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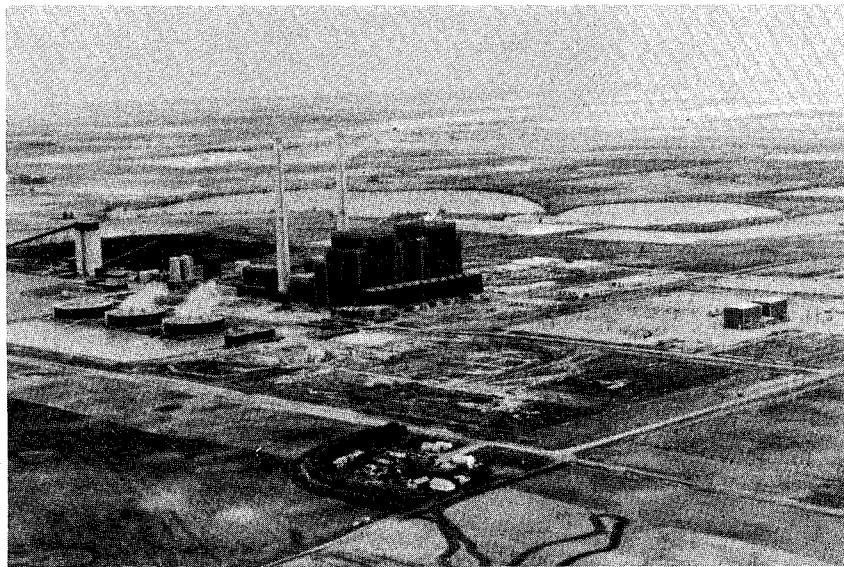
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# Socioeconomic Effects of Large-Scale Resource Development Projects in Rural Areas:



## The Case of McLean County, North Dakota

by

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## FOREWORD

Large-scale energy resource development projects are creating substantial changes in economic and social conditions throughout the western United States. During the last several years, such effects have been very noticeable in western North Dakota. This case study of an area affected by the construction of a large mine-mouth electric power plant (the Coal Creek Station) was undertaken to determine the magnitude and distribution of changes in the local economy, population and public services and the attitudes of local residents toward these changes.

This study examines the socioeconomic effects of power plant construction and operation during the period 1975-1981 and also compares the actual changes in key economic and social indicators with those projected in impact studies conducted during the early stages of project development. The study thus serves as an analysis of the actual impacts of a major resource development project, as an evaluation of the reliability of anticipatory impact assessments, and as an initial evaluation of the need for and effectiveness of impact management measures.

The authors extend special appreciation to the residents of McLean County and surrounding areas for their cooperation and assistance in this study. We wish to especially thank Mr. Loren Stadig, Management Representative of United Power Association; Ms. Sharon Sigurdson, Cooperative Power Association; Mr. Douglas Stone, Director of Public Affairs for the North American Coal Corporation; and Mr. Donald Peterson, Area Resource Development Agent of the Cooperative Extension Service for their valuable contributions to the study. The authors also gratefully acknowledge the manuscript reviews and valuable suggestions contributed by faculty members of the Department of Agricultural Economics, North Dakota State University.

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## HIGHLIGHTS

*The objectives of this study were to examine the economic, demographic, public service, and fiscal effects of the Coal Creek generating station on McLean County and the surrounding area in west-central North Dakota; to evaluate the accuracy of impact assessments completed before and during the early stages of project construction; and to identify and evaluate impact mitigation and growth management approaches employed.*

*The Coal Creek Station, constructed by United Power Association and Cooperative Power Association during the period of 1975-1980, is the largest coal-fired facility completed to date in North Dakota. A combination of primary, secondary, and participant observation data was used in the analysis.*

*The analysis indicated the socioeconomic effects of the Coal Creek project have been substantial, particularly in the communities of Underwood and Washburn. Yet, the impacts never appeared to be unmanageable in McLean County. Local governments were able to develop and implement realistic plans for responding to growth-related needs because impact information, updated as conditions changed, and state grants were provided to meet local needs. Pressures were also eased because a high percentage of the construction work force commuted from residences outside the county.*

*In contrast to many energy facility sites in other western states, workers within the area obtained most of the new jobs associated with Coal Creek development, commuting patterns were extensive, and the population did not decline substantially when construction was completed. The relatively high level of local worker recruitment for this project is largely due to the area's history of power plant construction projects that has led to development of a large pool of skilled construction workers in the area. Labor union jurisdictional boundaries were a factor in determining commuting patterns. The influence of other construction projects in the area played a key role in stabilizing the population.*

*Comparison of the impacts projected to those actually experienced indicated the impact assessment procedures employed provided reasonable approximations of the changes that occurred. Some areas for improvement also were highlighted by the comparison. First, more detailed analysis of the factors affecting the distribution of a project's effects is needed. Second,*

### *HIGHLIGHTS (CONTINUED)*

*studies providing information about similar projects in comparable areas should be pursued. Third, analysts should present their analyses in terms of multiple scenarios and ranges of impacts. Finally, effective impact monitoring and periodic reassessments are needed throughout a project's construction.*

*Three key aspects of the Coal Creek impact management program were the availability of community-specific impact projections and updates, existence of a mechanism for providing needed front-end financing for community services and facilities, and effective use of county zoning authority to control local growth patterns. Similar mechanisms should be considered in designing impact management programs for future projects.*

SOCIOECONOMIC EFFECTS OF LARGE-SCALE  
RESOURCE DEVELOPMENT PROJECTS IN RURAL AREAS:  
THE CASE OF MCLEAN COUNTY, NORTH DAKOTA

by

F. Larry Leistritz and Karen C. Maki\*

Need for the Study

North Dakota's lignite coal reserves represent a significant source of energy, and the use of this resource is increasing rapidly. Coal production has increased three-fold since 1970, and the use of lignite for electric power generation and synthetic fuel production is expected to increase even more rapidly in coming years. As a result, numerous rural areas in North Dakota are likely to experience the effects of the construction and operation of coal-related facilities.

Expanding coal development will affect the economic, demographic, public service, fiscal, social, environmental, and other characteristics of rural areas. Some of these effects may be generally regarded as positive while others may be considered negative, and in some cases the same change in community characteristics may be seen as favorable by some and adverse by others. Among the many effects of energy development, some of the most important are likely to be the influence of developmental activity on such socioeconomic factors as: (1) employment, (2) income, (3) business activity, (4) population growth, (5) population distribution, (6) population characteristics, (7) increased requirements for public services, including police, fire, medical, social, and other services, (8) public sector revenues and expenditures, and (9) community residents' perceptions and attitudes. The effects on these socioeconomic dimensions are of concern to both public and private decision makers in making investment decisions and are of critical importance in determining the overall costs and benefits of such projects to the areas where they are located.<sup>1</sup>

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<sup>1</sup>For further discussion, see Steve H. Murdock and F. Larry Leistritz, Energy Development in the Western United States: Impact on Rural Areas, (New York: Praeger Publishers, 1979).

To many local residents, the desirability of a new project is primarily a function of its positive effects on employment opportunities, business activity, income, and population in nearby communities. On the other hand, if resource development projects require significant expansion of local public services and facilities and hence substantial increases in public sector expenditures, local governments may experience severe growth management problems, and the project may become the focus of local concern. As a result, socioeconomic impacts are sometimes a major reason for opposition to development projects, and if service and related conditions deteriorate substantially, the result may sometimes be high rates of labor turnover and costly project delays.<sup>2</sup> Thus, the socioeconomic effects of energy resource development may significantly affect not only the residents of areas where such projects are sited but also the actual progress of the projects. The need for careful analyses of such effects and for the development of measures to prevent or alleviate adverse effects is thus apparent.

The socioeconomic impacts of large-scale projects have received increasing attention in recent years as the result of increasingly stringent regulatory requirements imposed by Federal and state governments. The National Environmental Policy Act (NEPA) of 1970 requires preparation of Environmental Impact Statements (EIS) for all projects involving a major federal action, and such statements must include the analysis of socioeconomic impacts. As a result, thousands of environmental statements have been completed for a variety of projects.<sup>3</sup> In addition, a number of states have enacted environmental and/or facility siting legislation imposing impact assessment requirements similar to those of NEPA. In fact, several states, including North Dakota, have imposed impact assessment, monitoring, and mitigation requirements going

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<sup>2</sup>John S. Gilmore and Mary K. Duff, Boom Town Growth Management: A Case Study of Rock Springs--Green River, Wyoming, (Boulder, Colorado: Westview Press, 1975).

<sup>3</sup>Council on Environmental Quality, "National Environmental Policy Act," Federal Register, 43; June 9, 1978, p. 112.

beyond those of NEPA.<sup>4</sup> Because the socioeconomic assessment process is relatively new, however, few attempts have been made to evaluate the accuracy of impact assessments and the usefulness of the information they provide in planning and decision making. Such evaluations are critically important if the utility of future assessments is to be improved. Retrospective case studies of energy development areas appear essential to provide a basis for such evaluations.

At the same time, although extensive analyses of socioeconomic impacts and impact assessment methods have been completed,<sup>5</sup> the general state of knowledge concerning such effects is limited. Past analyses typically have been concerned only with the early portion of the project construction phase and have seldom treated the longer term effects associated with project operation. As a result, these studies generally lacked an ability to sufficiently address the effects of development over various project phases. Longitudinal analyses may best overcome this obstacle by addressing the full range of impacts which are likely to occur.

Another limitation of the current state of knowledge is that little definitive information is available concerning regional variations in

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<sup>4</sup>Impact assessment refers to efforts to anticipate the economic and social changes resulting from a new project. Monitoring refers to efforts to discern changes in economic and social indicators soon after they occur. Monitoring efforts sometimes provide the basis for updating impact projections. Impact mitigation refers to efforts to minimize those economic and social changes which are viewed as undesirable and to enhance those changes which are considered beneficial. Impact management is a term frequently used to describe the overall process of impact assessment, monitoring, and mitigation. For further discussion of these concepts, see F. L. Leistritz and S. H. Murdock, Socioeconomic Impact of Resource Development: Methods for Assessment, (Boulder, Colorado: Westview Press, 1981). F. L. Leistritz and Robert A. Chase, Socioeconomic Impact Monitoring Systems: Review and Recommendations, AE 81006, (Fargo: North Dakota Agricultural Experiment Station, 1981). J. S. Gilmore, D. Hammond, K. D. Moore, J. F. Johnson, and D. C. Coddington, Socioeconomic Impacts of Power Plants, (Denver: Denver Research Institute, 1981).

<sup>5</sup>For example, see Leistritz and Murdock, 1981; Murdock and Leistritz, 1979; and Denver Research Institute, Socioeconomic Impact of Western Energy Resource Development, (Washington, D.C.: Council on Environmental Quality, 1979).

socioeconomic impacts. Examples drawn from other western energy development areas may not be applicable to North Dakota. Information from retrospective case studies of projects developed in different regional contexts is needed, both to more accurately anticipate the effects of future projects that may be developed in a given area (e.g., west-central North Dakota) and to aid in more precisely establishing relationships between site area characteristics and impact events.

