Population[e]	Plant-Induced Population as % of Existing Population during: Construction Average[a]	Construction Peak[b]	Operations[c] Peak	Construction Plus Operations[d] Peak
Cherokee County	42,100	2%[g] (1-3.5%)[h]	4%[g] (1.5-7%)[h]	2.5%[g] (1.5-4%)[h]	5.5%[g] (2.5-9%)[h]
Unincorporated Cherokee County	22,070[f]	4% (2-6.5%)	7.5% (3-13.5%)	5% (3-7.5%)	10% (5-17%)

a Plant-Induced population during construction is expected to average approximately 850 (the possible range is 400-1450).
b Plant-Induced population during construction is expected to peak at approximately 1675 (possible range is 675-3025).
c Plant-Induced population is expected to be approximately 1150 from 1987 on (possible range is 700-1625).
d Total plant-induced population is expected to peak at approximately 2250 (possible range is 1080-3770).
e Estimated population as of 1977.
f Cherokee County's 1977 population less the population of Gaffney and Blacksburg.
g Represents most likely number.
h Figures in parentheses represent possible range.

SOURCES: South Carolina Manpower Research and Analysis for Cherokee County Population; South Carolina Statistical Abstract, 1977 for Gaffney and Blacksburg Population; Table 4-1 for projected plant-induced population increases.

could be expected to increase by 10%, with a range of from 5% to 17%, as a result of combined construction and operations activities during the peak period of 1983-86. This represents a significant increase that could substantially affect Cherokee County's socioeconomic organization. Even after construction ends, the 5% increase over current population levels, plus or minus 2 to 2-1/2%, expected throughout the operations period will be sufficient to have a continuing impact on the study area.

4.2 SOCIAL ORGANIZATION

4.2.1 Housing

From 1983-86, during the combined peak of construction and operations, it is expected that 1075 new dwelling units, with a possible range of from 350 to 1490, will be needed in Cherokee County as a result of plant-related activities. Based on the housing choices of construction workers at Duke Power Company's McGuire Nuclear Station,[4] it is projected that 485 single family homes, give or take roughly 250, will be required along with 450 mobile homes, with a range of from 190 to 780. It is expected that 140 multi-family dwellings, with a possible range of from 65 to 240, will also be needed (Table 4-3). These figures may be slightly high because they assume that each in-moving worker will require a separate unit while, in reality, some single workers and marrieds without families present may share accommodations.

From 1989 onward, after construction is completed, 460 new dwelling units, plus or minus approximately 180, will be required by those workers whose jobs are created, directly and indirectly, by plant operations. Based on worker preference at Duke's Oconee Nuclear Station, it is expected that the vast majority of this demand will be for single-family houses.[4] 380 new single-family units, plus or minus 150, will be needed as will be 45 multi-family dwellings, plus or minus 15, and 35 mobile homes, give or take 15 (Table 4-3).

Table 4-3. Projected Plant-Induced Housing Demand in Cherokee County

	Construction Period		Operations Period	Construction Plus Operations
	Average	Peak	Peak	Peak
Total Number of Dwelling Units[a]	450[b] (220-740)[c]	850[b] (350-1490)[c]	460[b] (280-650)[c]	1075[b] (510-1780)[c]
Single Family[d]	160 (75-260)	300 (120-520)	380 (230-535)	485 (255-760)
Multi-Family[e]	60 (30-105)	120 (50-210)	45 (30-65)	140 (65-240)
Mobile homes[f]	230 (115-375)	430 (180-760)	35 (20-50)	450 (190-780)

a Based on one unit for each in-moving worker
b Represents most likely number
c Figures in parentheses represent possible range
d Assuming 35% of construction workers and 82% of operations workers will demand this type of housing.
e Assuming 14% of construction workers and 10% of operations workers will demand this type of housing.
f Assuming 51% of construction workers and 8.0% of operations workers will demand this type of housing.

SOURCES: Table 4-1 for number of in-moving workers;
Robinson, David L., Socio-economic Impact due to Construction and Operation of Duke Power Company Power Stations, with Applications to Cherokee Nuclear Station, University of North Carolina at Charlotte, Aug. 1977, for type of housing demanded.

Between 1970 and 1976, nearly 3,000 new residential units were built in Cherokee County, indicating the presence of a fairly active building industry. Roughly one-half of these units were mobile homes, corresponding to the proportion of construction period demand expected for this type of dwelling (Sect. 2.5.1.1). We estimate that, with adequate advance notice, plant-induced housing needs can be met by area builders and that the bulk of these new residences will be in the unincorporated part of the county south of Gaffney.

Because the number of in-movers expected during the peak period is substantially greater than what will be maintained during operations, it is possible that providing housing and public services to accommodate peak growth will constitute over-building in terms of operations period population. However, because significant growth is expected in Cherokee County at least through 1990 even without the nuclear station (Sect. 2.3.2), we believe that any over-capacity of housing and services resulting from new residents leaving the county after project completion will be shortlived.

4.2.2 Public Services

4.2.2.1 Utilities

Each of the new plant-induced housing units discussed above is a potential user of electricity, water, and sewerage services. The number of prospective new customers expected during the peak period, shown in Table 4-4, represents a sizable proportion of the total number now serviced in Cherokee County (Sect. 2.6.2). While the Gaffney Board of Public Works has expanded its capacity in recent years and plans to continue to do so,[3] most of the demand for utilities is expected to be in rural parts of the county, away from Gaffney which is the center of the Board's service area. Adequate sewerage service is likely to be the hardest for new residences to obtain, necessitating the continued utilization of spetic tanks on land that is unsuited for this use.

Table 4-4. Plant-Induced Demands for Selected Public Services

	Construction		Operations	Construction Plus Operations
	Average	Peak	Peak	Peak
Additional Residents Needing Police and Fire Protection and Public Health Facilities	850[a] (400-1450)[b]	1675[a] (675-3025)[b]	1150[a] (700-1625)[b]	2250[a] (1080-3770)[b]
Additional Dwelling Units Needing Utility Service (electricity, water, sewerage)	450 (220-740)	850 (350-1490)	460 (280-650)	1075 (510-1780)
Additional School age Children[c]	290 (140-480)	550 (230-970)	280 (170-400)	690 (325-1145)
Additional Daily work-related Automobile Trips on Local roads[d]	3030 (2840-3240)	5000 (4660-5340)	1590 (1490-1690)	5940 (5540-6340)

a Represents most likely number
b Figures in parentheses represent possible range
c Assuming 0.65 school age children per construction worker and 0.61 per operations worker
d Assuming two work trips daily at the Transportation Research Board's national average of 1.4 passenger per vehicle.

SOURCES: Table 4-1 for number of new workers and residents;
Table 4-3 for number of new dwelling units;
Robinson, David L., Socio-economic Impact Due to Construction and Operation of Duke Power Company Stations, with Applications to Cherokee Nuclear Station, University of North Carolina at Charlotte, August 1977, for number of school age children per in-moving worker.

4.2.2.2 Schools

Information gathered at other Duke Power Company nuclear stations indicates that 0.65 school age children can be expected to accompany each in-moving construction worker and 0.61 students will come with each operations employee.[4] Based on these findings, it is most likely that 690 new students with a possible range of from 325 to 1145, will be added to Cherokee County schools during the peak period. After construction is completed, 280 of these new spaces, plus or minus 110, will still be required as a result of operations period employment (Table 4-4). At present, Cherokee County schools are operating over design capacity with 23 modular classrooms currently in use. However, disregarding the nuclear plant, school enrollment was expected to decline by nearly 500 between 1978 and 1983 (Sect. 2.6.1). This loss will partially offset the plant-induced increase expected during the peak period, causing less severe overcrowding than would otherwise be the case.

4.2.2.3 Public safety

During the peak period, 2250 new Cherokee County residents, with a possible range of from 1080 to 3770, will require police and fire protection. The figure will drop to 1150, plus or minus 450, during the operations period (Table 4-4). This influx will slightly lower existing ratios of police officers and firemen to residents and could have some negative impact on current levels of service, especially in light of a previous study indicating that certain types of crime increased during the construction of a nuclear facility in another rural South Carolina county.[5]

4.2.2.4 Health care

New residents will also need health care facilities (Table 4-4). Currently, the number of primary care physicians per resident in Cherokee County is low compared to neighboring counties, particularly those with a larger city such as Spartanburg.[4] The number of registered nurses and dentists is also relatively low here although Cherokee County is much

better off in terms of short term general hospital beds per resident. The plant-induced population influx will increase the demand somewhat for the above services but should not significantly worsen the existing situation.

4.2.2.5 Transportation

Table 4.4 shows the number of additional automobile trips expected daily on local roads as a result of direct and indirect employment during plant construction and operations. Based on the expectation that all workers, whether they are prior residents, in-movers, or commuters, will travel to work by automobile and that they will conform to the national average of 1.4 passenger per vehicle, the following figures are reached. Over the entire construction period, a daily average of 3030 new work-related trips, plus or minus 200, will be added to existing traffic levels on local roads. 5940 new daily trips, plus or minus 400, will be made during the peak period and 1590, plus or minus 100, will be maintained throughout operations.

As pointed out in Sect. 2.6.7, the current road situation requires all plant-bound traffic coming from the east or west along I-85 to pass through the City of Gaffney on its way to the Cherokee Nuclear Station (Fig. 2.1). Since most commuters must travel this route, there is a strong potential for increased congestion of Gaffney roads as plant-induced traffic increases. From Gaffney, all plant-bound vehicle will travel southeast on primary State Route 105 and then east on secondary State Route 13. Portions of the Duke Access Road described in Sect. 2.6.7 may be completed in late 1980 with the effect of easing congestion through Gaffney and along State Route 105. The completion date for the entire project is still highly uncertain, however, and any further delay will extend the above-mentioned stress on area roads into the peak construction period.

A rough rule of thumb used by the South Carolina Department of Transportation is that a paved, two-lane primary state road in a rural area has the capacity to handle approximately 4000 vehicle trips daily. The

capacity of a primary road in an urban area would be higher than this while the capacity of a secondary road would be lower. At the southern edge of Gaffney, just within the city limits, the 1977 average daily traffic on State Route 105 exceeded 4000 by 10% while State Route 18's volume exceeded it by almost 50%. Heading south, traffic volumes along both roads declined steadily as the distance from Gaffney increased. A count taken on secondary State Route 13 in January, 1978 showed 1500 average daily trips near the plant site (Personal Communication between Charles Moorfield, Chief Planner, South Carolina Department of Transportation and Martin Schweitzer, ORNL, Oct. 23, 1978).

Since construction began in 1976, traffic volumes in the plant area have been rising and this trend will continue, as indicated by the figures given in Table 4-4. At the peak period, plant-induced traffic from direct workers alone will be approximately 4800, exceeding capacity on the rural stretches of State Routes 105 and 13 and seriously impeding traffic flow inside Gaffney. These impacts will be especially severe if further delays are encountered in the completion of the Duke Access Road.

4.3 LAND USE

As described in Sect. 3.1, the Cherokee Nuclear Station will occupy a total of 2263 acres, of which 1272 acres will be closed to the public. The remaining area will be available for limited recreational uses. Prior to the acquisition of the site by Duke Power Company, there were 16 permanent dwellings and one recreational home here, the residents of which have since been displaced (ER, p. 2.1-1). Some farmland has also been taken as well as open fields and woodlands (ER, 2.2-2 and Fig. 2.1-3).

The construction and operation of the CNS will also affect land use beyond the boundaries of the site. As discussed in Sect. 4.2.1, a substantial number of new dwelling units will be built to accommodate plant-induced population growth and this will increase the amount of land

used for residential purposes, particularly in the southern part of the county. At the same time, motor vehicle traffic in the area will increase significantly (Sect. 4.2.2.5), additional land will be taken for the Duke Road and there is the possibility that existing roads will be widened to accommodate new levels of usage (Sect. 4.2.2.5).

As will be pointed out in Sect. 4.4.2, it is expected that commercial activities in the area will proliferate in response to the buying power of the Duke work force and a certain amount of land will have to be devoted to this. There is also the possibility that new industry will move into the county as a result of plant operations (Sect. 4.5.1), requiring additional land.

The land that will be taken by the various pursuits described above is currently used in a variety of ways. The northwest part of the county is agriculturally the most productive, being devoted to row crops, orchards, and some cattle raising. More cattle is raised in the western part of the county, while in southern Cherokee County, where most plant-induced growth is expected to occur, farming has been declining. There is some cattle and crop production there although much of the area is in open fields and large woods (ER, p. 2.2-2). We conclude, then, that the loss of productive farmland due to plant-induced land use changes will be relatively minor.

Except for Gaffney and Blacksburg, none of Cherokee County has any land use controls such as zoning or subdivision regulations (Sect. 2.6.4). It is possible that such devices will be adopted to ensure that the land conversion process described above will take place in an orderly and productive manner. Our recommendations on this will be presented in the following chapter.

4.4 ECONOMIC ORGANIZATION

4.4.1 Employment

As discussed in Sect. 4.1, a large number of new jobs will be created locally as a result of the construction and operation of the Cherokee Nuclear Station. Over the entire construction period, an average of 2120 workers, give or take roughly 150, will be employed, 1700 directly by Duke Power Company and the remainder indirectly in service-related occupations. At the combined peak of construction and operations 4160 new jobs, plus or minus 280, will be available, 3350 directly in the employ of Duke Power Company and 810, plus or minus 280, in service fields. Finally, after construction is over there will still be 1115 jobs available, plus or minus 70, as a result of operations-period activities; 805 of the new workers will be employed directly by Duke and another 310, give or take 70, will hold jobs induced indirectly by the CNS.

In addition to listing total expected employment, Sect. 4.1 also pointed out that roughly 750 current Cherokee County residents are expected to fill jobs created directly and indirectly by CNS activities. The assumption that local workers will be capable of doing the required work is given weight by the fact that nearly half the skilled workers employed at other Duke projects were hired as unskilled laborers and trained on the job (ER, p. 8.1-4). Consequently, we believe that the local unemployment rate is likely to decline as a result of this project, at least until construction is completed at which point the number of jobless county residents may increase.

4.4.2 Income

In 1976, Cherokee County was ranked 18th of South Carolina's 46 counties with an average annual per capita income of $4,651.[6] The relatively high wages to be paid direct employees of Duke Power Company during both construction and operations (Personal Communication between D. B. Blackmon,

Duke Power Company and E. Peelle, ORNL, 3/31/78) will have the effect of raising the average income within the county. In addition to benefiting CNS employees directly, the wages paid by Duke may act to raise salaries elsewhere in the county as existing businesses compete to retain their own employees. Finally, higher incomes are likely to result in more money being spent locally for needed goods and services. These expenditures will not only result in the creation of new service-related jobs as explained in Sect. 4.1.2, they may also result in a broader selection of goods and services becoming available within Cherokee County. However, higher wages may also bring higher prices which would have a detrimental effect on those individuals living on low and fixed incomes.

4.5 PUBLIC FINANCE

4.5.1 Plant-Induced Revenues

As pointed out in Section 3.3, the Cherokee Nuclear Station will generate a very substantial amount of tax revenues for federal, state, and local units of government during its period of operations. Nearly $110 million will be paid each year in federal income tax while slightly over $50 million will go to the state of South Carolina through franchise power, income, and several other taxes. Locally, Cherokee County will receive $42.4 million dollars annually in property taxes paid on the assessed value of the plant.* Nearly 20 years will elapse, however, between the start of construction and the time the county receives its full share of expected revenues.