Finally, perhaps the most serious limitation of past analyses has been their failure to evaluate the impact mitigation and growth management measures adopted by project developers and by local and state governments. The principal justification for conducting detailed impact assessments is to enable decision makers to more effectively manage the impacts associated with development. Information concerning the effectiveness of the impact mitigation approaches employed in connection with past projects thus appears essential as a basis for developing more effective strategies for managing the impacts of future projects.

#### Purpose of the Study

The analysis presented here represents an attempt to meet the need for retrospective analyses of the socioeconomic impacts of energy resource development. It examines the economic, demographic, public service, and fiscal effects of the construction and early operational phases of the Coal Creek electrical generating station, constructed by United Power Association and Cooperative Power Association during the period 1975-1980, on McLean County and the surrounding area in west-central North Dakota. The Coal Creek Station is the largest coal-fired facility completed to date in North Dakota. In view of announced plans to develop coal conversion facilities of even larger scale in the near future, an analysis of this type appears particularly timely.

The report has three major objectives:

- 1) to examine the economic, demographic, public service, and fiscal effects of the Coal Creek Station;
- 2) to evaluate the accuracy of impact assessments completed before and during the early stages of project construction; and



- 3) to identify impact mitigation and growth management approaches employed and evaluate the effectiveness of these measures.

### Scope of the Study

A combination of primary, secondary, and participant observation data is utilized in addressing the various objectives. Key data sources include an anticipatory impact assessment for the Coal Creek project completed by North Dakota State University personnel in 1976,<sup>6</sup> a longitudinal analysis sponsored by the Old West Regional Commission during 1976-1977,<sup>7</sup> a survey of the Coal Creek work force,<sup>8</sup> and a retrospective analysis conducted by the Denver Research Institute in 1979.<sup>9</sup> Geographically, the analysis is focused on McLean County and on communities in the county which experienced substantial growth during the project construction period. Because many Coal Creek workers lived in surrounding counties and commuted to work at the site, however, an overview of conditions in five of these counties during the Coal Creek construction period also is presented. Likewise, because coal-related projects that were being built in Mercer and Oliver Counties during the period of Coal Creek construction probably had some influence on conditions in McLean County, an overview of these projects is presented.

The remainder of the report is organized into six sections. First, an overview of coal development projects in west-central North Dakota is presented.

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<sup>6</sup>N. E. Toman, N. L. Dalsted, A. G. Leholm, R. C. Coon, and F. L. Leistritz, Economic Impacts of Construction and Operation of the Coal Creek Electrical Generation Complex and Related Mine, (Fargo: North Dakota Agricultural Experiment Station, 1976).

<sup>7</sup>Institute for Policy Research, Socioeconomic Longitudinal Monitoring Project--Profile of McLean County, North Dakota, Report prepared for the Old West Regional Commission, (Laramie: University of Wyoming, 1977).

<sup>8</sup>J. S. Wieland, and F. L. Leistritz, Profile of the Coal Creek Project Construction Work Force, Agricultural Economics Miscellaneous Report No. 33, (Fargo: North Dakota Agricultural Experiment Station, 1978).

<sup>9</sup>J. S. Gilmore, M. E. Miller, D. K. Flory, J. M. Uhlmann, B. P. Guild, D. C. Coddington, H. I. Zeid, and J. Gunyou, Case Study #1: Coal Creek Station, McLean County, North Dakota, Prepared for Electric Power Research Institute, (Denver: Denver Research Institute, 1980).

Second, measures taken by the state to prevent or alleviate adverse effects of such development are briefly described. Third, the Coal Creek Station and the major activities involved in its construction are described. Fourth, baseline conditions in the impact area are reviewed. Fifth, the major socioeconomic impacts of Coal Creek construction are identified and quantified, and the effects actually experienced are compared with those projected in the anticipatory analysis. Finally, conclusions concerning the overall magnitude of impacts experienced, the accuracy of various aspects of the assessment process, and the effectiveness of various impact mitigation measures are discussed. The report thus provides an overview of coal development impacts in relation to the context of development in west-central North Dakota. It is thus intended to be of utility to both the reader who wishes to obtain a general understanding of coal development in North Dakota and the impact analyst who wishes to obtain insight into the accuracy of impact assessments and the effectiveness of impact mitigation measures.

#### Overview of Coal Development in Western North Dakota

In order to properly evaluate the impacts of the Coal Creek Station, it is necessary to place its construction in the context of other coal-related activity in west-central North Dakota. Since the mid-1960's, eight coal-fired power plants have been constructed in McLean, Mercer, and Oliver Counties (Table 1). In addition, construction of the nation's first commercial-scale coal gasification plant has recently been initiated in Mercer County. The Great Plains Coal Gasification Project, which will produce about 125 million cubic feet of synthetic natural gas per day, is being developed by a consortium of gas pipeline companies headed by American Natural Resources Company. All of these plants are fueled by lignite coal mined in McLean, Mercer, and Oliver Counties, and the water required for their operation comes from the Missouri River and/or Lake Sakakawea (Figure 1).

Development of these projects has led to a substantial increase in coal production in the region. Mines supplying these facilities are listed in Table 2. When full production levels are reached in the mid-1980's, these mines will produce about 28.6 million tons of coal per year (MMTPY). The mines in

TABLE 1. COAL CONVERSION FACILITIES CONSTRUCTED IN NORTH DAKOTA, 1965-1981

Facility	Owner	Development Period		Capacity
		Start of Construction	Completion of Construction	
Leland Olds Station, Unit 1	Basin Electric Power Coop.	1963	1966	212MW
Stanton Plant	United Power Association	1964	1966	172MW
Milton R. Young	Minnkota Power Coop.	1967	1969	235MW
Leland Olds Station, Unit 2	Basin Electric Power Coop.	1971	1975	440MW
Square Butte	Square Butte Power Coop.	1973	1977	440MW
Coal Creek, Unit 1	United Power Association/ Cooperative Power	1975	1979	550MW
Unit 2	Association	1976	1980	550MW
Coyote	Consortium <sup>a</sup>	1977	1981	410MW
Antelope Valley Station, Unit 1	Basin Electric Power Coop.	1978	1983	438MW
Unit 2		1980	1985	438MW
Great Plains Coal Gasification Project	American Natural Resources and Associates <sup>b</sup>	1980	1984	125MMCFD

<sup>a</sup>Montana-Dakota Utilities Co.; Otter Tail Power Company; Minnkota Power Cooperative; Minnesota Power and Light Co.; and Northwestern Public Service Company.

<sup>b</sup>Other firms participating in this project include People's Gas Company, Tenneco, Inc., and Transco.

MW = megawatts

MMCFD = million cubic feet per day

McLean, Mercer, and Oliver Counties also account for a large and growing proportion of the state's total coal production. These counties accounted for 66.4 percent of the state's coal production in fiscal year (FY) 1976 and for 77.8 percent in FY 1981 (Appendix Table 1).

The construction and operation of these facilities have had a substantial effect on employment, income, and population in the multi-county region surrounding the sites. The combined construction work force for the various facilities ranged from 1,839 to 4,620 during the period 1977-1979 (Table 3). During this same period, the permanent (operation and maintenance) work forces were expanding at several of these facilities. The increase in these permanent work forces amounted to 450 jobs in 1978 and 821 in 1981. When the power plants and mines listed in Table 3 are fully staffed (in the mid-1980's), their permanent work forces will total about 1,250.

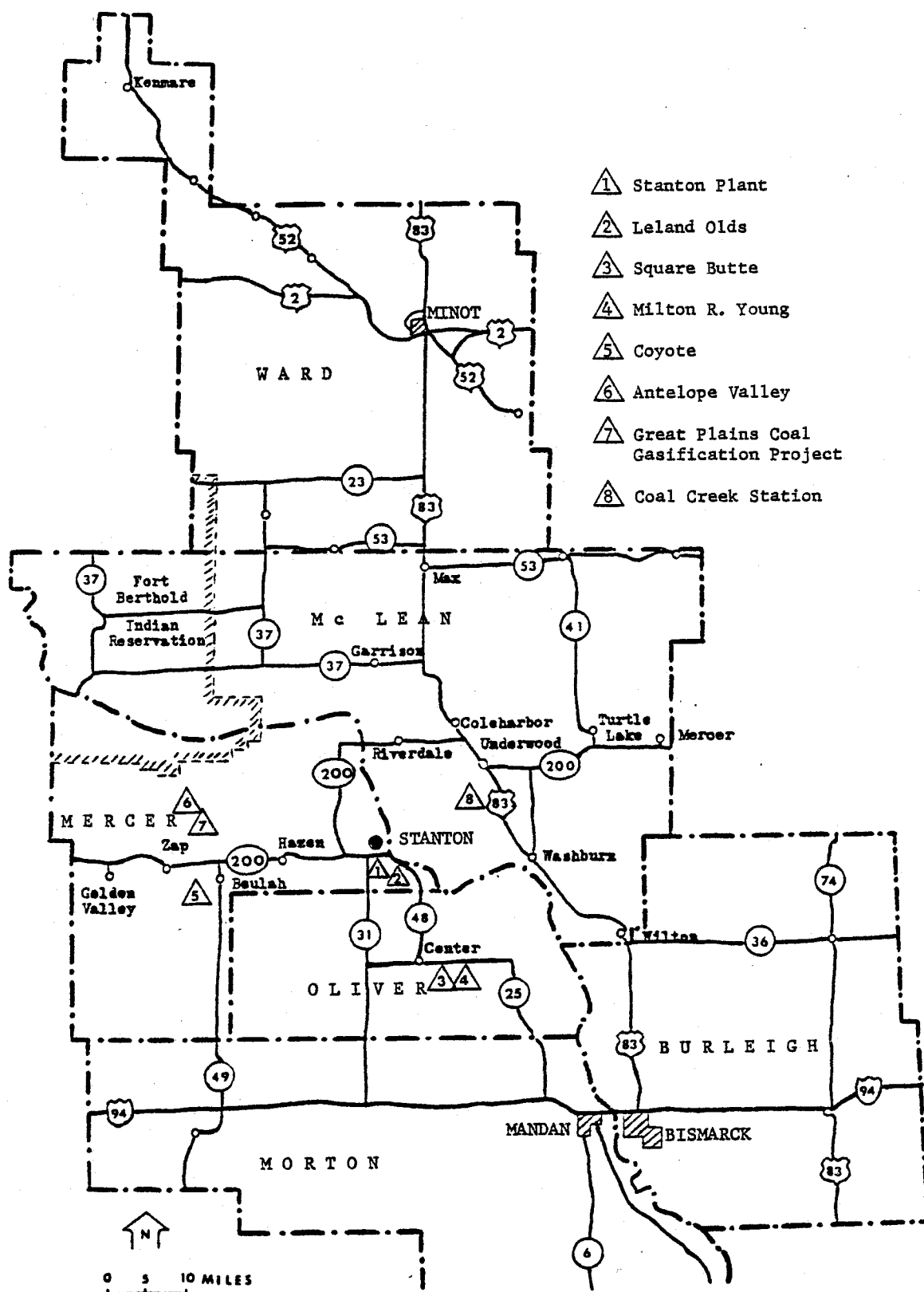


Figure 1: Major Energy Facilities in West-Central North Dakota

TABLE 2. LIGNITE MINES ASSOCIATED WITH COAL CONVERSION FACILITIES IN WEST-CENTRAL NORTH DAKOTA

Mine	Owner	Construction Date	Principal Facility Supplied	Yearly Production (Million tons)	Full Production Schedule (Year)
<u>Operation</u>					
Indianhead	North American Coal Company (NACCO)	--	Stanton Plant	1.05	1967
Glenharold	Consolidation Coal Co.	--	Leland Olds Plant	3.80	1976
Center	Baukol-Noonan, Inc.	--	Milton R. Young Plant	4.20	1978
Beulah	Knife River Coal Mining Company	--	MDU Heskett Plant	2.00	1922
<u>Under Construction</u>					
Falkirk	The Falkirk Mining Co. (Subsidiary of NACCO)	1976-1980	Coal Creek Complex	5.60	1985
Coteau	The Coteau Properties Co. (Subsidiary of NACCO)	1978-1986	Antelope Valley Station	5.20	1989
Beulah	Knife River Coal Mining Company	1979-1981	Coyote Plant	2.20	1982
Coteau	The Coteau Properties Co. (Subsidiary of NACCO)	1981-1985	Great Plains Coal Gasification Plant	<u>4.70</u>	1985
Total Capacity				28.75	

SOURCE: Adapted from Interindustry Technical Assistance Team, Mercer County Socio-Economic Impact Mitigation Assessment, Vol. IV, 1979.