In South Carolina there is no property tax paid on construction work in progress (CWIP), so Cherokee County will realize no increase in revenue from Duke's holdings until after the first generating unit begins producing electricity in 1985. Because a 5-year exemption on general purpose county taxes is granted all industrial concerns upon request, Duke will be liable only for school taxes at this time, amounting to $10.7 million (Sect. 3.3). Four years later, all 3 units will be on line and Duke will pay $32.1 million in school taxes. It will not be

*Assuming current tax rates.

until 1995, however, that the general tax exemption will expire on the last of the 3 units and the full $42.4 million per year becomes due (Table 4-5).

Relative to Cherokee County's current revenues, the amounts to be paid by Duke Power Company are enormous. The $10.7 million expected in 1986 in school taxes on just one unit is over 2-1/2 times the property taxes currently received by Cherokee County and is equivalent to 85% of the county's total revenue from all sources. In 1995, the $42.4 million paid by Duke will be slightly over 10 times the amount of property tax now collected by the county and will be more than triple the total revenues Cherokee County currently receives (Table 4-5).

In response to these dramatic increases in revenues, Cherokee County may lower existing property tax rates, increase the level of public services, or combine these two options. It is the judgment of the staff that either of these actions is likely to stimulate a secondary wave of growth. Lower tax rates and improved services, separately or together, can make Cherokee County more attractive for residential, commercial and industrial development. Unlike plant-induced growth, however, which is expected to center in the southern part of the county, much of this new growth, particularly the industrial portion, is likely to be in the vicinity of Interstate 85.

4.5.2 Plant-Induced Expenditures

While the presence of the Cherokee Nuclear Station will contribute to government revenues, it will also necessitate expenditures in several different areas. As discussed in Sect. 4.2.2.5, traffic will increase dramatically on area roads, both within Gaffney and in unincorporated parts of the county. Since most plant-induced traffic will be on state primary and secondary roads, the financial burden of any necessary repairs or improvements will fall to the state of South Carolina. (Personal Communication between Charles Moorfield, Chief Planner, S. C. Dept.

Table 4-5: Projected Plant-Induced Revenues Relative to Current Revenues in Cherokee County

	Property Taxes to be Paid by Duke Power Company[f]	Duke Property Taxes as a Percentage of: Cherokee County's Current Property Tax Revenues[d]	Cherokee's Current Total Revenues[e]
1986[a]	$10.7 Million	261%	85%
1990[b]	$32.1 Million	783%	255%
1995[c]	$42.4 Million	1,034%	337%

a After the first unit comes on-line

b After all three units come on-line but before the five year exemption on general county taxes expires

c After 5 year exemption on general county taxes expires on all three units

d Property tax revenues were $4.1 Million in 1977

e Total county revenues were $12.6 Million in 1977

f These estimates do not include possible future changes in tax rates resulting from the 1977 School Finance Act or the property reappraisal program now in progress.

SOURCE: Cherokee County, S. C.: Financial Statements and Schedules for the Year Ended June 30, 1977, Cline, Brandt, Pope & Co., Gaffney, S. C. for Cherokee's Property Taxes and Total Revenues; Personal communication between D. B. Blackmon, Duke Power Company and E. Peelle, ORNL, March 31, 1978; and personal communication between Catherine Gibson, Cherokee County Treasurer and E. Peelle, ORNL, April 13, 1978 for Duke's tax obligation.

of Transportation and Martin Schweitzer, ORNL, 11/20/78). However, the city of Gaffney has in the past repaired secondary state roads within its corporate limits so additional wear on these routes could contribute to local costs. In addition, responding to any plant-related traffic problems on city and county streets and roads not on the state system will be solely a local responsibility (Personal Communication between Ben Clary, Gaffney City Administrator and Martin Schweitzer, ORNL, 11/21/78).

Plant-induced population growth is also expected to bring an increased demand for utilities and other public services (Sect. 4.2.2.1 – 4.2.2.4), the provision of which entails additional public expenditures. Substantial capital costs are involved in expanding water, sewerage and electric service areas but the Gaffney Board of Public Works, the largest utility supplier in the county, has traditionally financed these improvements through operating surpluses and grants from other levels of government, avoiding the necessity of committing general city funds (Personal Communication between Terry Hill, Asst. Manager, Gaffney Board of Public Works, and Martin Schweitzer, ORNL, 11/20/78). It has been suggested that additional traffic through Gaffney city streets may cause damage to underlying water and sewer lines and, if so, this would represent an additional cost of the Cherokee project. Finally, the influx of school age children expected as a result of plant activities will represent an added financial burden to the county and any necessary improvements in police and fire protection will have to be paid for by county and municipal governments.

In response to the impacts and growth forces caused by the CNS, Cherokee County may choose to employ a full-time planning staff. This will involve a further monetary expenditure, but the return in terms of orderly growth and community benefits is likely to be substantial.

4.5.3 Timing of Revenues and Expenditures

While many of the impacts associated with the Cherokee Nuclear Station will be incurred early in the life of the project, plant-induced revenues

will not begin until the period of peak employment is nearly over and will not reach their highest level until nearly 10 years later, as illustrated by Fig. 4-1. The negative impacts of this time lag, whereby public funds will be required for the expansion of various services before the Duke Power Company begins to pay property taxes on the improved value of its holdings, can be addressed through appropriate mitigation to be discussed in the following chapter.

4.6 CONCLUSIONS

4.6.1 Benefits of the Cherokee Nuclear Station

As discussed in the previous sections, the Cherokee project promises to bring a number of benefits to the area. Cherokee County's population is expected to grow as a result of the in-migration of workers whose jobs are created, directly and indirectly, by the CNS. A secondary growth wave is also likely in response to the lower taxes and/or improved public services made possible due to Cherokee County's greatly expanded tax base. This expanded tax base offers options and choices to local government which are rarely found. In addition, the local unemployment rate is expected to decrease while per capita income and county revenues will both rise. There is also a chance that a broader selection of goods and services will become available here in response to plant-induced expansion of local buying power. Finally, with population increases and growth in the local economy may come changes in the structure and conduct of government. Under similar stimuli, other communities have moved toward greater formalization and bureaucratization in their affairs. Judgments differ as to whether these changes are desirable or not but they must be considered.

4.6.2 Costs of the Cherokee Nuclear Station

The above benefits will not be generated without costs. Population growth will increase the demand for housing which, without proper

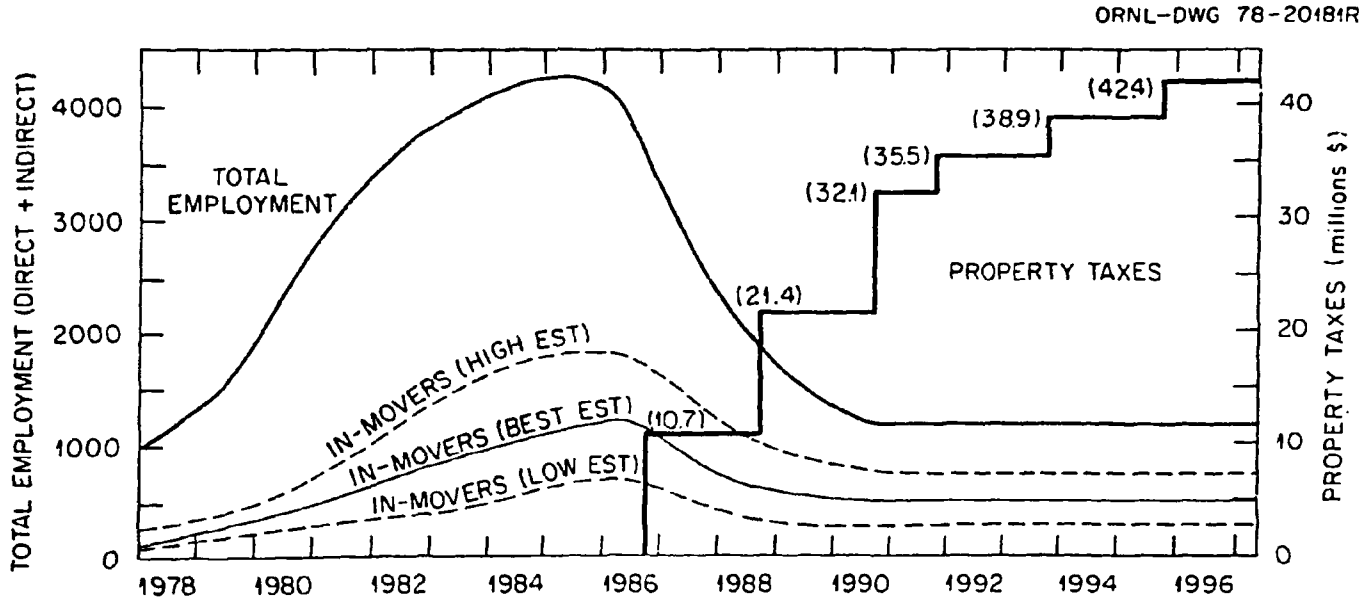

Fig. 4.1. Timing of plant-induced impacts relative to taxes generated.[a]

[a]It should be noted that the two vertical scales used in this table are independent of each other. No conclusions about the equivalence of CNS property taxes and plant-induced impacts can be inferred from the relative magnitude of the different curves. In addition, the property tax estimate does not include possible future changes in tax rates resulting from the 1977 School Finance Act or from the property reappraisal now in progress.

advance notice for builders, could result in a local housing shortage. The influx of new residents can also put a strain on various public services, resulting in existing systems operating over capacity and public expenditures being required for improvements. Plant-induced traffic congestion promises to be an especially serious problem with local roads receiving increased wear and local residents suffering from impeded traffic flow and a greater risk of accidents. Local incomes inflated by high CNS wages may bring higher prices to the detriment of those living on low and fixed incomes. Finally, it is likely that without advance planning, new residential and commercial endeavors will be located in scattered areas throughout the county and that conflicts between incompatible land uses will arise.

Just as a gap occurs between <u>when</u> plant-induced problems arise and plant-induced revenues become available to help solve them, a similar imbalance occurs in terms of <u>where</u> CNS costs and benefits will accrue. It is expected that Gaffney's streets and roads will experience greatly increased traffic congestion, its public safety facilities will be increasingly strained, and its central business district will lose retail trade to scattered commercial areas following plant-induced residential growth outside the city limits. However, it will receive none of the property tax revenues paid by the Duke Power Company to compensate for these impacts. Cherokee County will likewise bear significant impacts of the CNS, but it will also receive a substantial amount of tax revenue at a later time. It is, therefore, important to distinguish between Cherokee County, which receives monetary payment as well as costs, and the city of Gaffney, which gets only the latter.

With properly designed monitoring and mitigation programs, the balance between the benefits and costs identified above can be improved, making the overall effect of the Cherokee project more positive for the entire area. The final chapter of this study will suggest ways in which that end can be achieved.

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CHAPTER 5. OPTIONS FOR MONITORING AND MITIGATING THE IMPACTS

The impacts discussed in Chapter 4 present both problems and opportunities for Cherokee County. Only one of the opportunities is relatively certain, however, that being the substantial increase in property tax base* from Duke Power Company's property tax payments when all three Cherokee units become fully operational in 1996. Several additional opportunities may be captured, depending upon which path Cherokee County decides to pursue in the next few years among at least four options now open to it. Likewise, the problems presented by the growing workforce (in-movers, needs for housing and services, traffic, etc.) will vary from minor to severe depending on which actions the county and others decide to take and how soon.

Knowing what to do in the future depends in large measure upon a full and adequate knowledge of what is happening now and throughout the construction period. The estimate most critical to these consideration, the expected number of in-movers, is known only within a wide range of probability, and most other projections in turn depend upon this estimate. These uncertainties can be handled with a program to collect and monitor certain types of needed information throughout the construction period, as many other communities and/or energy developers are doing when faced with similar problems.

After summarizing the problems, discussing four options for dealing with them, and reviewing monitoring and mitigation plans in use at other energy sites, possible monitoring plan and various mitigation strategies for Cherokee County's particular problems are developed. Since each option entails a different choice and different direction, possible mitigation measures are keyed to each option.

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*Assuming that local tax rates and South Carolina utility assessment and taxation practices remain substantially the same as today.

5.1 THE PROBLEMS

Since the substantial benefits (see 4.6.1) of the Cherokee Nuclear Station need little mitigation, this section is focused exclusively on those impacts and circumstances which cause problems. There are three main sources of problems for Cherokee County resulting from the building of the CNS:

1) impacts directly caused by the workforce (traffic, demands for services) and tax revenues from the plant;

2) uncertainty about the location, timing, and intensity of impacts caused by inmovers;

3) structural constraints which complicate dealing with the impacts above. These include timing of tax revenues, timing of bypass road construction, and lack of planning capability.

5.1.1 Problems Arising from Impacts

Since all have been discussed in 4.6.2, the impact-problems are not treated in depth below.

1. Traffic problems and congestion from worker traffic and trucks
   - increased accident rate
   - congested local street and roads – Gaffney and county
   - road wear and damage – Gaffney and county
2. Increased demand for housing
   - single family
   - multi-family
   - apartments and sleeping rooms
   - mobile homes
3. Increased demand for public services
   - schools
   - water
   - sewer

- law enforcement
- fire protection

4. Location of new growth during construction likely to be in unincorporated southern portions of county — away from service centers, bypassing the cities.
5. Secondary growth wave during operations caused by favorable tax situation.

5.1.2 Problems Arising from Uncertainty of Data

Uncertainty about the exact location, timing, and intensity of impacts is unavoidable because these decisions are made individually by the thousands of workers and, given the present state of the art of social impact assessment, they cannot yet be reliably predicted. Nonetheless, forecasts can be made about the number of inmovers with probability ranges placed upon these estimates to reflect the degree of uncertainty. An average has been calculated within the range for each category which can be used for planning purposes. Much work has been done and some progress made in attempting to uncover the variables which affect worker's inmoving decisions, including numerous surveys of workers by utilities and researchers.[1] In no case, however, have the basic uncertainties and indeterminacy of the data in these situations been satisfactorily overcome so that reliable predictions can be made. Worker surveys conducted by Duke Power Company at its Oconee, Catawba and Cherokee plants were taken at different points in the construction-operation cycle and the results can only be extrapolated to other construction situations with great care. The data collected by a single survey of the Cherokee workforce taken in summer 1977, when the number of workers was less than 500, has not been analyzed and no more recent surveys have been taken.[2] Faced with the great expense and difficulty of collecting large amounts of information frequently from workers so that their future actions might be "predicted," impact communities, utilities, researchers, and regulatory agencies have increasingly turned to another method of dealing with these uncertainties. That method is to monitor closely certain selected events

and data as the construction project proceeds (such as changes in population, school enrollments and traffic) so that appropriate mitigation and planning can be undertaken before adverse impacts become too serious or unmanageable. The specific information to collect will be discussed in Sect. 5.4.

5.1.3 Problems Arising from Institutional Constraints

The third type of problem facing Cherokee County because of the CNS construction and operation involves three conditions which prevent or hinder dealing with the impacts discussed above. 1) The timing of the building of Duke access road (eastern bypass around Gaffney) is a serious problem since traffic increases are already noticeable in the area and are projected to heavily overload the capacity of local streets and roads before completion of the bypass in 1981. Any further delays will compound the problem since the cumulative workforce will be nearing peak in 1981 and 1982. Delays within the state government and its department of transportation are primarily responsible for the postponement of the project, which is also complicated by the joint funding arrangement between ARC and the state of South Carolina.

2) The timing of tax revenues from the CNS means that no revenues are available to deal with impacts of construction in the period from now to 1986 or later (see Sect. 4.5). The first payments (school tax only) will not be made until one year after the first unit begins operating (1986), while the full amount of tax revenue will not be received until 1996. The ample revenue situation for Cherokee County after 1996 contrasts with the lack of revenues in the next decade when impacts will be most intense.