TABLE 3. CONSTRUCTION AND PERMANENT WORK FORCES ASSOCIATED WITH SELECTED COAL-FIRED POWER PLANTS AND COAL MINES, WEST-CENTRAL NORTH DAKOTA, 1975-1981

Facility	Year						
	1975	1976	1977	1978	1979	1980	1981 <sup>a</sup>
Construction Workers: <sup>b</sup>							
Leland Olds, Unit #2	300						
Square Butte	400	500	100				
Coal Creek and Falkirk Mine	230	602	1,542	2,224	2,015	520	0
Coyote and Mine			197	799	1,149	983	318
Antelope Valley and Coteau Mine				423	1,456	2,074	1,727
Great Plains Gasification						180	113
Subtotal, Construction Workers	930	1,102	1,839	3,446	4,620	3,757	2,158
Permanent Workers: <sup>c</sup>							
Leland Olds #2 and Glenharold Mine Expansion	85	85	85	85	85	85	85
Square Butte and Mine Expansion			80	80	80	80	80
Coal Creek and Mine	36	48	200	285	329	427	437
Coyote and Mine Expansion					20	75	115
Antelope Valley and Coteau Mine					2	48	104
Subtotal, Permanent Workers	121	133	365	450	516	715	821
Total	1,051	1,235	2,204	3,896	5,136	4,472	2,979

<sup>a</sup>Data reflect employment levels through July 1981.

<sup>b</sup>Number of construction workers represents average work force level for peak quarter for each facility. Mine construction workers are included where applicable.

<sup>c</sup>Number of permanent workers represents average annual employment at each facility.

SOURCE: Interindustry Technical Assistance Team, 1979 and 1981. North Dakota Regional Environmental Assessment Program, unpublished printouts, Bismarck, 1977.

(If the permanent work force of the Great Plains Gasification Project and associated expansion of the Coteau Mine, estimated to total about 950, were included, the work force would total about 2,200.)

The construction and operation of these facilities have resulted in substantial stimulus to the regional economy. Expenditures by such projects within the region are primarily in the form of project payrolls, construction subcontracts, and purchases of supplies and materials from local firms. Of these different forms of economic stimulus, project payrolls are generally the largest, amounting to more than half of total local expenditures during project construction and about two-thirds during operation.<sup>10</sup> The project payrolls alone can represent a substantial stimulus to the regional economy. For example, during 1979 an average of about 4,000 construction workers were employed at three power plant construction sites in the area, and the annual earnings of these workers averaged about \$23,500.<sup>11</sup> Thus, the total construction payroll for the three sites during 1979 was about \$94 million. Similarly, about 500 permanent workers were employed at the various facilities in 1979 (Table 3), with annual earnings averaging about \$20,000 for a total payroll of about \$10 million.<sup>12</sup> Some of this increased purchasing power is lost to the region due to leakage effects. (Leakages are flows of purchasing power out of a region; common forms of leakages include purchases from distant suppliers, wages paid to workers commuting from outside the area, and taxes paid to higher levels of government.) Leakages may be particularly high in the case of those construction workers who maintain a permanent residence elsewhere and reside in the region only during the work week. Nevertheless, the economic stimulus provided by energy facility development has been substantial and has resulted in substantial increases in business activity and employment in the local trade and service sectors.

The period of expanded coal resource development has been one of substantial employment growth in west-central North Dakota. Six counties have experienced most of the coal-related employment growth. The new plants and mines are located in McLean, Mercer, and Oliver Counties. Many of the construction workers and most of the permanent employees live in these

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<sup>10</sup>For further discussion and examples from specific projects, see T. Hertsgaard, S. Murdock, N. Toman, M. Henry, and R. Ludtke, REAP Economic-Demographic Model: Technical Description, (Bismarck: North Dakota Regional Environmental Assessment Program, 1978).

<sup>11</sup>Information on average earnings was derived from Gilmore, et al., 1980.

<sup>12</sup>Gilmore, et al., 1980.

counties. In addition, substantial numbers of construction workers live in the cities of Bismarck, Mandan, and Minot, located in Burleigh, Morton, and Ward Counties, respectively. Bismarck and Mandan have also experienced a substantial part of the increased trade and service activity associated with development, and most of the principal development firms maintain offices there. Changes in total employment for these counties for the period 1972-1979 are shown in Table 4. Overall, employment in the six-county area grew by 20,162 or 31.5 percent over the seven-year period. While factors other than coal development undoubtedly contributed to this growth, the influence of energy facility construction and operation was substantial throughout the period.

The composition of the employment growth is shown in Table 5. Examination of Table 5 indicates that the largest percentage growth occurred in the following sectors: mining; construction; finance, insurance, and real estate; manufacturing; services; and retail trade. The sectors accounting for the largest absolute growth in employment were construction, services, retail trade, and wholesale trade. A substantial percentage of the growth in mining and construction sector employment can be attributed directly to expanded coal mining and power plant construction. Similarly, a substantial portion of the employment growth in such sectors as retail trade and services can be attributed to the secondary effects of energy-related activities. (For example, if relatively conservative secondary employment multipliers of 0.5 for construction workers and 1.0 for permanent workers are applied to the additional energy project employment figures for 1979 shown in Table 3, an estimate of about 2,800 additional local trade and service jobs is obtained.) Thus, the composition of employment growth in the region clearly reflects the direct and indirect effects of energy resource development.

Increased population accompanied the growth in employment opportunities in west-central North Dakota during the 1970's. Population increased by 16.7 percent for the six-county area as a whole with all counties except Ward experiencing some growth (Table 6). All three facility site counties experienced population growth, and this increase in population was particularly noteworthy as, in each case, it reversed a previous trend of population decline. Two of the site counties also experienced positive rates of net migration during the 1970's, and this also represents the reversal of previous trends (Appendix Tables 2 and 3).



TABLE 4. EMPLOYMENT TRENDS IN SELECTED NORTH DAKOTA COUNTIES AFFECTED BY COAL DEVELOPMENT, 1972-1979

County	1972	1973	1974	1975	1976	1977	1978	1979	Change, 1972-1979	
									Number	Percent
Facility Site Counties:										
McLean County	4,499	4,530	4,692	4,816	5,137	5,711	6,549	6,255	1,756	39.0
Mercer County	2,602	2,829	3,225	3,341	3,120	3,430	4,402	5,335	2,733	105.0
Oliver County	862	839	956	1,187	1,588	1,303	1,082	1,069	207	24.0
Secondary Impact Counties:										
Burleigh County (Bismarck)	20,891	21,533	23,141	24,760	26,017	27,688	28,780	30,465	9,574	45.8
Morton County (Mandan)	7,916	8,186	8,742	8,864	9,408	10,004	10,444	10,827	2,911	36.8
Ward County (Minot)	27,179	28,169	29,402	30,537	30,942	29,968	30,143	30,160	2,981	11.0
<hr/>										
TOTAL	63,949	66,086	70,158	73,505	76,212	78,104	81,400	84,111	20,162	31.5

NOTE: These employment data are by place of work and represent annual averages.

SOURCES: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (REIS), 1972-1979.

TABLE 5. EMPLOYMENT BY INDUSTRIAL CATEGORY FOR NORTH DAKOTA COUNTIES AFFECTED BY COAL DEVELOPMENT,<sup>a</sup> 1972-1979

Industrial Categories	1972	1973	1974	1975	1976	1977	1978	1979	Change, 1972-1979	
									Number	Percent
Agriculture	7,322	7,171	7,113	6,998	7,011	6,796	6,858	6,831	-491	-6.7
Mining	323 <sup>b</sup>	349	371	393 <sup>b</sup>	561 <sup>b</sup>	635 <sup>b</sup>	502 <sup>b</sup>	1,056 <sup>b</sup>	+733	226.9
Construction	2,546	3,003	3,642	4,779	5,197	5,658	7,201	7,521	+4,975	195.4
Manufacturing	2,352	2,429	3,807	3,703	3,316	3,205	3,279	3,406 <sup>b</sup>	+1,054	44.8
Transportation and Public Utilities	3,494	3,603	3,573 <sup>b</sup>	3,666 <sup>b</sup>	4,003	4,141 <sup>b</sup>	4,322 <sup>b</sup>	2,781 <sup>b</sup>	-713	-20.4
Retail Trade	8,820	9,331	9,771	9,957	10,764	11,397	11,653	12,488	+3,668	41.6
Wholesale Trade	2,747	2,994 <sup>b</sup>	3,218 <sup>b</sup>	3,717 <sup>b</sup>	3,993	4,341	4,259 <sup>b</sup>	4,564 <sup>b</sup>	+1,817	39.8
Finance, Insurance, and Real Estate	1,654	1,756 <sup>b</sup>	1,893 <sup>b</sup>	1,946 <sup>b</sup>	2,060 <sup>b</sup>	2,268 <sup>b</sup>	2,409 <sup>b</sup>	2,611	+957	57.9
Services	9,926	10,108	10,766 <sup>b</sup>	11,512 <sup>b</sup>	12,299 <sup>b</sup>	13,156 <sup>b</sup>	13,488 <sup>b</sup>	14,252	+4326	43.6
Federal Government	10,097	10,584	10,428	9,925	9,939	9,815	9,656	9,212	-885	-8.8
State and Local Government	10,249	10,254	11,480	11,967	12,014	11,223	11,544	10,836	+587	5.7
Other	4,429 <sup>b</sup>	4,471 <sup>b</sup>	4,936 <sup>b</sup>	4,790 <sup>b</sup>	4,899 <sup>b</sup>	5,292 <sup>b</sup>	5,634	5,882	+1,453	32.8
TOTALS	63,949	66,086	70,158	73,505	76,212	78,104	81,400	84,111	20,162	31.5

<sup>a</sup>Includes McLean, Mercer, Oliver, Burleigh, Morton, and Ward Counties.