3) Lack of local planning capability in Cherokee County means that there is no professional staff available locally to collect information and devise plans for dealing with the expected impacts. Without land use planning and controls, such as zoning and subdivision regulations, there are no tools available to the local government to direct, phase or limit growth in ways that could minimize impacts, and incompatible land uses

are likely to result. Other impact communities have belatedly created such tools after experiencing sudden uncontrolled development,[3] but by then many lasting problems have been created which can be expensive to rectify. In the absence of a clear set of local plans and objectives, implemented and enforced by local authorities, the responsibility for development decisions affecting Cherokee County's future will continue in the hands of private developers and business interests. Cherokee County's large growth potential during operation and thereafter can only be optimized and directed according to local wishes and goals if suitable and adequate expertise is available to deal with these opportunities.

5.2 THE OPTIONS FOR CHEROKEE COUNTY

How to deal with the problems listed above as well as the opportunities presented by the building and operation of the CNS is the major set of decisions facing Cherokee County in the next two decades. These choices, or a series of choices, revolve largely around growth management decisions concerning what kind of development should occur, and when it should happen. The decisions made by the county will alter the course of impacts making them more or less adverse, and will determine whether several additional opportunities are captured or ignored. At least four main options are available to the county.

5.2.1 Option One — Do Nothing

No response on the part of the county is the easiest in some regards since it requires no action on the part of local government and no changes in modes of operation. In this case it is assumed that growth will be uncontrolled: more temporary and fewer permanent workers will move in, mobile homes will proliferate, traffic congestion will be severe for several years especially during shift change, and schools will be overcrowded at selected locations requiring more temporary units. In the absence of land use planning and adequate sewerage service, more septic tanks will be installed in unsuitable soils, residential development will occur in scattered places outside the cities, strip commercial development

will proliferate along crowded roads, and the likelihood of incompatible land uses adversely affecting each other will be increased. Local residents will pay more of the costs as quality of roads and schools declines at least temporarily. Decisions about what Cherokee County will be like will be made according to Duke Power Company's construction schedule and by private business interests according to their own private criteria, rather than by local government and citizens. Many future choices and opportunities will be foreclosed and foregone but no effect or money need be invested or consideration given to thinking about the future. Things will "happen as they will" and the future character and appearance of Cherokee County will be altered. Cherokee County will be a "passive bystander" as its future is being determined by others and by outside circumstances.

5.2.2 Option Two — Preventing Growth

The strategy here is to prevent adverse impacts by tightly managing and controlling growth during construction. Since few resources are immediately available during the major impact period, preventing growth bypasses the need for additional resources to deal with services overloads. Growth can be kept to a minimum by high-standard subdivision regulation, full-cost user fees for new water and utility hookups, and by restricting new septic tanks and mobile homes unless they meet stringent soil suitability and location standards. Growth pressures as well as local impacts can be further lessened by early construction of the Duke access road to make it easier for workers to enter and leave the county. But since there is some question whether Cherokee County efforts will have much effect in speeding up the road, this impact may be unavoidable. Growth prevention will probably work with or without the early access road possibility, but more attention will have to be devoted to strict implementation and enforcement of the other growth control mechanisms. This option has the advantages of requiring fewer resources than the later ones, of preventing many adverse impacts on local citizens and still leaving open for later decisions whatever approach Cherokee County wishes to take toward the second growth wave to come during operation of

the CNS. It does require some resources, strong support for the new growth limitation policy, and concerted effort by local officials and staff to implement and enforce the new policy against contrary interests. It represents the most abrupt changes of the four options from present Cherokee County policy.

5.2.3 Option Three – Selective Growth

Encouraging selective growth within Cherokee County captures some of the opportunities offered by the building of the CNS and minimizes or mitigates some of the adverse impacts. After deciding upon a set of local goals about which in-movers the county wishes to encourage [short-term (less than one year), mid-term (one to four years) and long term or permanent (4 + years)], plans can be developed concerning where and when growth should occur. One functional criterion could be that growth will be permitted in those areas where adequate services can be suppled, when they can be supplied. Land use plans and zoning regulations could be utilized to channel growth to selected areas with high-growth potential, and away from areas where services are difficult to arrange. Strip development can be controlled or limited along with other incompatible land uses. More resources will be needed in the interim to finance the planning effort and the selective provision of services; this will require increases in the local tax rates, or securing outside funding. The advantages of this option are that it prevents or mitigates many adverse impacts upon local citizens, it provides for orderly growth and development as resources permit, and it protects the county's options relative to phase 2 growth during operation.

5.2.4 Option Four – Maximum Growth

If the goal is to encourage maximum growth of population in Cherokee County during both the construction and operation periods, this can be accomplished through a maximum program of investment in additional public and private services. The strategy would be to avoid or mitigate adverse impacts by meeting all potential demands for services and thus encouraging

settlement by both temporary and permanent workers. Both land use planning and a heavy capital investment program in public facilities (especially schools) are required. Well-designed and well-placed mobile home and residential developments would be encouraged through land use planning and technical aid to meet certain standards. Provision of timely and adequate utilities to growth areas would be encouraged through the Gaffney Board of Public Works and other utilities. Local business interests would gain the most under this option and additional commercial and service capacity would locate in the county to service the growing population. There would be less "leakage" as fewer workers commuted to homes outside the county.

The disadvantages of this option are that it requires substantial additional internal funding (increases in local taxes, issuing bonds) as well as outside funding during the construction period. Encouraging the settlement of temporary workers means that some adjustments will be required when they depart during the declining workforce period (1986-1990). However, the county would be relatively well prepared to deal with the expected secondary growth with a good set of public services and temporary excess-capacity in them. Maximum growth during the construction period forecloses any low growth option for the county's future, but leaves it well-prepared to attract additional permanent residents in the 1990's.

5.2.5 Comparing the Options

As shown in Table 5.1, these four options differ in several respects. Option One requires no action or investment, but allows the most adverse impacts and forecloses more future choices for the county. Relative to quantity of resources required, the options vary directly from One (none) to Four (most). The options can be arranged from most to least inmovers as follows: One and Four (largest number though differing amounts of short- and long-term workers), Three (moderate) and Two (least). All the options except number One require adoption and implementation of

Table 5.1. Comparison of Cherokee County Options

Options	In-Movers	Impacts Mitigated or Prevented ?				Land use planning required	Additional resources required	Preserves future options	Timing considerations
		Roads	Services	Land Use	Mobile Homes				
Option one No action	Large numbers More short-term Fewer long-term	No Maximum congestion	No Maximum overcrowding	No Maximum land use change, often incompatible and haphazard	No Maximum number	No	No	No	None
Option Two Preventing growth	Small number More long term	No or Yes depending on choice of county	Yes Minimum overcrowding	Yes Minimum incompatible change	Yes Minimum number	Yes	Yes Small amount of additional investment	Yes	Yes Land use and building controls must be passed as soon as possible
Option Three Selective growth	Moderate number More long-term	No or Yes depending on choice of county	Yes Services provided in selected growth areas	Yes Selected planned land use change to to meet local goals and resources	Yes Minimum to moderate number	Yes	Yes Moderate amount of additional investment	Yes	Yes Land use and building controls must be passed as soon as possible
Option Four Maximum growth	Large number More short-term	Yes Road is built with additional funds as soon as possible	Yes Maximum amount services provided through large public investment programs	Yes Significant change but in planned, orderly ways	Yes Large number in well designed and controlled locations	Yes	Yes Maximum amount additional investment. Requires outside funds	Partially Low growth option foreclosed. Second wave growth encouraged by provision of services	Yes Land use and building controls and capital planning process must be undertaken as soon as possible

land use planning and some additional resources. Only the maximum growth option (Four) deals explicitly with the road and traffic problem by allocating additional monies to the Duke access road project to permit its early completion. The number of mobile homes would vary from most to least by options One, Four, Three, and Two according to the amount of restraint and control put upon their location. The choices to be made are Cherokee County's according to whichever set of objectives and consequences is desired.

5.3 WHAT OTHERS HAVE DONE IN MONITORING AND MITIGATION OF IMPACT

Many local areas faced with similar impacts from energy development have devised a variety of ways of dealing with them. Of the many mechanisms used or created, five which are most pertinent to Cherokee County's problems will be discussed. These are monitoring plans, fiscal impact mechanisms, public services support, roads and traffic, and impact coordinating committees. The appendix briefly summarizes complete mitigation plans for the Hartsville, Skagit, Susquehanna and Wheatland projects.

5.3.1 Monitoring Plans

A monitoring plan involves the periodic collection and evaluation of data to reveal the magnitude and course of impacts. Projected impacts then can be compared to actual impacts.

The three most extensive impact monitoring programs currently under way at power plant construction sites are those at TVA's Hartsville, Tennessee, four-unit nuclear plant, Washington Public Supply System's nuclear units 1 and 4 (WPPSS 1 & 4) at Richland, Washington, and the Missouri Basin Power Project's three coal units at Wheatland, Wyoming. The most common information collected includes regular updates on direct employment, population, school enrollment, traffic, housing, and local government revenues and expenditures, among many others. The information is collected by the

utility, by school districts, by impact monitoring committees, local governments and/or planning departments. Items may be monitored monthly, quarterly, semi-annually, or annually. Reports are made monthly to the Wyoming Industrial Siting Board (Wheatland), semi-annually to the USNRC (Hartsville) and yearly to the Washington Energy Facility Siting Evaluation Council (WPPSS 1 & 4). In all cases, the information collected is used to evaluate, modify, and guide the impact mitigation plans for each of these facilities. A summary of these plans is included in the appendix, along with the monitoring report of the Pennsylvania Power and Light Company for its Susquehanna plant. The latter was a one-time study voluntarily undertaken by PP&L to assist in internal planning for project impacts. Eleven monitoring projects including the four described above are discussed in the Atomic Industrial Forum report on the"state-of-the-practice" in social impact assessment, monitoring, and management in the electric energy industry.[4]

5.3.2 Fiscal Impact Mechanisms

Since lack of resources to deal with "front-end" service needs and other construction impacts is the rule rather than the exception for energy-impact communities, various mechanisms have been used to try to close this gap between impact needs and belated resources. The second common gap for impact areas involves tax base mismatches wherein several impact communities share unequally in tax revenues. It is common for a county to get all the taxes while towns and cities get most of the inmovers and impacts.

Mechanisms to close the timing gap include prepayment of taxes, direct payments, loans, loan/bond guarantees, purchase of bonds/notes, and state-organized impact assistance funds (Wyoming, Montana, North Dakota). All of these measures except the last have been utilized by utilities or energy developers. The Puget Sound Power & Light Company has agreed to prepayment of taxes on its Skagit nuclear plant and has received local zoning and state permit approvals on this basis. Prepaid taxes may not

be claimed on Federal income tax returns until they are actually due,[5] which represents additional cost to the utility. The State of Utah has specifically altered its laws to allow prepayment of state use and sales taxes to impact communities. The Hartsville and Wheatland mitigation plans involve direct payments, loan guarantees, and purchase of notes (Wheatland only) to help provide resources to mitigate impacts when they occur.[6]

Fiscal mechanisms to alleviate the location imbalance problem by sharing the resources over a more complete impact area include special combined taxing districts in Utah and Wyoming, and regional revenue sharing in the Twin Cities of Minnesota as authorized in the Fiscal Disparities Act.

5.3.3 Public Services Assistance

Principal difficulties facing impact areas when they seek financial or technical assistance from other levels of government are 1) learning where and how to apply in the maze of state and federal assistance programs, 2) that most existing assistance programs are not geared to the needs of impact communities (EDA, FmHA, EPA), 3) competition for limited funds among many applicants, and 4) the lengthy time periods before successful applicants receive actual funding. Coordination of programs and assistance is much discussed but almost non-existent. With the exception of regional commissions, attempts to coordinate assistance to impact communities "has met with virtually no success."[8]

Dealing with these problems without either experience or professional help is difficult: Gillette, Wyoming found that "things have gone much better since we hired a grantsman"[7]; others have hired professional managers, planners, and temporary or permanent technical assistance.

Two guides are recommended which both list and review the applicability of more than 100 federal programs for local impact assistance. They are the

- *Energy Impact Assistance Report to the President* published by U.S. Department of Energy (March 1978) (pp. 46-53 and Appendix D).
- *Mitigating Adverse Socioeconomic Impacts of Energy Development* prepared for U.S. Department of Energy, Office of Intergovernmental Relations, by Keith Moore, Diane Hammond, John Gilmore, Dona Flory, University of Denver Research Institute and Dean Coddington and Dennis Donald, of Bichert, Browne, Coddington and Associates (January 1978) (pp. 16-31 and Appendix A).

These programs are administered via numerous federal agencies, often with channeling through state or regional officials. Assistance may involve direct grants, loans, bond guarantees, etc. Local matching funds are often required.

5.3.4 Roads and Traffic

The two most common transportation problems at energy development sites are need for additional roads (usually for site access) and traffic problems generated by construction traffic. At eastern locations where most workers tend to commute rather than re-locate, traffic is often the only significant construction impact. Most local areas have had to hire additional police officers and equipment to deal with traffic congestion at shift change periods.

Access roads have been built by energy developers, state or local governments, either singly or in combination. At the proposed Greene County nuclear power plant (New York), the utility proposed five options for access road improvements, ranging from $17 to $50 million,[9] to be financed by the utility.

The Hartsville mitigation plan included an extensive employee transportation plan involving TVA-organized vanpooling, buses and carpooling (costing $1 million during the first two years of construction).[10] This "soft solution" avoids the more extensive costs of road building while reducing traffic congestion.

5.3.5 Impact Coordinating Committees

Though the organization and scope may vary, many energy projects and most mitigation plans involve a coordinating committee where problems can be discussed and information exchanged among the major parties. Members include representatives of all affected local jurisdictions (counties, cities, school districts), the energy developer and sometimes, state or other interested parties, and local interest groups (agriculture, business, hospital, etc.).

The purpose of these task forces or coordinating committees varies from simple information and education exchange, to planning and initiating action, to reviewing and evaluating the status of impacts and mitigation efforts at regular intervals.

The Hartsville Project Coordinating Committee meets quarterly to review the impact situation in the five-county impact area, present requests and concerns to the TVA Coordinator, and to review TVA monitoring reports. The HPCC office and staff are funded by TVA. Additional studies, special purpose meetings, and rechecking of in-mover data have resulted from these meetings.

5.4 DEVISING MITIGATION STRATEGIES TO FIT THE PROBLEMS AND CHOSEN OPTION

Just as each of mitigation plans discussed in the Appendix is tailored to fit the particular circumstances, impacts, and impact area involved, the mitigation strategy to be chosen by Cherokee County should be specially designed to fit the problems and circumstances in Cherokee County. Since both resources and constraints are variable (though some are more fixed than others), the particular plan that results will be largely determined by the amount of effort and problem-solving attitude devoted to devising solutions. There is no "one" or "best" solution. The choices to be made about future objectives of the County outlined in Sect. 5.2 will primarily determine the direction and character of the desirable

mitigation strategy. Choosing the goal will then direct the local decision makers toward decisions about the tools, mechanisms and approaches which will implement that goal.

Criteria for a satisfactory mitigation plan include the following:

- Does it cover major impacts of concern?
- Does it make use of all available resources, starting with local ones?
- Have adequate resources been identified and secured to do the job?
- Does it give priority to the most serious and time-dependent impacts?
- Is it flexible? Can it adapt to changing conditions throughout the impact period?
- Is it compatible with local goals and objectives?
- Are some groups or residents neglected and left to pay an undue share of costs, inconvenience, and disruption?

After all the discussion focusing upon mitigation of impacts, it should be recognized that only some impacts are mitigable. Others which are just as real and inevitable cannot be altered or alleviated and are thus unmitigable.

The components of a mitigation plan for Cherokee County could reasonably include measures to:

- deal with road and traffic problems,
- reduce the time gap between peak services demands and future tax revenues,
- deal with expected growth in the first and second growth periods,
- monitor and evaluate changes as they occur during the construction period, and
- oversee and evaluate the operation of the monitoring and mitigation plan selected.

5.4.1 Roads and Traffic

The extra traffic on already inadequate roads is expected to cause serious over-loading and congestion at least until the Duke Access road bypassing Gaffney is completed. The delays in starting the first portion of the road construction mean that this improvement will not be ready until late 1980 while the second section will not be completed until near-peak conditions in 1981 or later. Considering the substantial efforts of Cherokee, Duke Power, and SCACOG officials to date in attempting to facilitate and accelerate the early completion of this road, it is not obvious what can further be done. In the event that the second section is further delayed, three possibilities which could be tried to raise the priority and speed-up this project include:

- redoubled cooperative efforts by all three parties along the same path,
- assumption of financial responsibility by Cherokee County to get the project started and to assure its completion,
- more intervention or direct assumption of responsibility by Duke Power Company.

County officials will have to decide whether any one of these additional efforts should be undertaken, balancing these additional efforts and costs against the increasingly severe impacts from delay. In the latter two cases, either the County or Duke Power would supply the extra effort and money to get the project started, thus becoming a third party sharing in the costs. Perhaps some arrangements can be made by the County to reimburse Duke Power Company from future tax monies in return for timely extra assistance now when it is most needed.

Other construction period mitigation efforts needed to cover costs and reduce impacts include:

- additional law enforcement staff to handle traffic problems throughout the construction period,

- increased local road maintenance and repair costs until workforce totals decline after 1986.

5.4.2 Reducing the Time Gap Between Impacts and Future Revenues

All of the options except number One (No Action) require expenditures in order to mitigate impacts and pay for needed services during construction. The higher growth options also require expenditures for capital improvements during construction. If Cherokee County wishes to do something to reduce this tax-base mismatch, the possibilities include:

- raising the funds locally through increasing taxes, borrowing money, etc.;
- applying for assistance to Duke Power Company on the basis of documented specific needs and plants;
- applying for assistance to state or federal programs on the basis of specific, documented needs.

These options for raising additional revenues during the time of greatest impact can be applied singly or in combination. In most cases it would be desirable for Cherokee County to demonstrate its commitment to its own future by raising at least some of the necessary funds. Many federal programs require local matching funds or are keyed to the degree of local tax effort.

According to the survey of mitigation programs done by the Atomic Industrial Forum and the Edison Electric Institute, "management efforts are usually shared by public entities and industry ... in cases where substantial impacts occur."[11]

Of the 100 federal programs reviewed in the two documents referenced in Sect. 5.3.3, only one-third are applicable to impact communities, and of these, about 25 would be generally applicable to Cherokee County. Many of these are highly specialized programs as for drug abuse, alcohol abuse, and child abuse assistance and would not be first priority for

Cherokee County. The most promising programs are probably those of the Appalachian Regional Commission, EDA Adjustment Assistance, HUD planning, and Farmers Home Administration (community facility construction). The South Carolina Appalachian Council of Governments is already familiar with most of these and can provide detailed information and assistance if Cherokee County decides to investigate or pursue any of these outside sources of assistance.

If Duke Power Company is approached for voluntary assistance during the construction period, it must be on the bais of specific, documented needs and plans which are part of a larger, long-term, development plan. Possible arrangements include grants or loan guarantees, or prepayment of taxes in some form.

5.4.3 Planning for Growth

All options except the no-action choice will require certain steps to deal with growth during the construction period. The minimum steps required by all growth-management options are:

- develop goals and objectives for land use and growth management;
- hire professional planner and some support staff to develop and implement chosen goal and objectives, through land use planning devices such as building controls, subdivision regulations, septic tank limitations, mobile home ordinance.

The selective-growth and maximum-growth options would require in addition the following measures:

- improve housing quantity and variety in both city and county;
- provide public services in advance of development of selected growth areas;
- establish joint planning authority to coordinate efforts of cities and county;

- secure services of grantsman or other specialized staff to arrange timely application and qualification for federal and state assistance programs;
- develop a long-range capital improvements program and establish priorities among projects;
- seek adequate local and outside funding to implement goals.

In view of the County's shortage of low and middle-income housing, and the shortage of rental units typically experienced during heavy worker in-migration during construction, the county may wish to support and encourage availability of a broader range of quality housing in order to ensure balanced growth during this period. Various federal programs can be tapped for technical assistance and grants. Special attention is needed in the areas of mobile home park development and rental housing if the maximum growth option is chosen.

Capital improvements programming is one of the major problems confronting energy impact communities. For an extensive discussion of how to proceed and what to consider, see Chapter 6, Capital Programming, pp. 131-150, in *Managing the Social and Economic Impacts of Energy Developments*, for the U.S. Department of Energy Research and Development Administration, July 1976.

Since different areas of the county share unequally in the costs and benefits of the CNS development, action can be considered under <u>any</u> of the growth options to partially rectify those aspects which are within the power of the county. Growth will be bypassing the cities for various reasons, and will be focusing on the southern portion of the county during construction, and along the interstate during operation. A major share of the traffic impacts will be experienced by Gaffney, however, even after the Duke access bypass road is completed. Better long-term growth and greater equity will be achieved if measures are taken to:

- protect Gaffney's role as the county commercial and cultural center via downtown renovation, park development, and improved roads and parking. (Compare similar recommendations in *The Economy of Cherokee County*, by Hammer, Greene and Siler Associates, 1971, pp. 101-117).
- share county revenues with Gaffney and Blacksburg through creation of an inclusive taxing district, impact area, or some form of government consolidation (see Sect. 5.3.2).

Solutions to such tax-mismatch problems are often the most difficult to solve politically. Failure to address them directly can result in serious long-term costs being paid by some citizens and the creation of unnecessary local political rifts.

5.4.4 Monitoring the Impacts

The purpose of this monitoring plan is to record changes in demand and level of services, and to produce a record of excess demand in services, if any, during the construction period. This evidence will justify the claims of Cherokee County for both internal and external support. It also allows tracking the actual course of impacts and comparing them with population and workforce-inmover projections. Trendlines can be constructed from the data collected and compared with pre-project baselines (see Chapter 2). The course of mitigation plans can be altered for new impacts, disappearance of effects, or other changes in intensity or location of impacts.

The monitoring plans summarized in the appendix range from simple to complex. The monitoring effort undertaken by Cherokee County should be carefully linked to expected impacts and supporting baseline data. It is a common error to begin collecting too much information, to become bogged down in the evaluation, and to waste effort and money in the process. Complexity or extra volume of data in monitoring is not a virtue, but a liability. Nothing should be collected for which a need is not seen or

justified. A suggested data collection program with suggested time frames and source of information is given in Table 5.2. Two principal types of information are needed:

- workforce number, characteristics, and percentage inmovers
- community services capacity and demands during impact period

Information should be collected by the usual agency and forwarded to the monitoring coordinator. Some types of information will have to be collected directly by the coordinator or other county staff. The monitoring coordinator is responsible for collecting, analyzing, and evaluating the data and issuing reports semi-annually or at the direction of the Impact Committee. More information on the process can be found in the monitoring reports of any of the on-going monitoring projects, and general guidelines are available in the socioeconomic sections by Linda Berry in the *Environmental Monitoring Handbook for Coal Conversion Facilities*, ORNL-5319, May 1978. A suggested short questionnaire for plant construction workers is shown in Fig. 5.1, based on questionnaires used in the TVA and other employee monitoring efforts. Only one item need be added to this questionnaire — that concerning the worker's status as either a construction or operations worker.

5.4.5 Impact Coordinating Committee

It is assumed that the Cherokee County Impact Committee will continue in an expanded role of overseeing, evaluating and adjusting the operation of whatever monitoring and mitigation plan is selected. Membership of this committee should be evaluated so that it includes all parties who have an interest and stake in the outcome.

5.4.6 Summary and Conclusion

This report has inventoried Cherokee County's capabilities (Chapter 2) and CNS project characteristics (Chapter 3), projected expected impacts

Table 5.2. Suggested variables for Cherokee County monitoring plan

Variable		Frequency of collection	Source
Workforce	Total	Every 6 months	Duke Power Co.
Worker	occupation		
	age		
	marital status		
	number and age-school age children		
	present residence location		
	present residence type		
	previous residence location		
	construction or operations status		
Workforce	Projection update		Duke Power Co.
Population estimate			
	Gaffney	Annual	S.C. Div. Research & Stat.
	Blacksburg		Local phone and utility hookups
	Cherokee County		
Schools	Enrollment by grade	Every 6 months	Cherokee Co. Schools
	# teachers & support staff		
	# construction worker children		
	pupil/teacher ratios		
	capacity limits	Annual	
	expenditures and revenues		
	# mobile units in place	Every 6 months	
Traffic counts at selected locations on 18, 105, 13 and 29 in Gaffney and outside		Quarterly	S.C. Dept. Transportation
	Vehicles in peak hour		
	Vehicle occupancy rate		
Police	# calls and arrests	Every 6 months	Gaffney Police Sheriff
	# traffic accidents-location		
	crime rates by category		
	staff and equipment levels		
Water & Sewer	Capacity	Every 6 months	Gaffney Board Public Works Other utility districts
	average daily flow		
	peak daily flow		
	location of new lines		
	additional connections possible		
Revenues and expenditures			
	Gaffney	Annual	City of Gaffney Cherokee Co. Schools Cherokee County
	Cherokee County Schools		
	Deviation from Budget		
Housing	# Building permits and housing starts	Every 6 months	City Building Inspector County Health Dept. Local realtors via monitoring staff
	# mobile homes		
	# septic tank permits		
	location of new housing		
	average value of housing		
	average value of rents		

1. What is your present occupation (job title)? _____
2. What is your address (street and town)? _____
3. About how far is this from the construction site? _____
4. What type of home are you living in now (circle one)? apartment, single-family home, mobile home, motel or rooming house, other _____
5. a. Are you living in the same town you lived in before you started working on your present job? yes no
   b. If no, where did you live previously (town and state)? _____
6. Are you married, single, widowed, divorced? (circle one)
7. a. If married, is your spouse living with you at your local address? yes no
   b. Is your wife/husband employed locally? yes no
   c. Was she/he employed locally before construction of this project started? yes no
8. How many children under 18 live with you at your local address? _____
9. What are the ages of these children? _____

Fig. 5.1. Questionnaire for plant employees.

Source: ORNL-5319, "Environmental Monitoring Handbook for Coal Conversion Facilities," Sect. 3.3.2, May 1978.

from the interaction of the two (Chapter 4), defined four options for Cherokee County, and presented a range of possible mitigation and monitoring plans (Chapter 5) for dealing with the problems identified in Sect. 5.1. Four options, and general implementation guidelines for each, are presented for Cherokee County decision makers after reviewing pertinent features of other mitigation and monitoring plans. With the exception of the "no action" option, all plans deal with impacts according to some strategy determined by how the County wishes to manage growth. Solutions for impact problems depend on which growth strategy is selected and what additional resources are secured during the impact period. A monitoring program deals with the data and projections uncertainty problems, while direct action is proposed to deal with the institutional problems of delay of the needed access road, timing and location problems from the tax base mismatch, and lack of local planning capability.

All the options for Cherokee County choices are flexibile and can be adapted to include or delete certain growth management devices. The attempt here was to present four distinct, reasonably coherent choices for discussion purposes and implementation sufficient to achieve them. It is now up to Cherokee County decision makers to determine which plan best suits their needs, desires, and future directions, and to take steps to implement that decision.

REFERENCES — CHAPTER 5

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2. Private communication, Don Blackmon, Duke Power Company, to Martin Schweitzer, ORNL, Oct. 13, 1978.

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6. Peelle, Elizabeth, "Mitigating Community Impacts of Energy Development: Some Examples for Coal and Nuclear Generating Plants in the United States." Paper presented at AAAS 1979 Annual Meeting, Houston, Texas, Jan. 3, 1979.

7. Mayor Mike Enzi, Gillette, Wyoming; personal communication to Elizabeth Peelle, ORNL, Jan. 3, 1979.

8. *Report to the President: Energy Impact Assistance* published for the Energy Impact Assistance Steering Group by U.S. Department of Energy, Washington, D.C. 20585. DOE/IR-0009, UC-13, March 1978, p. 38.

9. Final Environmental Statement, Greene County Nuclear Power Plant, Unit 1, Docket # STN 50-549. U.S. Nuclear Regulatory Commission (in press), February 1979.

10. Hartsville Nuclear Plants Socioeconomic Monitoring and Mitigation Report, March 31, 1978, Knoxville, Tennessee, September 1978.

11. Energy Impact Associates, op cit., p. 13.

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Appendix A

SUMMARY OF SELECTED MONITORING AND MITIGATION PLANS AND REPORTS

TVA – Hartsville Monitoring Plan

Component	Variables-Information Collected	Frequency*	Sources
Population	Population estimates by county for 5 county area	Semiannual	TVA State-Tenn. Local censuses
Employment (employee surveys)	Mover/commuter status Residence location by city and county owner/renter Housing choice house/mobile home/apt/room Family status School age children - by age		TVA Local surveys and censuses
Secondary employment	Population changes Basic employment		TVA - State of Tennessee
Education classrooms equipment school buses	Names of impact student School previously attended School and grade Transportation information Attendance records		Seven school districts TVA employee data
Impacts on counties and communities	Family status Housing choice house/apt/mobile home/room Renter/owner Movers within city limits Movers within counties		TVA employee surveys
Local government budgets	Total revenues Expenditures		Local governments HPCC
Health services ambulance-Trousdale Tennessee Dept. of Health-salaries	Employee use of medical services		TVA employee survey
Water and Sewer	Capacity of city and county services average daily flow peak daily flow additional connections possible		TVA survey of local water and sewer systems
Traffic	Vehicles in peak hour Hartsville traffic study	{Quarterly 12 locations} One time	Tenn. DOT
Employee transportation subsidy to van and bus pools	Vehicle occupancy car pool/van/bus/car counts		TVA

*Frequency is semiannual unless otherwise noted.

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TVA - Hartsville Monitoring Plan (continued)

Component	Variables-Information Collected	Frequency*	Sources
Housing	Housing supply by type by county	One-time and occasional update	TVA and local realtors
Local recruitment and training	Employee county residence Resident trainee programs enrollments (steamfitters boilermakers GED)	Semiannual	TVA State of Tenn.
Local planning assistance	Design and implementation of development standards and plans in 5 counties and 5 cities		Local planning boards T.S.P.O.
Local impact committee	General review and evaluation of impact status and mitigation	Quarterly meetings of HPCC Board	21 officials
		Annual review-HPCC	5 counties and 16 towns

*Frequency is semiannual unless otherwise noted.

Missouri Basin Power Project Monitoring Plan

Component	Variables-Information Collected	Frequency*	Sources
Manpower, work force	Total (net) employment classified by	Monthly	MBPP and Burns and McDonald Engineers
	Daily commuter / Temporary resident / weekly commuter		
	Residence location Family status and size Number and age of children Projections of workforce (for temporary residents)		Wyoming Employment Security Commission
	Induced employment	Quarterly	MBPP
Population estimates	Municipal utility hookup (number)	Semiannual	Municipal utility
	School registration		School district
	Construction workers residence marital status family size, ages		MBPP
Education	Enrollment by grade Teacher and support staffs Teacher/pupil ratios Classroom space available Revenues and expenditures	Monthly	Individual schools in 2 school districts
Housing	MBPP housing occupancy rates by employee/non-employee change of housing status change of housing type		MBPP Housing Dept.
	Private sector housing sale of single family homes availability of rental property by type realtor survey re vacancies newspaper and radio inquiries mobile home survey		
Public service	Police report	Quarterly	Wheatland City Chief of Police and the Platte County Sheriff's Department
	Fire report	Monthly, submitted quarterly	Wheatland Fire Department
	Wheatland municipal utility present usage vs. total capacity	Quarterly	Wheatland City

*Frequency is monthly unless otherwise noted.