<sup>b</sup>Information withheld for some counties to avoid disclosure or because less than 50 employees were involved, but included in total. Hence column entries do not add to total.

SOURCE: U.S. Dept. of Commerce, Bureau of Economic Analysis, Regional Economic Information System (REIS).

TABLE 6. POPULATION TRENDS IN SELECTED NORTH DAKOTA COUNTIES AFFECTED BY COAL DEVELOPMENT, 1960-1980

County	1960	1970	1975	1980	Percent Change	
					1960-1970	1970-1980
Facility Site Counties:						
McLean	14,030	11,251	11,324	12,288	-19.8	+9.2
Mercer	6,805	6,175	6,400	9,378	-9.3	+51.9
Oliver	2,610	2,322	2,400	2,495	-11.0	+7.5
Secondary Impact Counties:						
Burleigh	34,016	40,714	47,100	54,811	+19.7	+34.6
Morton	20,992	20,310	21,800	25,177	-3.2	+24.0
Ward	47,072	58,560	61,200	58,392	+24.4	-0.3
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TOTAL	125,525	139,332	150,224	162,541	+11.0	+16.7

SOURCES: U.S. Department of Commerce, Bureau of the Census, Census of Population, North Dakota, 1960-1980. U.S. Dept. of Commerce, Bureau of the Census, Current Population Reports, Series P-25 and P-26, North Dakota.

Increased employment opportunities and an enhanced population base are often regarded as beneficial aspects of resource development projects. The rapid and substantial population growth often associated with construction of energy conversion facilities, however, may lead to problems in providing housing and public services and facilities to meet the needs of a rapidly expanding population. Further, small rural communities often are ill-equipped to deal with growth management issues as they frequently lack financial resources, professional personnel, and experience in coping with rapid change.

During the mid-1970's, North Dakota's decision makers at both state and local levels anticipated many of the growth management problems that could be associated with large-scale coal development. Consequently, several measures aimed at mitigating growth-related problems of communities affected by coal development were enacted into law in 1975 and 1977.

### State Response to Coal Development

By 1974, North Dakota policymakers had become aware of the magnitude of coal development projects proposed for the state, and many desired that the state adopt a positive, proactive stance in response to both the problems and the opportunities associated with development. Accordingly, four major pieces of legislation were enacted by the 1975 Legislative Session to provide a basis for constructively managing the development of large-scale energy facilities. These legislative measures concerned the following major subjects: (1) coal severance tax, (2) coal conversion tax, (3) energy facility siting, and (4) environmental information for policymakers.

#### Coal Severance Tax

The state of North Dakota established a coal severance tax in 1975 at the rate of \$0.50 per short ton. The tax rate was indexed to inflation (i.e., the rate was increased in proportion to the rate of inflation), and the revenues from the tax were distributed in the following manner: 35 percent to a Coal Impact Fund (from which grants would be made to local governments), 5 percent to the county where the coal was mined, 30 percent to a state trust fund, and 30 percent to the state general fund.

The severance tax was extensively debated in the 1977 Legislative Session. The resulting legislation provided for the following major changes in the severance tax:

1. The tax rate was increased from \$0.50 to \$0.65 per short ton (with an inflation adjustment which would increase the tax rate by \$0.01 for each point increase in the Bureau of Labor Statistics' Wholesale Price Index). This adjustment formula caused the severance tax rate to increase at roughly three times the rate of inflation.
2. The revenues were apportioned between state and local governments with 30 percent accruing to the state general fund, 15 percent to a state trust fund, 35 percent to the Coal Impact Fund, and 20 percent to the county where the coal is mined. The county's share is further subdivided (by statute) with 40 percent accruing to the county general fund, 30 percent being divided among the incorporated municipalities (in proportion to their population), and 30 percent being divided among the school districts (in proportion to enrollment).

3. The trust fund was to be administered by the Board of University and School Lands as a source of loans for impacted local governments.

This legislation had the effect of making 70 percent of the severance tax proceeds available to local governments. When the effects of both the tax rate and distribution formula changes are considered, the fiscal resources available to local governments (per ton of coal mined) more than doubled.

The severance tax was again the subject of substantial debate in the 1979 Legislative Session. The major changes in the severance tax resulting from the 1979 session were:

1. The tax rate was increased from \$0.65 to \$0.85 per short ton, and the inflation indexing formula was altered to provide for an increase in the tax rate by \$0.01 for each four points increase in the Wholesale Price Index (i.e., the tax rate would increase at a rate somewhat less than the general rate of inflation).
2. The distribution of the severance tax revenues remained as specified by the 1977 legislation except for a provision to allow distribution of revenues to counties (and their municipalities and school districts) which are adjacent to coal producing counties. The effect of this provision is that, if the tipple (loading facility) of a mine is within 15 miles of another county in which no coal is mined, then the apportionment is based upon 30 percent to the cities in the coal producing county and any city in the non-coal producing county within 15 miles of the mine tipple, based upon population; 40 percent to the county general funds of the two counties based upon a ratio of assessed valuation of all the quarter sections of land which lie in the non-coal producing county within 15 miles of a mine tipple to the assessed valuation of all the land in the coal producing county; and 30 percent apportioned between school districts in the coal-producing county and those in the adjoining non-coal producing counties within 15 miles of a coal tipple based upon the total number of students in the coal producing county and the number of students actually living on the quarter sections of land within 15 miles of the tipple in the non-producing counties.

#### Coal Conversion Facility Privilege Tax

The coal conversion facility privilege tax is applied to electrical generating plants and other coal conversion facilities (e.g., coal gasification and liquefaction plants). The tax is in lieu of all ad valorem (i.e., property) taxes except for taxes on the land on which the facility is located. This tax is applicable to any electrical generating plant having at least one generation unit with a capacity of one hundred twenty thousand kilowatts (120MW) or more and to any coal conversion plant using or designed to use over five hundred thousand tons of coal per year.

The tax rate for electrical generating plants is 0.25 mill on each kilowatt hour of electricity produced for sale. For coal gasification plants, the rate is 2.5 percent of the gross receipts of the facility or \$0.10 per one thousand cubic feet of synthetic natural gas, whichever is greater. For other coal conversion facilities, the rate is 2.5 percent of gross receipts. The revenue from this tax is divided between state and local governments with 65 percent accruing to the state general fund and 35 percent to the county where the facility is located. The county's share is further allocated, by statute, with 30 percent being distributed to the municipalities, 30 percent being divided among the school districts, and 40 percent accruing to the county general fund.

The coal conversion privilege tax was initially enacted in 1975. This legislation had the same provisions as the present law except that the allocation of revenues between county and state was based on a sliding scale whereby the state obtained a larger share of the revenue from larger facilities. The distribution of the county's share was also somewhat different from that prevailing under current law. The present law, described above, has been in effect since 1977.

#### Energy Facility Siting Act

The Energy Facility Siting Act was also enacted by the 1975 Legislative Session and has continued in force with only minor amendments. This act provides the state Public Service Commission with siting authority over energy conversion and transmission facilities. Energy facilities covered by this act include electric generating plants (50MW or larger), plants for manufacture or refinement of 100 MCFD or more of gas, plants for manufacture or refinement of 50,000 barrels or more of liquid hydrocarbon products per day, and any uranium enrichment plant. Pipelines associated with such facilities (except for natural gas gathering systems) are covered by the act as are electrical transmission lines of 200 kilovolts (KV) or more. Transmission lines of 116 to 200 KV are covered if they do not follow section lines, property lines, or established rights-of-way (e.g., roads or railroads).

The Public Service Commission was empowered to establish siting criteria and procedures for permit application and review for facilities covered by the act. In determining whether to grant a certificate of site compatibility (for

plants) or a construction permit (for transmission facilities), the Commission conducts an extensive review and holds public hearings to determine that the construction and operation of the facilities will produce minimum environmental and socioeconomic impacts. Further, the Commission has the authority to impose requirements designed to minimize or mitigate such impacts as a condition of granting a permit.

Several major energy facilities have been reviewed and permitted under the Siting Act. Among these are the Coyote and Antelope Valley electrical generating plants and the Great Plains Gasification Project.

#### Environmental Information for Policy Makers

In 1974, the North Dakota Legislative Council was concerned that the state have a comprehensive environmental information and analysis system to enable legislative and executive branch decision makers to reach informed decisions concerning coal development issues. Accordingly, in mid-1974, the North Dakota Legislative Council contracted with Battelle Columbus Laboratories to conceptualize such a system. Battelle prepared and presented to the Resources Development Committee of the Legislative Council a report suggesting a design and structure for a "regional environmental assessment program." Legislation was subsequently enacted by the 1975 Legislative Session, establishing the North Dakota Regional Environmental Assessment Program and providing an initial appropriation of \$2 million from the coal severance tax trust fund.

During the period 1975-1979, the North Dakota Regional Environmental Assessment Program (REAP) sponsored numerous baseline environmental studies in the area likely to be affected by extensive coal development. REAP also developed computerized data bases and software to make key information readily accessible to decision makers and to facilitate specific policy-oriented analyses. Of particular relevance to this discussion of the economic and social effects of development, REAP sponsored the development of a computerized economic, demographic, and fiscal impact projection model that became known as the REAP Economic-Demographic Model-1 or RED-1. The RED-1 Model was made available for general use by decision makers in January 1977. During the next two years, the model was utilized extensively as a planning and policy tool by

legislative committees, state agencies, and local governments.<sup>13</sup> Applications of particular interest include the model's use by legislative committees in developing the formula for distributing the coal severance tax revenues to local governments, its use by the Coal Impact Office in determining the needs of various communities for impact grants, and its use by local jurisdictions as a tool in planning new public facilities.<sup>14</sup>

The Regional Environmental Assessment Program was terminated, by gubernatorial veto, in 1979. During its four years of operation, however, it appears to have at least partially fulfilled its mission of making information concerning the environmental and socioeconomic impacts of energy development more readily available to policymakers.

### The Coal Creek Station

The Coal Creek Station, owned by United Power Association and Cooperative Power Association (UPA/CPA),<sup>15</sup> is located in McLean County. The plant site is about five miles south of the town of Underwood. Construction of the plant began in 1975 and was completed in 1980. The total investment for the plant, transmission lines, and coal mine was \$1.2 billion (Table 7). Major factors considered in selecting the 2,500 acre site between Washburn and Underwood were: (1) availability of lignite coal in the immediate area, and (2) availability of water from the nearby Missouri River. Selection of the McLean county site necessitated construction of 435 miles of 400KV power lines to Delano, Minnesota.