Missouri Basin Power Project Monitoring Plan (continued)

Component	Variables-Information Collected	Frequency	Sources
Public service (continued)	Recreation MBPP recreation usage Platte County recreation use	Quarterly	Black Mountain Recreation (MBPP) Facility and the Platte County Recreation Dept.
Social services	Public assistance caseload Mental health caseload as of % of current population	Quarterly	MBPP Wheatland Mental Health Center and Platte County Board of Commissioners
Local fiscal activity	Revenues, Expenditures } for Platte County, Town of Wheatland and School District #1	Annual	Univ. of Wyoming Institute for Policy Research
	Per capita tax flows Deviation from budget		MBPP Staff
Planning	Subdivision plats submitted/ approved	Monthly	Platte Co. Joint Planning Board
Small community impacts (outside Wheatland)	School enrollment Community growth capacity Net utility hook-ups as % of capacity	Monthly	Local communities
Local Impact Committee (PACC)	Overview and evaluation of impacts on Platte County area, functioning of MBPP contingency and mitigation plans	Monthly Annual	Local, state and MBPP officials(11)

MISSOURI BASIN POWER PROJECT

A N N U A L

S O C I O - E C O N O M I C

I M P A C T A L L E V I A T I O N

P R O G R E S S R E P O R T

Prepared
by MBPP Staff
September 1, 1977

SECTION VIII. SOCIO-ECONOMIC IMPACT MONITORING PROGRAM

8.0 . . . . the Applicant shall:

(19) Within one hundred twenty (120) days from the date hereof, the Applicant shall develop and submit for Council approval, a program to monitor and evaluate socio-economic impacts, featuring provisions for timely implementation of contingency measures, and for evaluation of the effectiveness of mitigating actions. Continuing evaluations shall be provided to the Office of Industrial Siting Administration on a bi-monthly basis. The Monitoring Program shall meet, as a minimum, the requirements outlined in Appendix A, attached hereto, and incorporated in this Permit.

8.1 The Missouri Basin Power Project has designed and implemented a Socio-Economic Impact Monitoring Program, which has been approved by the Wyoming Industrial Siting Administration. This Program was designed to meet the requirements of "Appendix A" of the Industrial Siting Permit. The areas this program monitors and the frequency of the reporting process are outlined in the Report Matrix Table VIII-A.

8.2 The Socio-Economic Impact Monitoring Staff reports directly to the Project Area Coordinating Council (Monitoring Board). This Council consists of the Mayors or their designated representatives from Wheatland, Guernsey, Hartville, Glendo and Chugwater; the Presidents of Platte County School District No. 1 and No. 2; a representative of the Platte County Commissioners; a representative of the Industrial Siting Administration; a representative of the Laramie River Conservation Council; and a representative of MBPP. This Council meets in open public session on the third Monday of every month to review the report prepared and submitted by the MBPP Monitoring staff. The list of the officers and members of the Council is outlined as Exhibit No. 6.

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8.3 As directed by the Council, the Missouri Basin Power Project has established a specific account which is funded at $10,000 per annum. Monthly expenditures by the Monitoring Board are detailed and include per diem and travel costs of Board members. Expenditures to date total $2,918.85.

8.4 General operating procedures for data collection, processing and presentation are presented as Exhibit No. 7.

MONITORING PROGRAM REPORTING MATRIX

I. Monthly Reports
   - A. MBPP Employment
   - B. MBPP Housing Status
   - C. Non-MBPP Housing Status
   - D. Schools
   - E. Smaller Communities

II. Quarterly Reports
   - A. Public Services
     1. Police Report
     2. Fire Report
     3. Municipal Utility Report
     4. Recreation
   - B. Social Services
     1. D-PASS
     2. Mental Health
   - C. Workforce Projections Update
   - D. Induced Employment

III. Semi-Annual
   - A. Population

IV. Annual
   - A. Revenues & Expenditures
   - B. All reports will be updated for assessment on an annual basis.

V. Basis for Revising Projections

The monitoring program is an extension of the initial planning and assessment efforts. All assumptions and models will be continually verified for accuracy by using actual data generated by the influx of construction personnel. Projection revision will be triggered by significant deviation of actual data from original projections.

Susquehanna Monitoring Plan

Component	Variable	Frequency	Source
Management employee survey	Occupation Residence area Housing choice Owner-Renter Family size Age Number of children by age by school district Shopping patterns Use of local services Attitudes Expected length of residence	One time at beginning	Pennsylvania Power & Light
Area leader survey	Attitudes and evaluation of plant impacts	As needed (Unstated)	PPL
Employment and Manpower	Unemployment-region	One time	Bechtel
	Estimated manpower needs	Continuing	
	Residence location by county	Quarterly	
	Occupation	Quarterly	
	Mover/commuter/local status	Quarterly	
Economic inputs	Wages by county Plant purchases by county	Annual	Bechtel
Local taxes	Assessed valuation, millage and other taxes for 15 towns and school districts	Annual	Pennsylvania Economy League
School Services	Enrollment by school district	Annual	Bechtel School District
Housing market	Housing market values by county Available housing Condition Amount	Unstated (as needed)	County Planning Commission Local realtors
Health services	Number of cases referred to Berwick Hospital	Annual	Bechtel

COMPARISON OF MITIGATION PLANS FOR HARTSVILLE, SKAGIT AND WHEATLAND

Selected Tables from "Mitigating Community Impacts of Energy Development: Some Examples for Coal and Nuclear Generating Plants in the United States" by Elizabeth Peelle, Oak Ridge National Laboratory (ORNL), in *Nuclear Technology*, June 1979

Table II

Project Characteristics

	Hartsville, Tennessee	Skagit County Washington	Wheatland, Wyoming (Laramie River)
Fuel	Nuclear	Nuclear	Coal
Size	4-unit 1269 Mw of electrical power (each)	2-unit 1300 Mw of electrical power (each)	3-unit 500 Mw of electrical power (each)
Cost	$\sim\$3.5 \times 10^9$	$\sim\$1.9 \times 10^9$	$\sim\$1.4 \times 10^9$
Utility	TVA	Puget Power and Light	Missouri Basin Power Project
Licensing Agency	NRC	NRC Wash. EFSEC Skagit County	Wyoming Industrial Siting Administration
Status	Under construction NRC Permit 1977	NRC permit pending State permit received Jan., 1977 County rezone agreement-1974	Under construction State permit 1976

Table III

Goals of Mitigation Plans

I. "The applicant shall take the necessary mitigating actions as identified within the application and the hearing record, to reduce the socioeconomic impacts of the facility upon present and expected inhabitants." (Wheatland, Wyoming)

II. "To reasonably and adequately mitigate the impacts of the construction of the project on the community and protect the health and safety of the public during construction and operation." (Skagit, Washington)

III. "To utilize local capabilities to the extent possible; to provide assistance to the impact communities sufficient to maintain pre-project service levels or generally accepted standards; to enhance, to the extent possible, long-term benefits from mitigation projects; to ensure coordination with appropriate bodies; and to provide necessary facilities and services in a timely and cost-effective manner." (Hartsville, Tennessee)

Table IV
Scope — Features of Mitigation Plans

	Hartsville	Skagit	Wheatland
Education Costs	X	X	X
Water and Sewage	X		X[1]
Mental Health and Social Services			X
Health and Medical	X		X
Local Government Budget	X		X
Planning and Coordination	X		X
Recreation			X
Law Enforcement	X	X	X
Housing	X Limited		X
Employee Transportation	X		
Resident Training	X		X
Roads			X
Monitoring	X[2]	X[3]	x[4]

[1]Also electrical.
[2]Twice yearly reports to NRC, state.
[3]Monthly and quarterly monitoring with "regular reporting" to state.
[4]Monthly reports to county; yearly evaluation by state.

Table V

Financing and Costs of Plans

	Hartsville	Skagit	Wheatland
Mode of payment or support	Direct payments Technical assistance Guarantees of cost recovery Supplementary funding	Prepayment of taxes	Direct payments Technical assistance Loan guarantees Outright grants Operating budget guarantees
Authority to determine payment amounts	Agreement formulas (education) Utility	Agreement formulas (education) with binding arbitration Law enforcement Comm.	Permit conditions Project Area Coordinating Council
Cost to Utility	∿\$10. x 10^6 (total)	\$125,000 - \$600,000 (for peak year)	∿\$19.3 x 10^6 (total)
Potentially recoverable costs	–	–	∿\$15.0 x 10^6
Local taxes	Non-taxable	∿\$30 x 10^6 (operation)	∿\$2.3 x 10^6 (1976-1983) use tax 460% assessed value increase (Platte Co.) 560% assessed value increase (School District #1)
Cost per kilowatt hour	0.03 mills [a]	0.033 mills [b]	0.18 mills [c]

[a] Calculated on basis of fixed charge rate of 8.5% and 60% plant capacity factor.
[b] Using fixed charge rate of 18% and 60% plant capacity factor.
[c] Using fixed charge rate of 8.5% and 70% plant capacity factor.

Appendix B

HARTSVILLE MONITORING PLAN
HARTSVILLE MONITORING REPORT — SEPTEMBER 1978

Tennessee Valley Authority

SOCIOECONOMIC IMPACT MONITORING PLAN

Hartsville Nuclear Plants
August 1976

TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401

SEP 7 - 1976

Director of Nuclear Reactor Regulation
Attention: Mr. Roger S. Boyd, Director
Division of Project Management
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Boyd:

In the Matter of the Application of	)	Docket Nos. STN 50-518
Tennessee Valley Authority	)	STN 50-519
	)	STN 50-520
	)	STN 50-521

Enclosed for your review is the TVA socioeconomic monitoring plan for the Hartsville Nuclear Plants. TVA has developed this program to monitor and evaluate socioeconomic impacts and the effectiveness of mitigating actions as required by the limited work authorization and as outlined in the TVA final environmental impact statement. Continuing information will be provided on a semiannual basis.

Very truly yours,

J. E. Gilleland
Assistant Manager of Power

Enclosure
CC (Enclosure):
Mr. Stan Echols
5650 Nicholson Lane
U.S. Nuclear Regulatory Commission
Rockville, Maryland 20850

Mr. Meyer Novick (2)
Environmental Statements Projects
Building 11A
Argonne National Laboratory
9700 South Cass Avenue
Argonne, Illinois 60439

Ms. Elizabeth Peelle (3)
Oak Ridge National Laboratory
P.O. Box X
Oak Ridge, Tennessee 37830

Mr. E. Lamar Seals, Regional Administrator
Department of Housing and Urban Development
1371 Peachtree Street, NE.
Atlanta, Georgia 30309

Mr. Jim Payne, Director
Office of Urban and Federal Affairs
1312 Andrew Jackson Building
Nashville, Tennessee 37219

HARTSVILLE NUCLEAR PROJECT

SOCIOECONOMIC IMPACT MONITORING PROCESS

The socioeconomic impact monitoring process is a 3-phase system designed to obtain information concerning the social and economic impact of the TVA construction work force on the local area, evaluate that information, and suggest appropriate adjustments to the impact forecasts and mitigation actions outlined in the TVA final environmental impact statement (FEIS). This process is diagramed on the attached figure.

In the FEIS, TVA made socioeconomic assessments and mitigation plans based on the projected magnitude and distribution of impact due to the construction force influx. The functional areas evaluated were education, housing, traffic, water and sewer facilities, health and medical services, and local government budgets. As a result, certain mitigation resources have already been committed; others will be committed based on the amount of actual socioeconomic impact identified through this monitoring system.

The monitoring concept revolves around a process in which data are collected from an information field. These data are then analyzed and after any problems are identified, appropriate program adjustments are made, the results of which will alter the information field. Data from the new information field must be once again collected and the entire process of data input and mitigation program output reiterated throughout the monitoring period. The monitoring of socioeconomic impacts started when the TVA construction force arrived and began plant construction. It will continue throughout the construction period, and for a brief period afterwards, to provide documentation of any postconstruction effects.

In the data collection phase of the monitoring process, information will be obtained from three sources. First, routine socioeconomic information will be obtained from each project worker upon initial employment. Also, after a short period of employment, followup surveys will be taken of the construction force to identify additional socioeconomic characteristics. Second, affected TVA functional divisions* will be expected to maintain appropriate local contacts and data sources to obtain information which they require about impact on the local systems for which they are responsible. This information should be summarized quarterly as components of the overall monitoring system and distributed to interested functional divisions including the Office of Power, the project coordinator, and the Division of Navigation Development and Regional Studies (ND&RS). Third, information will be compiled during the course of the project's construction by the Hartsville Project Coordinating Committee (HPCC). The HPCC, composed of local elected officials in the project area, will utilize its own staff and other supporting agencies to provide current local information to the monitoring process.

In the data analysis phase of the monitoring process, basic data from the first two sources will flow to two destinations--the functional divisions and ND&RS. Informational inputs from the HPCC will flow to TVA through the project coordinator. As diagramed, each point of data analysis will share its results with the others as appropriate. Each functional division will be responsible for analysis in its area of expertise and will evaluate new data, make impact assessments, identify problems, and develop mitigation adjustment alternatives. Simultaneously, ND&RS will receive summary reports from each division. The project coordinator will maintain an evaluation of the socioeconomic climate based on his and the HPCC's information and observations and inform the functional divisions

and ND&RS. Utilizing this information, ND&RS will evaluate the overall mitigation program to identify any shifts from the impact projections and advise functional divisions of changes which may alter their future mitigation deliveries. This should assure that the different mitigation components will remain in proper balance with each other, i.e., schools in relation to housing in relation to water and sewer, etc.

In the adjustment phase of the monitoring process, the functional divisions will utilize their own information, the overall program evaluation supplied by ND&RS, and information supplied by the HPCC and the project coordinator to make decisions as to the adequacy of their mitigation programs and the need to either continue as projected or make adjustments. If the need for minor adjustments in the mitigation program is indicated, the functional divisions will respond accordingly. However, if the adjustment is of a magnitude that requires a change in the budget or scope of the program, the functional divisions will make appropriate proposals for TVA interdisciplinary review and management approval. The results of the mitigation program with or without adjustments will serve to alter the impacts caused by the construction force which will be verified as the monitoring process continues.

As required in the Limited Work Authorization, a semiannual socioeconomic report will be provided to the Nuclear Regulatory Commission (NRC). In the final phase of the monitoring process, ND&RS will prepare the report based on its evaluations, the functional staff quarterly summary reports, and information supplied by the HPCC through the project coordinator. The report will be supplied to the Division of Power Resource Planning for submission to NRC.

The monitoring process will serve as the vehicle to identify the overall socioeconomic effects the Hartsville project is having on the local human environment. Further, it will provide the necessary factual basis for identifying the need for impact mitigation, and it will be the coordinated tool for measuring the effectiveness of the mitigation effort.