Ground breaking for the Coal Creek Station was originally scheduled for the fall of 1974. However, several factors (including a permit delay and bad weather) combined to set back the start of construction to May 1975. Once

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<sup>13</sup>For a description of the model's structure and data base, see Hertsgaard, et al., 1978. F. L. Leistritz, T. A. Hertsgaard, D. M. Senechal, S. H. Murdock, N. E. Toman, K. Wiig, and G. Schaible, The REAP Economic-Demographic Model: Background, Structure, and Applications, (Bismarck: North Dakota Regional Environmental Assessment Program, 1978).

<sup>14</sup>For a detailed discussion of these and other applications, see F. L. Leistritz, T. A. Hertsgaard, S. H. Murdock, and D. M. Senechal, Policy Making For Resource Development: The Case of Coal Development in North Dakota, AE 81008, (Fargo: North Dakota Agricultural Experiment Station, 1981).

<sup>15</sup>Even though UPA has a smaller interest in the Coal Creek Station than CPA, UPA functioned as construction manager. CPA is responsible for plant operation.



TABLE 7. CHARACTERISTICS OF THE COAL CREEK STATION

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Capacity:	1,100 megawatts (two 550MW units)
Capital investment:	
- power plant	\$ 711 million
- transmission lines	320
- coal mine	165
TOTAL	<u>\$1,196</u> million
Ownership:	United Power Association (44 percent) and Cooperative Power Association (56 percent)
Timing:	
- construction start-up	May 1975
- construction peak	July 1978
- completion of Unit #1	August 1979
- completion of Unit #2	Fall 1980
Fuel source:	
- BTU content of coal	6,500 BTU's/pound average
- type of mining	surface mining of two seams; overburden varies from 30 feet to 150 feet
- annual output	5.6 million tons (all to Coal Creek Station)
- size of reserves	305 million tons
- mine operator	Falkirk Mining Company, a wholly-owned subsidiary of North American Coal Corp.
Customers:	34 rural electric cooperatives in Minnesota and Wisconsin
Architect-Engineer	Black & Veatch
Employment:	
- peak construction	2,100 (plant only)
- permanent (plant)	240
- permanent (mine)	300

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SOURCES: United Power Association, Annual Report, 1978, (Elk River, Minnesota: UPA, 1979). Cooperative Power Association and United Power Association, The Coal Creek Project, undated. Interviews with UPA, CPA, and Falkirk Mining Company Representatives.

construction began, another major delay was experienced due to the failure of one supplier to provide tubing on time. Efforts to make up for this delay through the use of two ten-hour shifts were not totally satisfactory.

The construction management approach included the selection of Black & Veatch of Kansas City, Missouri as architect-engineer. Black & Veatch, in conjunction with UPA, selected and supervised all contractors and subcontractors. UPA maintained a small staff at the site to coordinate with Black & Veatch.

#### Socioeconomic Impact Management

The socioeconomic impact management approach adopted by UPA/CPA had several facets, including: (1) a Citizen's Advisory Committee, (2) a special study of community-level impacts, (3) a housing project, and (4) donations to local jurisdictions.

The Citizen's Advisory Committee was formed just prior to the beginning of project construction. The Committee, with about 15 members, advised UPA/CPA regarding local concerns and mitigation needs during the period 1975-1976 and disbanded late in 1976.

Because it was initiated prior to the enactment of the state's Energy Facility Siting Act, the Coal Creek Station was exempt from the provisions of this legislation. The EIS for this project, typical of many environmental statements developed in the early 1970's, contained only a cursory evaluation of socioeconomic impacts, and provided no community-specific impact information. As a result, one of the first recommendations by the Advisory Committee concerned the need for an impact evaluation to provide estimates of expected immigration and additional service requirements for each jurisdiction that might experience substantial impacts. UPA/CPA responded to this need by sponsoring a comprehensive socioeconomic impact assessment, conducted by the Department of Agricultural Economics of North Dakota State University (NDSU). The study was initiated in mid-1975, and a final report was distributed in May 1976.<sup>16</sup> The NDSU study team also made several presentations of interim results to groups of local officials and interested citizens during the course of the study.

Early in 1977 the North Dakota Regional Environmental Assessment Program (REAP) operationalized its economic-demographic assessment model and began to provide projections on request to local officials. In the summer of 1977, it became clear that the Coal Creek construction work force would substantially exceed the levels initially assumed. UPA/CPA provided revised work force

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<sup>16</sup>Toman, et al., 1976.

estimates to REAP, and revised impact projections were developed (based on an estimated peak work force of about 1,800 in 1978). These revised projections were utilized extensively by local officials and by the state Coal Impact Office. Thus, while local officials received little detailed impact information until construction had been initiated, detailed projections were available early in the construction period, and these projections were updated in response to changing conditions.

Before the initiation of construction activity, UPA/CPA took initial steps to stimulate housing development. UPA/CPA purchased a tract of about 30 acres on the outskirts of Underwood, and later located a housing developer and sold most of this land to this Bismarck-based developer. Out of the 30 acre tract, about five acres were donated to the City of Underwood--one acre for a swimming pool and four acres for a park. UPA/CPA also donated \$4,000 to the city to facilitate construction of the pool. The major role of UPA/CPA in housing development, then, was in locating and assembling developable land.

The cooperatives also made several donations in cash and in kind to local governments. In addition to the \$4,000 contribution to assist in constructing a swimming pool in Underwood, \$30,000 was provided to McLean County to enable construction of a highway shop, and \$4,000 was provided to assist in developing a golf course, located between Washburn and Wilton. Several roads in the vicinity of the plant and mine sites were improved by the developers and then given to the county.

In general, the mitigation activities of the cooperatives were viewed as being supplementary to, rather than substitutes for, local governmental planning and private developers' initiatives. The direct contributions of UPA/CPA to local jurisdictions were modest, but this is largely due to the existence of a comprehensive state program of grants and loans to local governments affected by coal development.

### The Construction Work Force

Construction employment for the Coal Creek Station for the period 1975-1980 is shown in Figure 2. As the graph indicates, there was a gradual buildup of the work force during 1975 and 1976 with peaks in the summers of 1977, 1978, and 1979. The project's construction force reached its maximum level of 2,224 in June 1978.

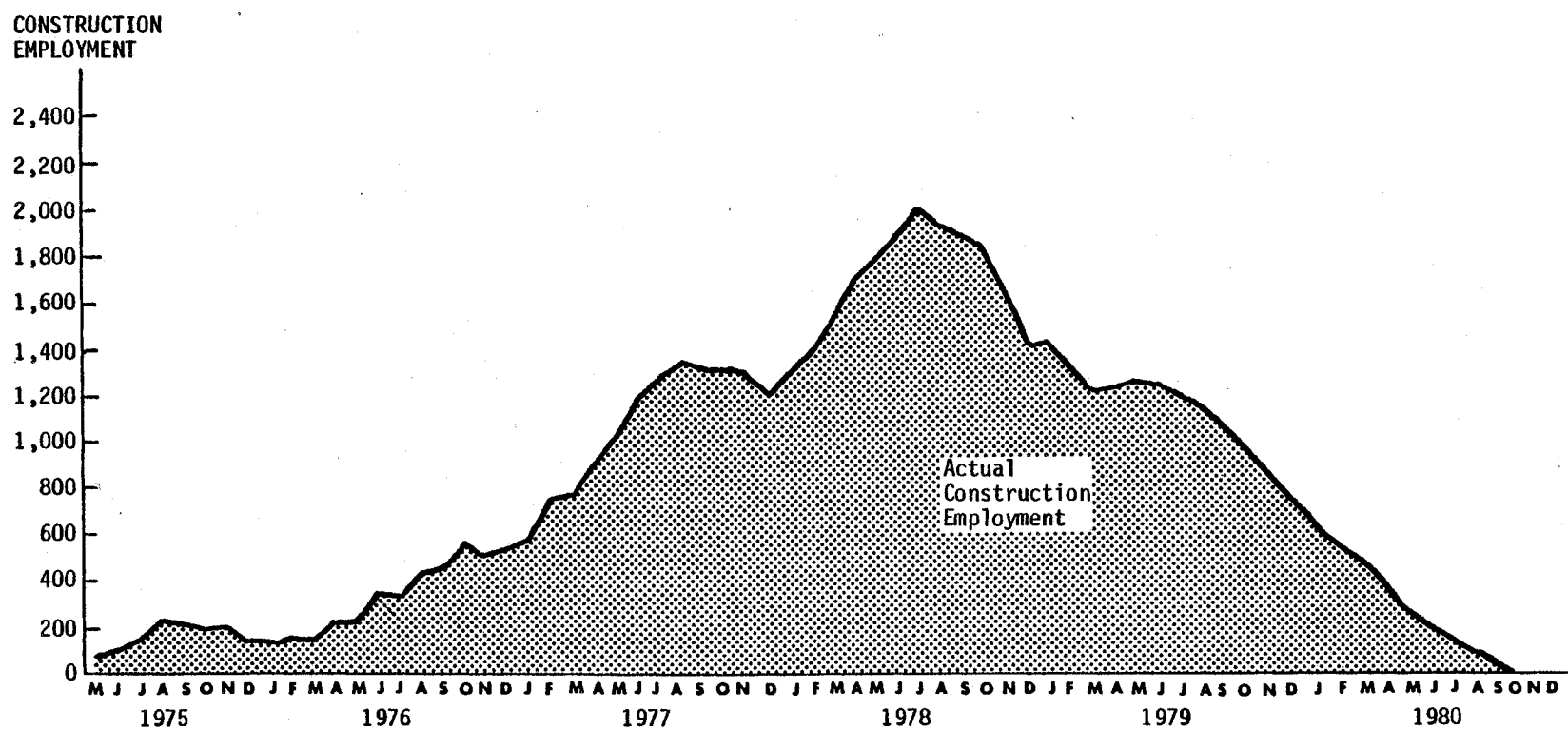


Figure 2: Summary of Coal Creek Station Construction Work Force, 1975-1978

Actual employment during the peak construction period, 1977-1979, substantially exceeded the work force projections prepared during the early stages of construction (Table 8).

TABLE 8. PROJECTED AND ACTUAL PEAK EMPLOYMENT BY YEAR FOR THE COAL CREEK STATION, 1975-1981

Year	Projected Employment <sup>a</sup>		Actual Employment <sup>b</sup>	
	Construction	Operation (includes mine)	Construction <sup>c</sup>	Operation (includes mine)
1975	225	35	230	36
1976	720	110	602	48
1977	925	190	1,542	200
1978	980	290	2,224	285
1979	550	393	2,015	329
1980	50	448	520	427
1981	0	485	0	437

SOURCES: <sup>a</sup>Estimates developed by UPA/CPA officials and reported in Toman, et al., 1976.

<sup>b</sup>Unpublished data provided by UPA/CPA officials.

<sup>c</sup>To account for UPA and Black & Veatch personnel at the site, the following estimates were added to the "Contractor Labor Force" provided by UPA: 1975:20, 1976:22, 1977-79:24.

The shifting demand for various crafts over the construction cycle is reflected in the changing mix of occupations shown in Table 9. In 1976, for example, ironworkers, laborers, and operators were the most frequently used crafts. In late 1978 and early 1979, more than one-quarter of the work force were electricians. Pipefitters represented one-fifth of the work force, and boilermakers about one-tenth. The changing mix of workers had a definite impact on the geographic distribution of impacts. For example, the electricians' local union is in Minot, thus a high proportion of electricians commuted about 70 miles from that city.

All plant construction workers were members of a union, and most of the locals were headquartered in Bismarck, except the electricians' local headquartered in Minot. On the basis of 40 hours per week, 50 weeks per year,

TABLE 9. CONTRACTOR LABOR FORCE, COAL CREEK STATION, BY CRAFT, BY QUARTER, JUNE 1975 - JULY 1979<sup>a</sup>

Craft	1975		1976				1977				1978				1979	
	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second
Boilermakers	0	8	0	8	12	49	87	166	214	220	250	250	245	190	129	122
Bricklayers	0	0	0	1	5	8	26	20	21	12	6	22	14	4	0	2
Carpenters	22	9	10	28	55	69	93	122	124	85	108	124	123	55	54	61
Cement Finishers	2	4	2	6	12	7	12	28	18	9	12	17	13	5	7	3
Electricians	10	13	10	16	20	32	26	114	207	275	255	306	438	475	345	356
Ironworkers	12	14	46	78	140	142	53	205	217	145	156	170	138	92	52	50
Laborers	49	12	21	60	65	84	80	146	146	125	112	167	163	127	94	111
Millwrights	0	0	0	1	1	0	0	20	26	40	32	57	50	46	41	46
Operators	70	48	17	83	65	50	62	98	139	123	113	126	130	68	35	47
Painters	0	0	0	0	0	0	0	7	12	8	5	25	39	32	27	20
Pipefitters	15	5	9	9	20	50	53	96	198	250	290	320	418	352	302	277
Sheet Metal	0	5	0	0	32	39	59	49	53	52	50	76	91	87	71	83
Insulators	0	0	0	0	0	0	0	0	0	30	53	49	61	57	54	54
Teamsters	7	6	3	7	5	15	10	16	15	9	6	7	22	11	3	5
Supervision	23	25	15	29	35	35	45	96	128	120	121	124	144	135	118	116
Total	210	149	133	326	467	580	606	1,183	1,518	1,503	1,569	1,840	2,089	1,736	1,332	1,353

<sup>a</sup>Excludes the Falkirk Mine, UPA, and Black & Veatch employment.SOURCE: Gilmore, *et al.*, 1980.

the typical construction worker earned \$20,000 to \$27,000 in 1979. Journeyman wage rates in 1979 for several of the crafts were estimated to be as follows:

Boilermakers	\$13.50/hour
Bricklayers	10.80 "
Carpenters	10.40 "
Electricians	10.80 "
Ironworkers	11.90 "
Laborers	7.47 "
Millwrights	11.50 "
Pipefitters	13.00 "
Sheet metal workers	10.80 "
Insulators	11.20 "
Operating engineers	10.30 "

Productivity of labor at the Coal Creek Station was considered to be average for new power plants. The construction manager for UPA did note a drop in productivity when the work force was on a ten-hour day early in 1979.

Labor turnover was not viewed as an especially difficult problem at Coal Creek. The UPA construction manager felt that, had construction proceeded according to original plans, turnover would have been substantially less.

#### The Permanent Work Force

When fully staffed, the Coal Creek Station and the Falkirk Mine which supplies its coal will employ more than 500 full-time workers (Table 8). The permanent work force was built up gradually during the construction period, and new workers completed substantial periods of training. In mid-1981, 239 workers were employed at the plant and 198 at the mine. This represents full staffing for the plant, but the mine work force is expected to grow to about 300 over the next three years as mining progresses to areas with thicker overburden located further from the plant.

The Falkirk Mine is operated by The Falkirk Mining Company, a wholly-owned subsidiary of The North American Coal Corporation. The total output of the mine is contracted to supply the Coal Creek Station. With about 27,000 acres containing recoverable lignite reserves of 305 million tons currently under lease, the mine has reserves sufficient to supply the Coal Creek Station for 55 years at the capacity production level of 5.6 MMTPY.

The Falkirk Mine's lignite is in two seams. The upper seam, which averages eight feet in thickness, contains 225 million tons. The overburden which must be removed to get at this first seam ranges from only a few feet to

150 feet. The second seam is between a few inches and approximately 30 feet below the first, and contains 85 million tons of coal. In order to strip the overburden, the mine has two large draglines, each with a 105 cubic yard bucket. The first dragline was completed in mid-1979. Trucks with 160-ton payload capacity are used to haul the coal to a crushing facility and a conveyor that moves it to the plant's stockpile. The mine required a total capital investment of \$165 million, excluding interest. Financing for the mine was arranged by UPA/CPA.

The mine workers were not unionized. In 1979, wages averaged \$10-\$12 per hour plus fringe benefits, which amounts to \$20,000 to \$24,000 per year. Earnings for permanent employees at the power plant averaged \$18,400 in 1979.

More than 90 percent of the plant's permanent work force were living in North Dakota at the time they were hired. About 78 percent now live in McLean County; 42 percent were living in the county when hired by CPA. At the mine, 89 percent of the workers were living in North Dakota when hired. About 74 percent of the mine employees now live in McLean County. Of the mine workers, 81 percent are married, and the married workers have an average of 2.19 children per household. The age profile of the mineworkers is:

<u>Age Category</u>	<u>Number</u>	<u>Percent</u>
20-30	76	38.4
31-40	92	46.5
41-50	24	12.1
51-60	6	3.0

The recruitment of permanent workers for the project was not designed to lure workers from local business or agriculture, but rather to seek first, unemployed but experienced personnel; second, those semi-experienced workers who might otherwise leave the area; and third, qualified personnel from other employment when they made inquiries. Nevertheless, some job-changing appears to have occurred in the area, based in large measure on the more attractive compensation offered by the plant and mine.

#### Baseline Conditions in the Impact Area

Agriculture is the principal basic economic activity of the six counties that have experienced most of the effects of coal development. Beef cattle and



small grain production are the major agricultural activities. Federal military activity makes a substantial contribution to the economic base of Ward county where a large Strategic Air Command base is located. In addition, a number of ICBM (Minuteman) missile installations are located in Ward and McLean Counties. Manufacturing activities have increased in the area in recent years, particularly in Burleigh County. Energy production has become an increasingly important segment of the area's economic base. Ward County has benefited from oil and gas exploration and production activity in the northwestern portion of the state while Morton County is the site of a major oil refinery. Finally, coal production and coal-fired power generation have become increasingly important in the region.

The picture that emerges, then, is that of a resource-oriented economy, traditionally linked to agriculture, that is becoming increasingly dependent on energy development and associated activities. Bismarck-Mandan and Minot have grown increasingly important as regional trade and commercial centers serving western North Dakota. The economic and population trends of the area and their likely outlook are examined in the following sections.

#### Employment Trends

Employment trends in the six-county area over the period 1960-1975 are summarized in Tables 10 and 11. Total employment in the region increased from 48,523 in 1960 to 65,485 in 1975, an increase of 35 percent. Industries experiencing the greatest percentage growth were government; finance, insurance, and real estate; business and personal services; and wholesale trade and agricultural processing. The industries showing the greatest absolute magnitude of employment growth were government, retail trade, and professional and social services. The agricultural sector experienced a substantial decline in employment (45.3 percent), resulting from increasing mechanization of agricultural production. The trend of increasing agricultural mechanization is illustrated by changes in numbers of farms and average farm sizes in the six-county area during the period 1959-1978. The number of farms decreased from 6,937 to 5,455 (21 percent) during this period while average farm size increased from 861 to 1,007 acres (17 percent) (Appendix Table 4).

Employment trends for the various counties are summarized in Table 11. Burleigh County registered the greatest growth (62 percent) followed by Ward (38.5 percent) and Morton (21.2 percent). Mercer County experienced modest

TABLE 10. EMPLOYMENT BY INDUSTRIAL CATEGORY FOR NORTH DAKOTA COUNTIES AFFECTED BY COAL DEVELOPMENT,<sup>a</sup> 1960-1975

Industrial Categories	Years				Change, 1960-75	
	1960	1965	1970	1975	Number	Percent
Agriculture	11,440	9,786	6,752	6,254	-5,186	-45.3
Mining <sup>b</sup>	665	300	421	470	-195	-29.3
Construction	3,917	3,471	3,722	5,070	+1,153	+29.4
Transportation	1,677	1,239	1,384	2,320	+643	+38.3
Communications and Public Utilities <sup>c</sup>	2,216	2,525	2,473	2,449	+233	+10.5
Petroleum Refining	282	222	176	156	-126	-44.7
Wholesale Trade, Agricultural Processing, and Misc. Manufacturing	3,587	4,559	4,440	6,089	+2,502	+69.8
Retail Trade	8,273	9,718	9,231	12,244	+3,971	+48.0
Finance, Insurance, and Real Estate	947	1,385	1,373	1,670	+723	+76.3
Business and Personal Services	3,284	3,776	4,574	5,789	+2,505	+76.3
Professional and Social Services	4,703	5,374	5,476	7,704	+3,001	+63.8
Government	7,532	11,806	13,843	15,270	+7,738	+102.7
TOTAL	48,523	54,161	53,865	65,485	+16,962	+35.0

<sup>a</sup>Counties included are Burleigh, McLean, Mercer, Morton, Oliver, and Ward.

<sup>b</sup>Includes coal mining, other mining, and petroleum extraction.

<sup>c</sup>Includes electrical generation.

SOURCE: Based on data provided by North Dakota Employment Security Bureau, Bismarck, North Dakota.

growth, largely attributable to expanded coal mining and power plant construction while McLean and Oliver Counties experienced decreases. Much of the decrease in McLean County employment occurred during the period 1960-1965 and was associated with completion of the Garrison Dam.

TABLE 11. EMPLOYMENT TRENDS OF SELECTED NORTH DAKOTA COUNTIES (NUMBER EMPLOYED BY PLACE OF WORK), 1960-1975

County	Year				Change, 1960-1975	
	1960	1965	1970	1975	Number	Percent
Burleigh	16,054	17,323	18,061	26,003	+9,949	+62.0
McLean	4,729	3,946	3,504	3,351	-1,378	-29.1
Mercer	2,169	2,849	2,043	2,341	+172	+7.9
Morton	5,715	6,091	5,651	6,926	+1,211	+21.2
Oliver	967	808	972	709	-258	-26.7
Ward	18,889	23,144	23,634	26,155	+7,266	+38.5
TOTAL	48,523	54,161	53,865	65,485	+16,962	+35.0

SOURCE: Based on data provided by North Dakota Employment Security Bureau, Bismarck, North Dakota.

#### Population Trends

Population in the six-county area had been growing steadily prior to the initiation of large-scale coal development (Table 12). This growth has been concentrated in the regional trade centers of Bismarck-Mandan and Minot, while the predominantly rural counties (McLean, Mercer, and Oliver) have experienced substantial decreases in population since 1950 (Table 12). The pattern of declining population in the rural counties most likely is the result of increased mechanization in agriculture coupled with changing rural trade patterns. As transportation facilities in rural areas have been improved, the smaller rural trade centers have been by-passed in favor of the larger regional trade centers. Thus, growth of the major regional trade centers has been partially at the expense of smaller communities.