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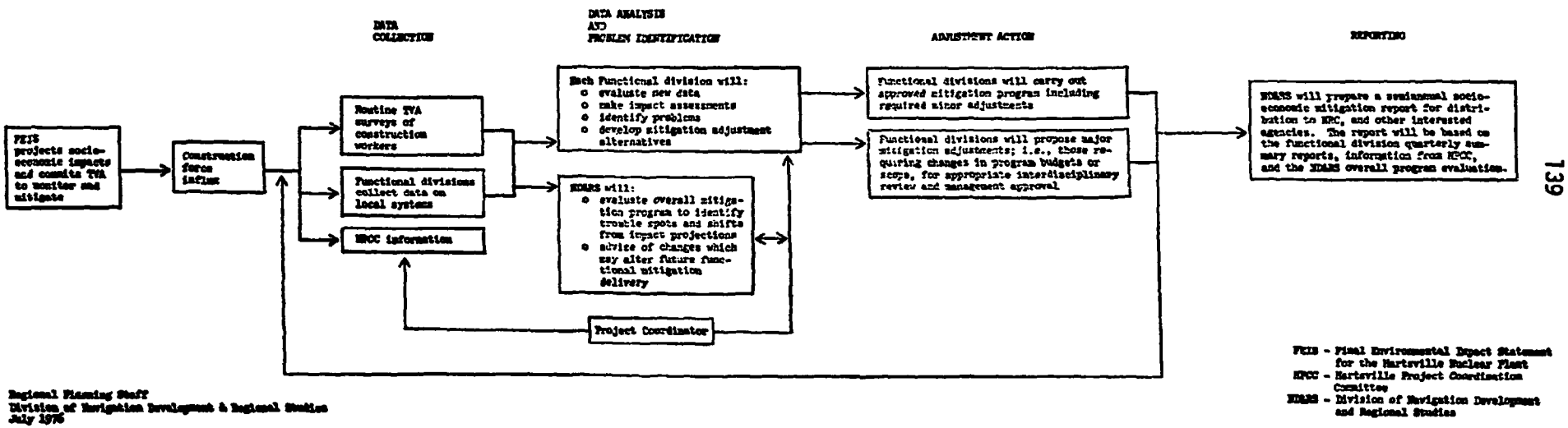
*The functional divisions will include: The Division of Personnel for education, Division of Medical Services for health and medical, Office of Tributary Area Development for transportation and local government budgets, Division of Navigation Development and Regional Studies for housing and secondary impacts (including employment), Division of Water Management for water and sewer, and the project coordinator.

HARTSVILLE NUCLEAR PROJECT — SOCIOECONOMIC IMPACT MONITORING PROCESS



Regional Planning Staff
Division of Navigation Development & Regional Studies
July 1976

FEIS - Final Environmental Impact Statement for the Hartsville Nuclear Plant
HPCC - Hartsville Project Coordination Committee
HDARS - Division of Navigation Development and Regional Studies

TENNESSEE VALLEY AUTHORITY

HARTSVILLE NUCLEAR PLANTS

SOCIOECONOMIC MONITORING AND MITIGATION REPORT

MARCH 31, 1978

Knoxville, Tennessee

September 1978

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CONTENTS

(Continued)

EXHIBITS

BACKGROUNDS AND HIGHLIGHTS

As a part of the licensing procedure to begin work on the four-unit Hartsville Nuclear Plants located in Smith and Trousdale Counties, Tennessee, TVA agreed to certain monitoring and mitigation actions to reduce the socioeconomic impact in the area expected to accommodate movers. The impact area is defined as Trousdale, Smith, Macon, Sumner, and Wilson Counties, Tennessee. TVA also agreed to report to the Nuclear Regulatory Commission the results of the monitoring efforts and mitigation actions taken to accommodate the impacts.

This is the fourth in a series of semiannual reports which will be submitted during construction of the Hartsville project, including three reporting periods following issuance of the operating license for the last unit.

On March 31, 1978, the employment level had reached 4,413; and the mover rate was 28 percent for a total of 1,251 movers which is much lower than projected. About one-third of the work force was hired from the impact counties.

TVA's major mitigation expenditures this period were for education ($290,184), local government budgets ($197,000), and employee transportation ($185,582); and TVA's total Hartsville mitigation payments at the end of March were $3,511,224.

HARTSVILLE NUCLEAR PLANTS

SOCIOECONOMIC MONITORING AND MITIGATION REPORT

I. General Status of Employment as of March 31, 1978

During April of 1978, a survey of all TVA employees as of March 31, 1978, was conducted. The timelag between employment and survey enables employees who moved to make personal adjustments and should provide a better picture of employee distribution, family characteristics, and housing choice.

The employment level was 4,413, and a total of 3,891 employees, or 88 percent of the employees, was surveyed. Of those surveyed, 1,103 indicated they were movers for a mover rate of about 28 percent (table A-1). Information on the family status and housing choice was obtained for those who moved (table A-5). While 870 of the 1,103 movers located in the five impact counties, local workers (nonmovers) are commuting to the project from a much more widespread area. Information on the distribution of both movers and residents is contained in tables A-1 and A-2 as well as figure 1. Additional information on the distribution and characteristics of movers is contained in tables A-3 through A-20.

Table A-1 lists the town of current residence of all employees. It is basically a "mailing address" location rather than a jurisdictional location, since all employees must provide a place name even though they may not live within any municipal limits. Figure 1 is based on this table. However, table A-3 provides a movers' distribution which is based on city limits for the five impact communities. The data on movers have been extrapolated to the total 4,413 employees on a ratio basis.

At the county level and above, both the origin and location of all employees are contained in table A-2. The diagonal line of the "From-To" tabulation indicates resident employees (nonmovers). For example, resident employees from Trousdale County are found by locating Trousdale County in the "From" column and going across the table to the "To" column which also says Trousdale County. In this survey, 150 residents of Trousdale County were employed at the end of March. Movers are any other data. For example, 21 employees moved from Alabama to Wilson County.

To compare the survey results with projections, the parameters from the "Final Environmental Statement - Hartsville Nuclear Plants" (FES) for the first two years of construction were applied to the number of employees surveyed. The results of this comparison are found in table A-4. The mover rate of 28 percent during this period is considerably less than the projected 45 percent. Also, the distribution of movers varies significantly from that projected with Sumner County receiving the largest share, 30 percent, compared to the projected 20 percent. The mover distribution to Smith County is low at only 8 percent compared with the projected 20 percent. Trousdale County, with 16 percent, was well below its projected 30 percent. The mover distribution, 8 percent, to Macon County is running close to the projected 10 percent. Wilson County had a mover distribution of 16 percent compared to the projected 20 percent. Sumner County received 377 movers, which is slightly larger than the number of movers projected (340); but the other counties contain far fewer movers than anticipated. Mover projections were made only for the five impact counties; however, 265 employees moved to other counties. Davidson County contains 72 movers. However, 101 employees indicated

they moved from Davidson County; and 84 of the 101 moved to impact counties (see table A-2).

II. General Characteristics of Movers

Total Project--Table A-5 contains data on family status and characteristics and housing choice for movers. Table A-4 contains a comparison of the extrapolation of some of these results with projections. As of March 31, 1978, 64 percent of those employees who moved brought their families. The remaining 36 percent moved without their families. School-age children per family averaged 0.8 compared to the projected 1.0. The total average family size was 3.2 compared to the projected 3.0.

The survey of housing choice indicated 47 percent are living in houses, 22 percent in mobile homes, 16 percent in apartments, 6 percent in motel and sleeping rooms, and 9 percent in "Other" accommodations. The "Other" category includes campers, motor homes, and vans.

There is still a considerable variation between the projections (31 percent and 47 percent) and survey results (47 percent and 22 percent) for houses and mobile homes respectively, but the projections included in the environmental statement were peak employment. This pattern is expected to change as the project approaches peak employment.

Impact Counties and Communities--Data on family status and characteristics and housing choice for each impact county are contained in tables A-6 through A-10, those movers within the city limits of each of the impact communities in tables A-11 through A-15, and for those movers within impact counties but outside of any city limits in tables A-16 through A-20.

III. Secondary Employment

Secondary employment impact is defined as a temporary increase in the trade- and service-related resident population which can be attributed to the Hartsville project. If the population increase in a county is greater than that arising directly from the project or from other basic employment increases in the county, there exists the possibility of secondary employment impact. As shown in table 1, only Trousdale County experienced an increase in population during this reporting period which cannot be explained by the influx of project-related population or other basic employment increases. The increase, however, is very small (12 people) and is within the margin of error in the monitoring procedure. For counties in the same size class as Trousdale, the average error is plus or minus 4.5 percent or about 240 people in Trousdale County. A complete discussion of the secondary employment monitoring methodology is given in appendix B.

IV. Functional Area Impacts and Mitigation Actions

Education--Monitoring direct impact on education continued to occur primarily through reports from the seven school districts and the Tennessee Department of Education. School districts and the department submit reports in January and July of each school year showing the names of students whose parents are employed at the Hartsville Nuclear Plants, the school previously attended, school and grade in which enrolled, and essential attendance and transportation information. A summary of school district reports for spring 1978 is shown in table 2. All school districts reported less direct impact student enrollment than anticipated. In

Table 1

ESTIMATES OF POPULATION AND POPULATION CHANGE
FOR MACON, SMITH, SUMNER, TROUSDALE, AND WILSON COUNTIES, TENNESSEE
FOR MONITORING SECONDARY SOCIOECONOMIC IMPACTS OF HARTSVILLE NUCLEAR PLANT CONSTRUCTION
SEPTEMBER 30, 1977 - MARCH 31, 1978

	Population Estimate 9/30/77	Population Estimate 3/31/78	Change in Population Estimate 9/30/77 - 3/31/78	Change in Project Related Population* 9/30/77 - 3/31/78	Remainder of Nonproject Related Population as of 3/31/78	Change in Population Possible from Other Primary Employment	Change in Population Unexplained
Macon County	14,864	14,863	-1	48	0	228	0
Smith County	13,139	12,984	-155	78	0	0	0
Sumner County	74,511	76,940	2,429	240	2,189	14,646	0
Trousdale County**	5,506	5,654	148	136	12	0	12
Wilson County	48,978	49,512	534	142	392	7,929	0

*TVA Employee Surveys.

** The 1976 population estimate by the Bureau of Census for Trousdale County was 5,300 with an average deviation of plus or minus 4.5 percent. U.S. Bureau of the Census, Current Population Reports.

Population estimates by Community Economics Projects Group.

9/1/78

most instances, the school districts did not update their December survey results.

Table 2

SCHOOL SYSTEMS'S REPORT

CHILDREN OF HARTSVILLE NUCLEAR PLANTS EMPLOYEES[1]

March 1978

School System	Children of Local Residents	Children[2] of Movers	Total
Smith County	190	12	202
Sumner County	293	124	417
Trousdale County	157	79	236
Wilson County	129	35	164
Macon County	117	46	163
Lebanon City	64	48	112
Watertown City	18	1	19
TOTAL	968	345	1,313

1. Public Law 81-874 assistance is available to the school systems to offset additional operating cost.

2. TVA education mitigation payments are based on these numbers.

TVA, the Tennessee Department of Education, and the seven local school districts in the impact area continue to operate under agreements for alleviating impacts on local school districts. Under these agreements, TVA provides funds for classrooms and schoolbuses. Total education mitigation payments through March 31, 1978, totaled $1,224,637.80 (table 3). This represents an increase of $290,183.51 since the last reporting period.

Table 3

TVA EDUCATION MITIGATION PAYMENTS[1]

School System	Facilities	Buses
Macon County	$ 140,000.00	$ 29,076.70
Sumner County	252,000.00	51,057.02
Smith County	191,743.00	26,979.04
Trousdale County	319,340.87	48,706.55
Wilson County	140,000.00	25,734.76
Lebanon City	--	--
Watertown City	--	--
TOTAL	$1,043,083.87	$181,554.07

1. Public Law 81-874 assistance is available to the school systems to offset additional operating cost.

All school systems in the Hartsville Nuclear Plants project area with the exception of Watertown (which is eligible) participate in School Assistance in Federally Affected Areas, Title I, Public Law 81-874 programs for fiscal year 1978. Wilson County became eligible for the first time in fiscal year 1978; Macon County in fiscal year 1977; Trousdale County in fiscal year 1976; Smith County, Sumner County, and Lebanon (city) were eligible and participated prior to fiscal year 1975. Since fiscal year 1976, all school systems in the area have experienced significant increases in the number of students claimed and the amount of payments received. The number of students claimed by the four participating school systems in fiscal year 1976 was 983; by the five participating school systems in fiscal year 1977 the total was 1,573; and in fiscal year 1978 the six participating school systems claimed 2,450 students.

According to the school systems in the impact counties and the State Department of Education, TVA is meeting its commitments; and the school systems are able to serve the direct impact students received thus far.

Housing--Rental housing in the area continues to be in short supply. As before, the efforts of most private developers are primarily concentrated on providing single-family conventional housing. However, the demand for rental housing in the immediate area is very high; but few units are under construction.

The developer of the 93-unit Shady Grove Mobile Home Park in Hartsville has experienced a greater demand for rental mobile homes than rental spaces. Therefore, he has purchased 25 mobile home units which he rents in addition to spaces. He contends that he will have to purchase more units in order to fulfill the housing request. It is anticipated that the 93 spaces in Shady Grove Park will be filled by August 1978.

The 150-space mobile home park at Hillsdale (Macon County) has been delayed by the severe winter weather and will not be available for occupancy until September 1978. Based on the experience of the other mobile home development, the developer is evaluating the possibility of purchasing a number of mobile or modular homes for the Hillsdale site. These units would be available around the first of November 1978. The Hillsdale Park could be expanded to accommodate an additional 50 units if necessary.

Local Planning and Coordination Assistance--TVA is continuing to assist the local planning commissions affected by this project. Letters of agreement cover a period from October 1 each year through September 30 of the following calendar year. The need for additional assistance to the local planning commissions is evaluated and negotiated on a year-to-year basis as appropriate. A summary of these payments is shown in table 4.

Table 4

TVA LOCAL PLANNING ASSISTANCE PAYMENTS

Planning Commissions	Amount Paid This Period	Total Paid to Date
Hartsville-Trousdale County	$ --	$ 2,293.38
Smith County	--	3,250.75
Sumner County	--	937.50
Wilson County	1,875.00	3,750.00
Carthage	343.18	1,887.56
South Carthage	120.60	482.38
Gordonsville	--	--
Lafayette	--	697.86
Gallatin	937.50	2,812.50
Lebanon	--	1,875.00
Hendersonville	468.75	1,875.00
Tennessee State Planning Office	--	20,000.00
TOTAL	$3,745.03	$39,861.93

TVA is continuing to provide staff support to the Hartsville Project Coordinating Committee (HPCC). During this reporting period, $25,000 was provided; and the total paid to date is $125,000.

Water and Sewer--The utility districts in the impact counties are surveyed periodically to determine if the water supply and sewer systems are adequate to handle the anticipated additional connections. Thus far, the water supply throughout the impact area has been sufficient to handle the additional connections. Although the sewer systems are generally overloaded during peak flows, these systems are able to accommodate the sewer connections on an average-daily-flow basis.

TVA has assisted and is continuing to assist those communities that have experienced significant temporary adverse water and sewer impacts by the construction of the Hartsville Nuclear Plants. As noted previously, in almost all areas, the overall number of actual movers continues to be much smaller than originally projected.

A report by the City of Gallatin Regional Planning Commission has caused the City of Gallatin to experience some concern over the impact of construction workers on their water and sewer systems. TVA feels that at present, however, there has been no measurable impact on either the water or sewer treatment facilities of the Gallatin systems with the addition of only 8 mobile homes within the city limits and a total of only 30 outside the city in Sumner County.

TVA has had an inquiry from the consulting engineer representing the city of Lafayette concerning a possible review of the impact of construction workers on the town's water and sewer systems. The originally planned mitigation for Lafayette was based on TVA's earliest projections that a total

of up to 150 mobile homes would be moved into the immediate Lafayette area. However, at the end of March the number of movers to Lafayette was still below that projected; and for this reason no mitigative actions by TVA concerning water supply or wastewater treatment facilities in Lafayette appear necessary at this time.

No impact mitigation payments for water and sewer were made during this reporting period. However, TVA will continue to monitor the water and sewer systems in the impact counties to determine their capability to handle the mover impacts as they occur.