Among the smaller communities, only a few experienced population growth during the 1960's (Table 12). For several of these communities, particularly Center, Beulah, Hazen, and Stanton, the principal factor associated with their population growth was expanded coal mining and/or power plant construction.

Because employment in the six-county area was growing less rapidly than the natural increase of the working age population during the 1960's, substantial

TABLE 12. POPULATION TRENDS OF SELECTED NORTH DAKOTA COUNTIES AND INCORPORATED PLACES, 1950-1970

County/City	1950	1960	1970	Change, 1950-1960		Change, 1960-1970		Change, 1950-1970	
				Number	Percent	Number	Percent	Number	Percent
Burleigh	25,673	34,016	40,714	+8,343	+32.5	+6,698	+19.7	+15,041	+58.6
Bismarck	18,640	27,670	34,703	+9,030	+48.4	+7,033	+25.4	+16,063	+86.2
McLean	18,824	14,030	11,251	-4,794	-25.5	-2,779	-19.8	-7,573	-40.2
Coleharbor	315	210	78	-105	-33.3	-132	-62.9	-237	-75.2
Garrison	1,890	1,794	1,614	-96	-5.1	-180	-10.0	-276	-14.6
Turtle Lake	839	792	712	-47	-5.6	-80	-10.1	-127	-15.1
Underwood	1,061	819	781	-242	-22.8	-38	-46.4	-280	-26.4
Washburn	913	993	804	+80	+8.8	-189	-19.0	-109	-11.9
Wilton	796	739	695	-57	-7.2	-44	-6.0	-101	-12.7
Mercer	8,686	6,805	6,175	-1,881	-21.7	-630	-9.3	-2,511	-28.9
Beulah	1,501	1,318	1,344	-183	-12.2	+26	+2.0	+157	-10.5
Hazen	1,230	1,222	1,240	-8	-0.6	+18	+1.5	+10	+0.8
Stanton	571	409	517	-162	-28.4	+108	+26.4	-54	-13.2
Morton	19,295	20,992	20,310	+1,697	+8.8	-682	-3.2	+1,015	+5.3
Mandan	7,298	10,525	11,093	+3,227	+44.2	+568	+5.4	+3,795	+36.1
Oliver	3,091	2,610	2,322	-481	-15.6	-288	-11.0	-769	-24.9
Center	492	476	619	-16	-2.0	+143	+30.0	+127	-25.8
Ward	34,782	47,072	58,560	+12,290	+35.3	+11,488	+24.4	+23,778	+68.4
Minot	22,032	30,604	32,290	+8,572	+38.9	+1,686	+5.5	+10,258	+46.6
TOTAL	110,351	125,525	139,332	+15,174	+13.8	+13,807	+11.0	+28,981	+26.3

SOURCE: U.S. Department of Commerce, Bureau of the Census, U.S. Census of Population, 1950, 1960, 1970. (Washington, D.C.: U.S. Government Printing Office). See Appendix Table 5.

outmigration occurred. Five of the six counties experienced net outmigration during the period 1960-1970, and the area had an overall net outmigration rate of 7.1 percent (Appendix Table 2).

#### Baseline Economic and Population Outlook

In the absence of major new resource development projects such as the Coal Creek Station, the likely outlook for the six-county study region would be for a very modest rate of population and economic growth. Without an increase in basic income from construction and mining activities, the region could still look forward to modest growth in manufacturing employment (primarily agriculture-related) and possibly in transportation activities. Agriculture will likely continue to provide increasing levels of output and income but decreasing levels of employment. This trend could continue to generate modest increases in trade and service employment. Overall, then, the region would probably experience modest increases in employment and real income as increases in other basic employment and trade and service employment would outweigh decreases in agricultural employment. The increase in employment opportunities would, however, be substantially less than the level needed to accommodate the natural increase of the labor force, and so high levels of net outmigration from the region would be expected. Net outmigration would be highly selective, as in past decades, in favor of the younger and better educated members of the population. This would lead to further increases in the average age of the remaining population and to substantial declines in primary and secondary school enrollments.<sup>17</sup>

The changes in employment and population expected to occur in the region in the absence of new resource development projects would not be distributed evenly over the six counties. Rather, the regional trade centers of Bismarck-Mandan and Minot likely would continue to grow and would probably be the location of much of the increased basic employment in manufacturing and transportation. They would also be expected to be the site of much of the increased trade and service activity. Growth in the regional trade centers

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<sup>17</sup>S. H. Murdock and T. K. Ostenson, Population Projections by Age and Sex, 1975-2000. Agricultural Economics Statistical Series, Issue No. 29, (Fargo: North Dakota State University, North Dakota Agricultural Experiment Station, 1976).

would be offset by a continued decline in the rural counties (McLean, Mercer, and Oliver). With economies based largely on agriculture and with agriculture providing a smaller percentage of the area's basic employment, these counties (and particularly their local trade centers) would face a bleak economic future.

Population projections for the six counties of the primary and secondary impact areas for the period 1975-2000 are summarized in Table 13. These projections indicate a population increase of 18 percent for the six-county area over the 25-year period.

TABLE 13. POPULATION PROJECTIONS FOR SELECTED NORTH DAKOTA COUNTIES, 1975-2000<sup>a</sup>

County	Year						
	1970 <sup>b</sup>	1975 <sup>c</sup>	1980 <sup>c</sup>	1985 <sup>c</sup>	1990 <sup>c</sup>	1995 <sup>c</sup>	2000 <sup>c</sup>
Burleigh	40,714	43,848	45,980	48,491	50,908	53,276	55,310
McLean	11,251	11,129	10,727	10,446	10,143	9,880	9,622
Mercer	6,175	6,180	6,010	5,877	5,725	5,585	5,425
Morton	20,310	20,921	21,027	21,354	21,625	21,894	22,099
Oliver	2,322	2,395	2,419	2,475	2,576	2,566	2,530
Ward	58,560	63,707	67,348	71,268	74,844	77,737	80,170
TOTAL	139,332	148,180	153,511	159,911	165,821	170,938	175,156

<sup>a</sup>Projections were developed based on historical trends and assume that no major development projects occur during the projection period. Key demographic assumptions include one-half the migration rate prevailing from 1960 to 1970 and 2.1 births per female.

SOURCE: <sup>b</sup>U.S. Bureau of the Census, U.S. Census of Population, 1970, (Washington, D.C.: U.S. Government Printing Office, 1971).  
<sup>c</sup>S. H. Murdock, and T. K. Ostenson, 1976.

#### Socioeconomic Effects of the Coal Creek Project

Construction and subsequent operation of the Coal Creek Station resulted in substantial changes in economic activity, population, public service needs, costs and revenues of local governments, and perceptions of local residents concerning coal resource development and its effects.

### Economic Effects

Construction of the Coal Creek Station led to substantial economic changes in McLean County. As discussed earlier, the construction work force reached peak levels of about 1,540 in 1977, 2,200 in 1978, and 2,000 in 1979. In addition, a number of permanent workers were hired beginning in 1976. The influx of project workers and their families led to increased sales and employment in the trade and service sectors of the local economy.

### Construction Work Force Characteristics

Two unique aspects of the Coal Creek Station work force, when compared to power plant construction work forces in other areas, relate to the rate of local hiring and the residential patterns of the workers. Local hiring rates were considerably higher than those found at many sites. A survey of the work force conducted in the third quarter of 1976 revealed that local workers made up 61 percent of the work force at that time.<sup>18</sup> (Local workers were defined as those who had lived at their current address prior to May 1975.) While the proportion of local workers undoubtedly decreased as the work force grew, local workers have continued to make up a substantial part of the work force. The relatively high level of local recruitment for this project is largely attributable to the area's history of power plant construction projects which has led to the development of a substantial pool of skilled construction workers in the area.<sup>19</sup>

The residential patterns of the workers were also somewhat unique in that only about one-third of the workers appear to have lived in McLean County. The residential patterns of the Coal Creek construction workers are summarized in Table 14. As shown in that table, a survey of the work force conducted in 1976 indicated that 35.5 percent of the respondents were living in McLean

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<sup>18</sup>J. S. Wieland and F. L. Leistritz, 1978.

<sup>19</sup>For comparable data for other sites, see Mountain West Research, Inc., Construction Worker Profile, (Washington, D.C.: Old West Regional Commission, 1975).

County, 35.1 percent were commuting from Bismarck-Mandan, and 12.7 percent were commuting from Minot. The workers' choice of residential location differed substantially between local and relocating workers. Of the relocating workers surveyed, 56 percent lived in McLean County with Washburn and Underwood being the principal places of residence. Only 24 percent of the local workers lived in McLean County, and most of the remainder commuted to the site from the Bismarck-Mandan area or from Minot (Table 14).

A work force census conducted in 1979 appears to suggest that a shift in settlement patterns occurred as project construction progressed. The census indicates that only 22.8 percent of the work force lived in McLean County in 1979 while 29.2 percent lived in the Bismarck-Mandan area and 12.3 percent in Minot (Table 14). Caution is advised, however, in comparing the data from the 1979 census with that from the 1976 survey. In the census, 30.7 percent of the work force (542 workers) listed places of residence other than those listed in the table, and many of these communities seem to be beyond feasible daily commuting distance. It appears, then, that many of the workers in the "other" category may have lived in the impact area during the work week (likely in motels, rented rooms, and recreational vehicles), returning to their permanent residences on weekends. (For a summary of residential location by craft from the 1979 census, see Appendix Table 6.)

Key demographic characteristics of the construction workers are summarized in Table 15. The average age of the local workers was 36.4 years while the relocating workers were slightly younger (33.2 years). Of the local workers, 71.2 percent were married while the corresponding figure for nonlocal (relocating) workers was 62.2 percent. An average of 1.29 dependents accompanied each relocating worker (i.e., 129 dependents per 100 workers). The children of the relocating workers were largely in the preschool age group, so 100 relocating workers brought an average of 31 school age dependents to the area.

A comparison of projected and actual values of construction worker characteristics generally considered important in impact analysis is presented in Table 16. Initial projections of these variables tended to be reasonably accurate. The comparison in Table 16 suggests that the percent of local workers



TABLE 14. PLACE OF RESIDENCE OF COAL CREEK STATION CONSTRUCTION WORKERS, 1976 AND 1979

Place of Residence	1976 Survey <sup>a</sup>						1979 Census <sup>b</sup>	
	Local Workers		Relocating Workers		Total			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Washburn	7	4.7	20	25.0	27	11.8	129	7.3
Underwood	10	6.8	18	22.5	28	12.3	108	6.1
Garrison	10	6.8	2	2.5	12	5.3	74	4.2
Turtle Lake	1	0.7	2	2.5	3	1.3	32	1.8
Riverdale	4	2.7	1	1.3	5	2.2	4	0.2
Max	3	2.0	0	0	3	1.3	22	1.2
Wilton	1	0.7	2	2.5	3	1.3	33	1.9
Subtotal, McLean County	36	24.3	45	56.3	81	35.5	402	22.7
Bismarck	58	39.2	22	27.5	80	35.1	364	20.6
Mandan							152	8.6
Minot	24	16.2	5	6.3	29	12.7	216	12.3
Stanton	13	8.8	3	3.8	16	7.0	34	1.9
Hazen	6	4.1	2	2.5	8	3.5	30	1.7
Center	11	7.4	3	3.8	14	6.1	23	1.3
Other	0		0	0	0		542	30.7
TOTAL	148	100.0	80	100.0	228	100.0	1,763	100.0

SOURCE: <sup>a</sup>Wieland and Leistritz, 1978.