Health and Medical Services--During this reporting period, TVA has provided $8,243 to the Mid-Cumberland Regional Health Office of the Tennessee Department of Public Health for the cost of nurse-clinician providing services at the Trousdale County Primary Health Care Center. Additional reimbursement was made to the department for $3,375 to pay for one-half the cost of an environmentalist to work in the impact area.

During this reporting period, TVA has provided $1,718 to the Upper Cumberland Regional Health Office for one-half the cost of a nurse for maternal and child health services in the impact area.

TVA also provided $2,453 during this reporting period toward the purchase of emergency medical training supplies and equipment through the Emergency Medical Services Division of the Tennessee Department of Public Health.

Several meetings with local officials and interested citizens were held to provide technical assistance in planning for an emergency response system for the Hartsville impact area counties. The health component of the system is to be developed in coordination with other elements. The health services provided in the impact counties are considered to be adequately servicing the additional population at this time.

Traffic--In accordance with an agreement between TVA and the Tennessee Department of Transportation, the department has been supplying TVA with traffic counts for 12 locations on a quarterly basis beginning in October 1975.

With approximately 4,400 employees, peak hour traffic east of the site has increased from 120 to 480 vehicles and to the west from 120 to 1,140 vehicles between October 1975 and March 1978. The peak hour traffic volume on Highway 25 west of the site is on the borderline of exceeding the allowable volume for level of service D operation (see appendix C). As expected, this peak volume occurs shortly after the afternoon shift change. TVA is trying to mitigate peak volumes by encouraging increased usage of vans and buses by TVA commuters. Volumes for other key highway segments are shown in table 5 and are well below the acceptable service volumes for level of service D operation. Volumes have decreased somewhat on Highway 25 west of Hartsville Nuclear Plants and Highway 231 between Lebanon and the intersection of Highway 25 due to the reopening of Highway 141 between Lebanon and Hartsville.

Table 5

TRAFFIC EVALUATION

(October 1975 to March 1978)

	Number of Vehicles During Peak Hour*		TVA Commuter Traffic
	1975	1978	
Highway 25 East of Plant	120	480	335
Highway 25 West of Plant	120	1,140	1,030
Highway 25 Through Hartsville	290	820	755
Highway 25 West of 231 Junction	210	570	295
Highway 231 South of 25 Junction	150	340	230
Highway 231 North of Lebanon	150	280	175

*Peak hour is the larger of the two hours (one in the morning and one in the afternoon) during which TVA commuter traffic makes the maximum contribution.

Employee Transportation--During the first week of October 1977, hourly trades and labor employees boycotted the TVA-sponsored van and bus program in protest to a proposed fare increase. The boycott, which lasted about two weeks, was settled after several meetings with employee representatives and a commitment by TVA that there would be no further fare adjustments for one year. It took a few months for ridership to build back up, but targeted**employee participation in the van and bus program is higher now than it was before the boycott. This has occurred, even though the total number of vans dropped from 121 to 115, through higher ridership per van and doubling (to 10) the number of buses. In addition, car pooling increased significantly during the boycott and this effect has continued.

**Targeted employees are those employees on the day shift living west of the plant.

Local Government Budgets--Measuring the impact of the Hartsville construction project on local governments in the impact area is an annual process of balancing project-related expenses against project-generated revenues. Projections for the second year indicate that seven local governments may incur deficits from project impacts. TVA executed contracts with these seven counties and cities to provide payment for the amount of the projected deficits. Contracts executed during this reporting period are as follows:

City of Hartsville	$ 79,000
City of Carthage	1,100
City of Lafayette	1,900
City of Gallatin	33,000
Trousdale County	54,000
Smith County	10,500
Macon County	17,500
TOTAL	$197,000

All local governments in the impact area operate on a July 1 through June 30 fiscal year. A formal monitoring and accountability plan will be implemented subsequent to September 30, 1978. Monitoring and accountability information derived from this plan will be presented in the next report.

Local Recruitment and Training--On March 31, 1978, the work force at the Hartsville Nuclear Plants consisted of approximately 28 percent movers, compared with a projected rate of 45 percent. A total of 1,367 workers were from the 5-county impact area, and 487 were from Davidson County. This indicates that local recruitment and training initiatives are continuing to be successful in reducing overall socioeconomic impact within the five counties. The steamfitter training program, which started in March 1977, has graduated 64 trainees who have filled jobs

at the Hartsville Nuclear Plants. Thirty trainees are presently enrolled in the program. The boilermaker training program started in September 1977 and has 33 trainees who will soon be available to fill jobs at the project. These two programs were developed to help meet the demand for highly skilled craftsmen in critical skill manpower shortage areas and to reduce TVA's construction mover impact. Trainees in these programs are from the 16-county recruitment area.

Summary of Mitigation Expenditures--In the seven functional areas of mitigation, TVA has made payments totaling $3,511,224. As noted in table 6, the major expenditures this reporting period were for education, local governments' budgets, and employee transportation.

Table 6

SUMMARY OF TVA MITIGATION

EXPENDITURES AS OF MARCH 31, 1978

	Expenditures This Period	Expenditures To Date
Education	$290,184	$1,224,638
Housing	--	423,000[1]
Local Planning and Coordination Assistance	64,862	164,862
Water and Sewer	--	255,000
Health	15,790	63,128
Local Governments	197,000	300,293
Employee Transportation	185,582	1,080,303
TOTAL	$753,418	$3,511,224

1. Includes $60,000 interest-bearing loan.

V. Future Patterns and Trends

It is expected that the employment level will reach 5,800 by the end of September 1978. The mitigation actions which are in progress to minimize the impacts of inmoving construction employees are as follows:

Education--Four school districts are in various stages of construction and renovation, and Trousdale and Macon County school districts have completed construction of new facilities. Watertown Special School District conducted a referendum in August to decide whether to renovate the existing building or dissolve and let the Wilson County school system absorb the special school district. As a result of this referendum, it was decided to keep the Watertown Special School District. A request is being made by the school district to the State legislature for a new tax rate which will hopefully provide additional revenues. This tax rate will be voted on in another referendum around the first of the year. Wilson County has completed construction on a new 16-classroom facility, and it was occupied in February 1978. Another 20-classroom facility is under construction and will be ready for occupancy and use by the beginning of the 1978-1979 school year. Lebanon Special School District, Sumner County, and Smith County are in the process of renovating and constructing additional educational facilities.

Health--TVA will continue to provide health mitigation payments for the nurse-clinician, environmentalist, nursing services, ambulance services, and emergency technician training. TVA will also furnish technical and financial assistance to Trousdale County for long-range emergency medical services planning.

Local Governments' Budgets--Mitigation for the local governments' budgets continues on an annual basis. During the next reporting period, TVA will negotiate contracts with Macon, Smith, Sumner, and Trousdale Counties and Carthage, Gallatin, Hartsville, Lafayette, and Lebanon totalling approximately $300,000.

Traffic - Employee Transportation--There has been some concern about traffic congestion along Route 25 west of the plant site. Counts taken thus far indicate that peak traffic volumes on Route 25 occur shortly after the afternoon shift changes. TVA is encouraging increased usage of vans and buses by TVA commuters to alleviate the traffic congestion. Increasing the shift differential between plants A and B by an additional 15 minutes could mitigate somewhat the peak volumes.

Emergency Response Planning--TVA has assigned a staff person to work with the Hartsville Program Coordinator, HPCC, and local communities to evaluate the capability of communities and TVA to respond to disaster situations. Ambulance service, fire protection, rescue squad, and civil defense are among the elements that will be studied.

Recreation--The Hartsville Project Coordinating Committee (HPCC) had expressed an interest in developing a comprehensive community recreation program. TVA will provide technical and financial assistance to the HPCC and individual communities to develop their recreation programs to meet the growing demand. TVA has committed $30,000 to Wilson County for a first-phase contribution for a $710,000, five-year park development program. TVA's total financial assistance could reach $120,000. The

TVA contribution is contingent upon Wilson County generating sufficient matching money from other sources to complete the proposed program.

Post-Project Assistance--TVA is now working with the Hartsville Project Coordinating Committee (HPCC) to explore long-range industrial development possibilities for the impact counties. A task force has been formed with representatives of the State of Tennessee, the development districts, Middle Tennessee Industrial Development Association, TVA, and HPCC to develop a set of recommended courses of action for preparing for long-term industrial development in the Hartsville project area. It is the goal of the task force to make these recommendations to the HPCC by the end of the year.

In conclusion, the overall mover rate continues to be lower than expected. As noted above, a number of mitigation actions are ongoing; and these are judged to be adequate at this time.

APPENDIXES
(TO HARTSVILLE MONITORING REPORT)

Appendix A. DETAILED SURVEY RESULTS

Table A-1

FOLLOW UP SURVEY
TOWN OF CURRENT RESIDENCE
HARTSVILLE NUCLEAR PLANT EMPLOYEES
ACTIVE EMPLOYEES 03-31-78

RUN DATE 08/11/78
RUN TIME 234451
REPORT 2

TOWN		MOVED TO TOWN	ALREADY IN TOWN	TOTAL	POPULATION
BAXTER	TN	7	55	62	1,314
CARTHAGE	TN	42	96	138	2,491
COOKEVILLE	TN	11	50	61	17,800
GALLATIN	TN	192	287	479	13,362
GORDONSVILLE	TN	9	23	32	601
HARTSVILLE	TN	166	149	315	2,243
HENDERSON	TN	59	109	168	28,000
LAFAYETTE	TN	78	130	208	2,583
LEBANON	TN	151	226	377	12,492
MURFREESBORO	TN	10	22	32	28,700
NASHVILLE-DAVIDSON	TN	47	437	484	469,000
PORTLAND	TN	5	35	40	3,081
RED BOILING SPRINGS	TN	8	45	53	956
SMITHVILLE	TN	5	87	92	3,762
WESTMORELAND	TN	12	35	47	1,423
BETHPAGE	TN	12	23	35	400
CASTALIAN SPRINGS	TN	58	18	76	150
DIXON SPRINGS	TN	22	20	42	100
GOODLETTSVILLE	TN	10	36	46	7,541
MADISON	TN	6	67	73	21,500
MOUNT JULIET	TN	13	57	70	1,568
OLD HICKORY	TN	6	38	44	6,000
PLEASANT SHADE	TN	11	14	25	150
WATERTOWN	TN	7	22	29	1,061
WHITE HOUSE	TN	6	11	17	1,305
SCOTTSVILLE	KY	5	59	64	3,584
SUBTOTAL		958	2151	3109	
ALEXANDRIA	TN	3	33	36	680
ALGOOD	TN	1	6	7	1,917
CELINA	TN	0	8	8	1,370
CLARKSVILLE	TN	1	12	13	44,500
COLUMBIA	TN	0	7	7	21,000
DOWELLTOWN	TN	1	11	12	329
FAIRVIEW	TN	0	5	5	1,925
FRANKLIN	TN	0	5	5	11,298
GAINESBORO	TN	4	19	23	1,101
GREEN BRIER	TN	0	26	26	2,279
LA VERGNE	TN	2	10	12	5,200
LIBERTY	TN	1	20	21	332
MANCHESTER	TN	2	12	14	6,809
SMYRNA	TN	2	11	13	5,696
SPRINGFIELD	TN	1	11	12	5,720
VANLEER	TN	0	5	5	321
WOODBURY	TN	1	10	11	2,087
ANTIOCH	TN	2	16	18	900
ASHLAND CITY	TN	2	14	16	2,027
AUBURNTOWN	TN	1	6	7	213
BRUSH CREEK	TN	1	11	12	230
BUFFALO VALLEY	TN	0	14	14	150
CHESTNUT MOUND	TN	0	5	5	125
COTTONTOWN	TN	0	6	6	100
DONELSON	TN	0	13	13	25,500
ELMWOOD	TN	2	11	13	150
HERMITAGE	TN	3	19	22	6,000
HICKMAN	TN	3	15	18	200
JOELTON	TN	2	16	18	900
LANCASTER	TN	1	7	8	150
RIDDLETON	TN	2	9	11	150
SILVER POINT	TN	4	10	14	150
TOMPKINSVILLE	KY	0	9	9	2,207
ADOLPHUS	KY	0	7	7	250
SUBTOTAL		42	399	441	
OTHER		193	238	341	
TOTAL RESPONSES		1193	2788	3891	
HNP WORKFORCE TOTAL				4413	

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Table A-3

Hartsville Nuclear Plants
Distribution of Movers and Associated
Population by County and Community
March 31, 1978

County	Percent of Movers	Number[1] of Movers	Population Influx[1] School-Age	Population Influx[1] Total
Trousdale	16	204	88	439
Smith	8	105	48	246
Macon	8	103	55	258
Sumner	30	377	224	1,004
Wilson	16	197	102	503
Other Counties	21	265	131	626
Total	100[2]	1,251	648	3,076
Community[3]				
Carthage	2	28	2	53
Gallatin	10	120	48	298
Hartsville	11	132	38	235
Lebanon	5	68	24	156
Lafayette	4	48	25	118
Total	32	396	137	860

1. Numbers extrapolated.
2. Percentages may not add to 100 because of rounding.
3. Within municipal limits.

Table A-4

Hartsville Nuclear Plants
Comparison of Survey Results with
Projections for Selected Parameters
Employment Level - 4,413

	Projected	Surveyed[1]
Number Movers	1,700	1,251
Percent Movers	45	28
School-Age Children	1,100	648
School-Age Children/Family	1.0	0.8
Total Population	3,900	3,076

	Percent	Number	Percent	Number
Movers with Families	65	1,105	66	821
Movers without Families	35	595	34	430

	Percent	Number	Percent	Number
Housing Choice:				
Houses	31	527	47	580
Mobile Homes	47	799	22	272
Apartments	18	306	16	204
Motel and Sleeping Rooms	4	68	6	80
Other	0	0	9	115
Total	100	1,700	100	1,251

	Percent	Number	Percent	Number
Distribution by County:				
Trousdale	30	510	16	204
Smith	20	340	8	105
Macon	10	170	8	103
Sumner	20	340	30	377
Wilson	20	340	16	197
Other Counties	0	0	21	265
Total	100	1,700	100[2]	1,251

1. Numbers extrapolated.
2. Percentages may not add to 100 because of rounding.

March 31, 1978

Table A-5

FOLLOW UP SURVEY
WORKERS WHO MOVED INTO HARTSVILLE NUCLEAR PLANT AREA PAGE C16

RUN DATE 08/11/78
MOVER SUMMARY REPORT 1F
ACTIVE EMPLOYEES 03-31-78 RUN TIME 234438

	MOVERS WITH FAMILY	WITH CHILDREN IN SCHOOL	TOTAL NUMBER OF CHILDREN	CHILDREN IN GRADE SCHOOL	CHILDREN IN HIGH SCHOOL	MOVERS WITHOUT FAMILY	TOTAL MOVERS
ANNUAL EMPLOYEES							
HOUSE OWNED	171	83	219	99	49	10	181
HOUSE RENTED	28	8	24	8	7	21	49
APARTMENT RENTED	49	8	19	11	0	43	92
MOBILE HOME RENTED	8	4	11	5	0	11	19
MOBILE HOME OWNED	20	6	24	6	1	13	33
SLEEPING ROOM	0	0	0	0	0	4	4
MOTEL	4	1	4	2	0	5	9
OTHER	12	3	8	3	1	6	18
TOTAL	292	113	309	134	58	113	405
HOURLY EMPLOYEES							
HOUSE OWNED	116	63	173	97	26	7	123
HOUSE RENTED	127	60	167	92	27	31	158
APARTMENT RENTED	48	13	45	16	1	40	88
MOBILE HOME RENTED	45	22	48	30	10	60	105
MOBILE HOME OWNED	60	32	82	44	16	23	83
SLEEPING ROOM	1	0	0	0	0	20	21
MOTEL	7	2	5	2	2	30	37
OTHER	28	9	36	12	5	55	83
TOTAL	432	201	576	293	87	266	698
ALL EMPLOYEES							
HOUSE OWNED	287	146	392	196	75	17	304
HOUSE RENTED	155	68	211	100	34	52	207
APARTMENT RENTED	97	21	64	27	1	83	180
MOBILE HOME RENTED	53	26	59	35	10	71	124
MOBILE HOME OWNED	80	38	106	50	17	36	116
SLEEPING ROOM	1	0	0	0	0	24	25
MOTEL	11	3	9	4	2	35	46
OTHER	40	12	44	15	6	61	101
TOTAL	724	314	885	427	145	379	1103

Table A-8

FOLLOW UP SURVEY
WORKERS WHO MOVED INTO HARTSVILLE NUCLEAR PLANT AREA PAGE 008

SUMNER RUN DATE 08/11/78
EMPLOYEES LIVING WITHIN THE COUNTY TOTAL REPORT 18
ACTIVE EMPLOYEES 03-31-78 RUN TIME 234438

	MOVERS WITH FAMILY	WITH CHILDREN IN SCHOOL	TOTAL NUMBER OF CHILDREN	CHILDREN IN GRADE SCHOOL	CHILDREN IN HIGH SCHOOL	MOVERS WITHOUT FAMILY	TOTAL MOVERS
ANNUAL EMPLOYEES							
HOUSE OWNED	104	50	136	60	34	7	111
HOUSE RENTED	13	3	10	4	2	9	22
APARTMENT RENTED	19	5	11	8	0	18	37
MOBILE HOME RENTED	2	2	3	3	0	2	4
MOBILE HOME OWNED	6	1	8	2	0	2	8
SLEEPING ROOM	0	0	0	0	0	2	2
MOTEL	1	0	1	0	0	3	4
OTHER	4	1	2	1	0	0	4
TOTAL	149	62	171	76	36	43	192
HOURLY EMPLOYEES							
HOUSE OWNED	31	14	37	22	2	3	34
HOUSE RENTED	33	18	58	29	9	6	39
APARTMENT RENTED	15	5	14	6	0	9	24
MOBILE HOME RENTED	6	2	5	4	0	10	16
MOBILE HOME OWNED	10	5	17	7	2	2	12
SLEEPING ROOM	0	0	0	0	0	1	1
MOTEL	2	0	1	0	0	4	6
OTHER	2	2	3	2	0	6	8
TOTAL	99	46	135	70	13	41	140
ALL EMPLOYEES							
HOUSE OWNED	135	64	173	82	36	10	145
HOUSE RENTED	46	21	68	33	11	15	61
APARTMENT RENTED	34	10	25	14	0	27	61
MOBILE HOME RENTED	8	4	8	7	0	12	20
MOBILE HOME OWNED	16	6	25	9	2	4	20
SLEEPING ROOM	0	0	0	0	0	3	3
MOTEL	3	0	2	0	3	7	10
OTHER	6	3	5	3	0	6	12
TOTAL	248	108	306	148	49	84	332

Table A-18

FOLLOW UP SURVEY
WORKERS WHO MOVED INTO HARTSVILLE NUCLEAR PLANT AREA PAGE 013

SUMNER RUN DATE 08/11/78
EMPLOYEES LIVING OUTSIDE CITY LIMITS REPORT 1C
ACTIVE EMPLOYEES 03-31-78 RUN TIME 234430

	MOVERS WITH FAMILY	WITH CHILDREN IN SCHOOL	TOTAL NUMBER OF CHILDREN	CHILDREN IN GRADE SCHOOL	CHILDREN IN HIGH SCHOOL	MOVERS WITHOUT FAMILY	TOTAL MOVERS
ANNUAL EMPLOYEES							
HOUSE OWNED	76	41	108	51	31	4	80
HOUSE RENTED	6	2	5	3	2	5	11
APARTMENT RENTED	3	1	1	1	0	3	6
MOBILE HOME RENTED	1	1	1	1	0	2	3
MOBILE HOME OWNED	4	1	6	2	0	2	6
SLEEPING ROOM							
MOTEL	0	0	0	0	0	2	2
OTHER	3	1	2	1	0	0	3
TOTAL	93	47	123	59	33	18	111
HOURLY EMPLOYEES							
HOUSE OWNED	18	7	21	13	0	1	19
HOUSE RENTED	15	8	29	16	4	3	18
APARTMENT RENTED	2	0	2	0	0	1	3
MOBILE HOME RENTED	6	2	5	4	0	6	12
MOBILE HOME OWNED	7	4	14	6	2	2	9
SLEEPING ROOM							
MOTEL	1	0	1	0	0	1	2
OTHER	0	0	0	0	0	4	4
TOTAL	49	21	72	39	6	18	67
ALL EMPLOYEES							
HOUSE OWNED	94	48	129	64	31	5	99
HOUSE RENTED	21	10	34	19	6	8	29
APARTMENT RENTED	5	1	3	1	0	4	9
MOBILE HOME RENTED	7	3	6	5	0	8	15
MOBILE HOME OWNED	11	5	20	8	2	4	15
SLEEPING ROOM							
MOTEL	1	0	1	0	0	3	4
OTHER	3	1	2	1	0	4	7
TOTAL	142	68	195	98	39	36	178

Appendix B

SECONDARY SOCIOECONOMIC IMPACT MONITORING OF HARTSVILLE NUCLEAR PLANT ENVIRONMENTAL IMPACT AREA

Secondary impact is defined as a temporary increase in the trade and service related resident population of the five-county area having an impact on community facilities and services which can be attributed to the Hartsville construction project.

TVA's monitoring program will consist of a three-step procedure during each reporting period for estimating and reconciling population changes for each of the impact area counties. Residential customers of power distributors and school enrollment will be used to provide independent estimates of county residential population change during a given reporting period. Population for the beginning of the first reporting period will be estimated by applying the procedure outlined in Step I below to the most current estimate of county population provided by U.S. Bureau of the Census Current Population Reports. Subsequent estimates of population for the start of a reporting period will be the TVA estimate at the end of the previous reporting period and will be adjusted each time more current census estimates are available.

An estimate of secondary impact will be made using the following three-step process.

Step I

Ratios of school enrollment and residential customers to population will be calculated at the beginning of the reporting period for each of the impact area counties. These ratios will be applied to the number of residential customers and school enrollment at the end of the period. This yields two estimates of population change during the reporting period. These two estimates are averaged to produce a single estimate of population change for each of the impact area counties.

Step II

Project employment population, taken from TVA employee surveys, will be subtracted from total adjusted population. If a residual population is derived, the analysis will continue to Step III.

Step III

This step comprises an analysis of nonproject related primary employment and its secondary effect to determine what part of the remaining unexplained population change should not be attributed to the project.

An estimate of change in total employment in each of the impact area counties during the reporting period is made using monthly data from the "CPS Labor Force Summary" produced by the Tennessee Department of Employment Security. In order to determine that part of the change in total employment which can be attributed to forces other than the construction project, it is necessary to estimate the change in nonproject related employment. Change in nonproject related primary employment is estimated using a linear interpolation of primary employment as a percent of total employment in 1970 and projected to 1980, as given in the 1974 report by the Tennessee State Planning Office, Tennessee Migration, Population Families, Income, and Manpower Demand Projections to 1990 for Development Districts and Counties. A ratio of .65 will be applied to the change in nonproject related primary employment to determine that part of the change in secondary employment which can be considered nonproject related. The total employment change is converted to population using an average family size of three and subtracted from any unexplained population remaining. [If there is no other explanation for the remaining population, then the possibility of it being the result of secondary employment does exist. However, there may be a delay of undetermined duration between a change in employment and the resultant change in population. Therefore, the unexplained population in any particular county should persist through more than one reporting period before it is termed as secondary impact.]

As results of the 1980 Census of Population or any other special census or census estimates are published, the population base of the impact area counties will be recalibrated. Residential customers, school enrollment, and total population will be recorrelated. Essentially, a new population base will be estimated from which to measure change throughout the remainder of the monitoring period.

[Revised 3/16/78]

Appendix C

TRAFFIC LEVEL DEFINED

Level of Service D

Level of service D approaches unstable flow, with tolerable operating speeds being maintained though considerably affected by changes in operating conditions. Fluctuations in volume and temporary restrictions to flow may cause substantial drops in operating speeds. Drivers have little freedom to maneuver, and comfort and convenience are low, but conditions can be tolerated for short periods of time.

Source: Highway Capacity Manual, Highway Research Board Special Report 87, 1965.

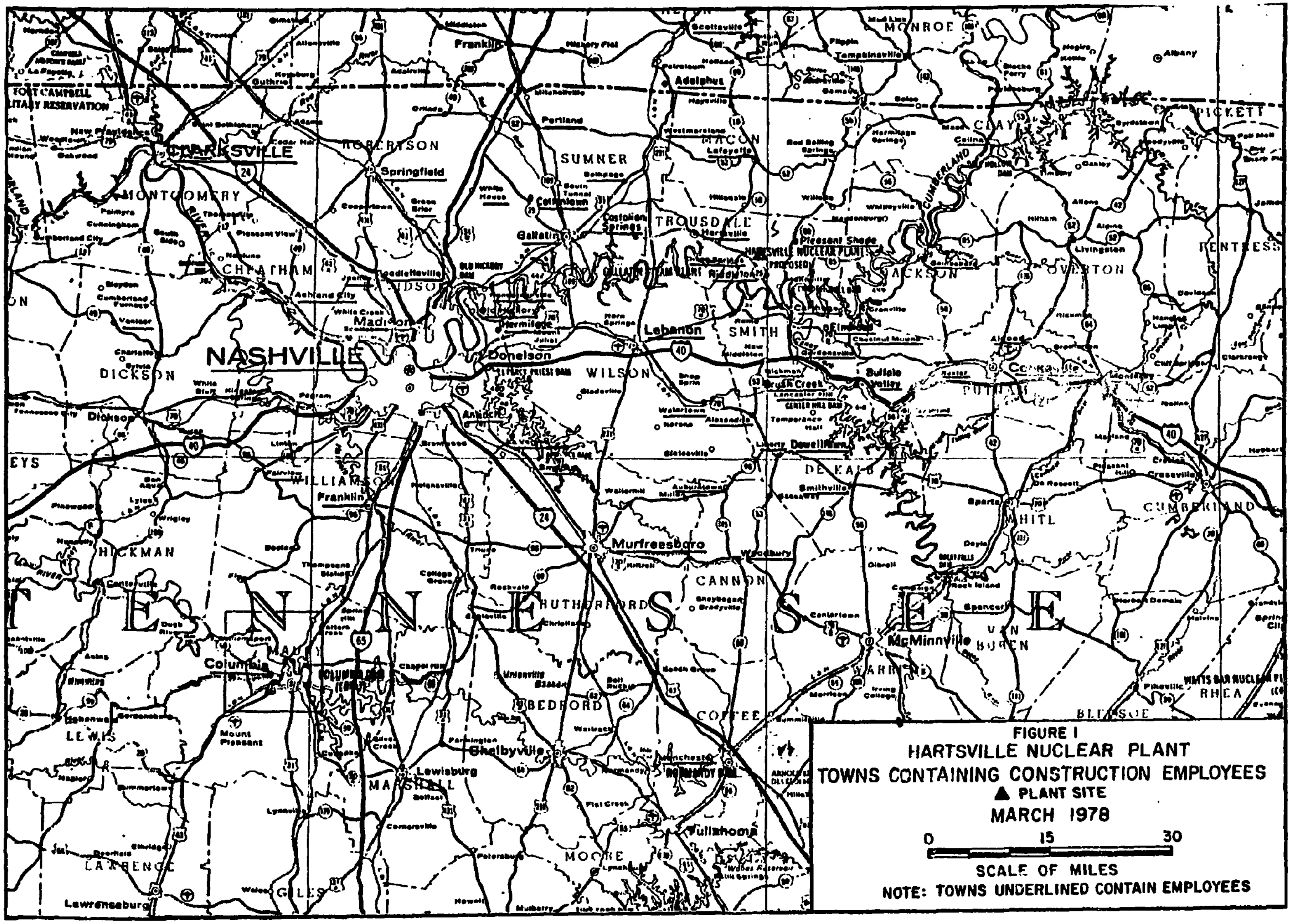

FIGURE I
HARTSVILLE NUCLEAR PLANT
TOWNS CONTAINING CONSTRUCTION EMPLOYEES
▲ PLANT SITE
MARCH 1978
0 15 30
SCALE OF MILES
NOTE: TOWNS UNDERLINED CONTAIN EMPLOYEES

ORNL/TM-6804

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285. Henry Cheney, Duke Power Co., P.O. Box 5107, Greenville, SC 29606

286-287. Cherokee County Chamber of Commerce (c/o Guy Meredith) 225 S. Limestone St., Gaffney, SC 29340

288. Cherokee County Health Department (c/o Louis Daze) P.O. Box 338, Gaffney, SC 29340

289-293. Cherokee County Industrial Development Board (c/o Guy Meredith) 225 S. Limestone St., Gaffney, SC 29340

294-295. City of Blacksburg, c/o William Byars, Administrator, City Offices Blacksburg, SC 29702

296-300. City of Gaffney, c/o Ben Clary, Administrator, 203 N. Limestone St. Gaffney, SC 29340

301. City of Gaffney Building Inspector (c/o John Mullins) 203 N. Limestone St., Gaffney, SC 29340

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311. George DeVeny, 290 F Liberty Bldg., Tennessee Valley Authority, Knoxville, TN 37902

312. Charles Diamond, Executive Director, Pickens County Planning & Development Board, P.O. Box 37, Pickens, SC 29671

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325. W. J. Finnegan, Director Conservation and Environmental Affairs, Puget Power Bldg., Puget Sound Power & Light, Bellevue, WA 98009

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333. Robert Gilbert, Environmental Projects Manager, Nuclear Licensing Division, U.S. Nuclear Regulatory Commission, Washington, DC 20555

334. Jack Gilmore, Industrial Economics Division, Denver Research Institute, University of Denver, Denver, CO 80208

335. Joel Haggard, Attorney and Counselor at Law, 2424 The Financial Center, 1215 Fourth Ave., Seattle, WA 98161

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337. Ernest Harrington, Sheriff's Office, E. Smith St., Gaffney, SC 29340

338. J. Kenneth Hill, Senior Vice Pres., Citizens and Southern National Bank, 423 Limestone St., Gaffney, SC 29340

339. John Huebner, Planning Director, J. E. Sirrine Co., 216 S. Pleasantburg Dr., Greenville, SC 29607

340. Ronal Larson, Program Evaluation Branch Chief, Solar Energy Research Institute, 1536 Cole Blvd., Golden, CO 80401

341. William Lilley, Office of Environmental Planning, Department of Public Services, Public Service Commission, State of New York, Empire State Plaza, Albany, NY 12223

342. John Little, City of Gaffney Councilman, Mobil Oil Station, 200 N. Limestone St., Gaffney, SC 29340

343. David Loeks, President, Mid-Hudson Pattern, Inc., 61 Livingston St., Poughkeepsie, NY 12601

344. Jay Lowe, Tributary Area Development, 290 Liberty Building, Tennessee Valley Authority, Knoxville, TN 37902

345. Frank McKee, Hartsville Project Coordinating Committee, P.O. Box 288, Hartsville, TN 37074

346-360. Dolphus Medley, Cherokee County Administrator, N. Limestone St., Gaffney, SC 29340

361. Peter Miller, Stanford Research Institute, 333 Ravenswood Ave., Menlo Park, CA 94025

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