<sup>b</sup>Census of total project work force tabulated by Denver Research Institute from employee records provided by UPA/CPA officials.

was substantially underestimated. It should be kept in mind, however, that the survey which was the source of the "actual" value was conducted relatively early in the construction period.

Although there were no firm data available on proportions of local and nonlocal workers later in the construction period, it appears probable that the proportion of nonlocal workers increased as the construction force grew and may have exceeded 50 percent at the peak of construction activities. The average number of dependents per relocating worker (1.29) was very close to the value projected (1.20).

TABLE 15. DEMOGRAPHIC CHARACTERISTICS OF COAL CREEK CONSTRUCTION WORKERS

Item	Local Workers	Relocating Workers
Average age (years)	36.4	33.2
Marital Status:		
Percent Married	71.2	62.2
Percent Unmarried	28.8	37.8
Total Dependents per worker <sup>a</sup>	1.78	1.29
Children by age category:		
Less than 6 years	0.34	0.42
6-12 years	0.38	0.16
13-18 years	0.37	0.15
Total Children	1.09	0.73
Percent of Workers Who Are High School Graduates	73.7	83.7
Average Length of Residence in West-Central North Dakota (months)	159.0	5.0

<sup>a</sup>Refers to all dependents living with the worker in the coal development area, divided by total number of workers.

SOURCE: Wieland and Leistritz, 1978.

Projections of the settlement patterns of the immigrating workers and their dependents also were reasonably accurate, although there was a tendency for the actual settlement pattern to be somewhat more dispersed than the original projection. The major deficiency of the initial projections appears to be the failure to consider Minot as a settlement location. More generally, factors that determine settlement patterns of construction workers are not fully understood.

#### Secondary Employment Effects

The economic stimulus provided by the construction of the Coal Creek Station led to substantial increases in employment in the trade and service

TABLE 16. COMPARISON OF PROJECTED AND ACTUAL VALUES OF SELECTED CONSTRUCTION WORKER CHARACTERISTICS

Item	Projected Value <sup>a</sup>	Actual Value <sup>b</sup>
Percent of Local Workers	50	61
Average Number of Dependents per Relocating Worker	1.20	1.29
Residential Distribution of Relocating Workers (Percent of workers living in each community):		
Washburn	23.0	25.0
Underwood	22.4	22.6
Garrison	3.7	2.3
Wilton	6.5	2.3
Turtle Lake	2.4	2.3
Riverdale	2.0	1.2
Coleharbor	1.3	0.0
Other McLean Co.	<u>0.0</u>	<u>0.0</u>
Subtotal, McLean Co.	61.3	55.7
Bismarck-Mandan	33.3	27.5
Stanton	1.5	3.8
Hazen	1.7	2.4
Center	1.1	3.8
Beulah	1.1	0.0
Minot	0.0	6.3
Other Communities	0.0	0.0

SOURCE: <sup>a</sup>Toman, et al., 1976.

<sup>b</sup>Wieland and Leistritz, 1978.

sectors of the McLean County economy. Employment by industrial sector for McLean County for the period 1972-1979 is presented in Table 17. As indicated in Table 17, substantial employment growth occurred during the period 1974-1977 in the following local service sectors: wholesale and retail trade (22 percent), finance, insurance, and real estate (26 percent), and services (23 percent). Additional employment growth occurred between 1977 and 1979 in the finance,

TABLE 17. MCLEAN COUNTY EMPLOYMENT BY INDUSTRIAL SECTOR (FULL- AND PART-TIME), 1972-1979

Industrial Categories	1972	1973	1974	1975	1976	1977	1978	1979
Agriculture	1,664	1,624	1,600	1,579	1,576	1,536	1,547	1,542
Mining	(L) <sup>a</sup>	28	24	15	50	66	123	159
Construction	183	257	228	300	555	1,083	1,667	1,166
Manufacturing	50	46	51	45	42	42	53	65
Transportation and Public Utilities	70	74	75	95	109	181	(D) <sup>b</sup>	(D)
Wholesale and Retail Trade	475	508	537	571	628	654	476 <sup>c</sup>	518 <sup>c</sup>
Finance, Insurance, and Real Estate	61	64	69	74	76	87	86	100
Services	445	438	487	529	558	598	649	680
Federal Government	384	355	346	318	282	274	286	279
State and Local Government	745	726	827	852	813	696	685	653
Other	<u>416</u>	<u>410</u>	<u>448</u>	<u>438</u>	<u>448</u>	<u>494</u>	<u>514</u>	<u>550</u>
TOTALS	4,499	4,530	4,692	4,816	5,137	5,711	6,549	6,255

<sup>a</sup>(L) = Less than ten Wage and Salary jobs.

<sup>b</sup>(D) = Not shown to avoid disclosure of confidential data (included in totals).

<sup>c</sup>Retail trade only. Wholesale trade not shown to avoid disclosure of confidential data (included in totals).

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (REIS).

insurance, and real estate sector (14.9 percent) and in the services sector (13.7 percent). Changes in employment in wholesale and retail trade during 1977-1979 cannot be determined from these data, however, because of disclosure limitations (Table 17).

When the increase in trade and service employment during the period 1974-1977 was compared to the change in project-related employment, the employment multiplier for project employment during this period was estimated to be 0.8.<sup>20</sup> That is, each project-related worker living in McLean County generated about 0.8 additional jobs in the local trade and service sectors. The additional trade and service employment associated with Coal Creek development was estimated to be about 270 jobs.

The estimated increase in local trade and service employment in McLean County can be compared with the changes in trade and service employment incorporated in earlier projections. The NDSU study used an estimate of 622 new secondary (i.e., local trade and service) jobs in the region.<sup>21</sup> The buildup of secondary jobs was projected to occur over the period 1975-1978 with the estimate for 1977 being 394 jobs. Two-thirds of these jobs were projected to be filled by local workers, and the remainder by relocating (immigrating) workers. The relocating secondary workers were expected to move primarily to Bismarck-Mandan (67 percent) and to Washburn and Underwood (10 percent each), but the distribution of the remaining secondary jobs (those filled by local workers) between McLean County and the regional trade centers was not estimated. More recent projections by REAP incorporated an estimate of 438 new indirect jobs associated with the Coal Creek Station in 1977, but only 156 of these jobs were estimated to be located in McLean County.<sup>22</sup>

When these projections are compared with the estimated increase in McLean County trade and service employment over the period 1974-1977, several points should be noted. First, because of the format in which they are presented (i.e., the location of jobs filled by local workers is not projected), the NDSU projections cannot be meaningfully compared with the data on actual changes. Secondly, the REAP projections appear to have underestimated the actual secondary

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<sup>20</sup>Gilmore, et al., 1980.

<sup>21</sup>Toman, et al., 1976.

<sup>22</sup>North Dakota Regional Environmental Assessment Program, Unpublished printout, Bismarck, North Dakota, 1979.

employment effects in McLean County. Whether this is because the overall regional effects were underestimated or because too small a percentage of the estimated secondary employment effects for the region were allocated to the county is difficult to determine. (Some underestimation of secondary employment effects would be expected, of course, given the initial underestimate of construction labor requirements and hence construction payrolls. As noted earlier, payrolls typically account for the majority of total local expenditures of such projects.) Thirdly, the retrospective estimates of secondary employment effects are not precise and are based on assumptions concerning the employment changes in various sectors which would have occurred in the absence of development.<sup>23</sup> Finally, it must be concluded that the secondary employment effects of resource development projects are not well understood and that the magnitude of these effects, their distribution over time and among communities, and the characteristics of the workers who fill the new jobs are topics requiring further analysis.

#### Development of Trade and Service Facilities

Construction of the Coal Creek Station provided a substantial stimulus for the expansion of trade and service facilities in the impact area. The general pattern which emerges from analysis of the project's effects on trade and service establishments is that a high percentage of the workers' purchases were made from establishments in Bismarck-Mandan. The impact of the project on trade and service establishments in McLean County was thus much less than would have occurred had the project been sited in a more isolated area.

During the period 1974-1978, the trade and service sectors in McLean County experienced a slight growth in total number of firms (5.5 percent) and moderate growth in number of employees (34.1 percent) and in total payroll (71.9 percent) (Table 18). The average number of employees per establishment also increased (27.0 percent) as did the average payroll per employee (28.2 percent). The growth in these categories has clearly been substantial, and much of this growth can probably be attributed to the influence of the Coal Creek project. It should be noted, however, that the county's growth rate during this period exceeded that of the state in only three of the five categories--number of employees, annual payrolls, and employees per establishment (Appendix Table 7).

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<sup>23</sup>Gilmore, et al., 1981.

TABLE 18. NUMBER OF ESTABLISHMENTS, EMPLOYEES, AND PAYROLL, MCLEAN COUNTY  
TRADE AND SERVICE FIRMS, 1974-1979

Item	Year						Change, 1974-1978	
	1974	1975	1976	1977	1978	1979	Amount	Percent
Number of establishments:								
Wholesale Trade	43	40	38	38	38	42	-5	-11.6
Retail Trade	82	83	81	95	90	88	+8	+9.8
Finance, Insurance, and Real Estate	14	16	18	19	19	19	+5	+35.7
Services	44	45	45	47	46	48	+2	+4.5
<u>TOTAL</u>	<u>183</u>	<u>184</u>	<u>182</u>	<u>199</u>	<u>193</u>	<u>197</u>	<u>+10</u>	<u>+5.5</u>
Number of employees:								
Wholesale Trade	201	218	217	188	209	265	+8	+4.0
Retail Trade	294	313	357	386	436	429	+142	+48.3
Finance, Insurance, and Real Estate	57	66	68	84	96	0 <sup>a</sup>	+39	+68.4
Services	290	323	339	366	388	434	+98	+33.8
<u>TOTAL</u>	<u>842</u>	<u>920</u>	<u>981</u>	<u>1,024</u>	<u>1,129</u>	<u>---</u>	<u>+287</u>	<u>+34.1</u>
Annual Payroll (\$1,000):								
Wholesale Trade	1,469	1,807	1,900	1,876	1,923	2,597	+454	+30.9
Retail Trade	1,309	1,423	2,185	2,173	2,483	2,752	+1,174	+89.7
Finance, Insurance, and Real Estate	401	548	618	800	900	0	+499	+124.4
Services	1,227	1,569	1,841	1,987	2,267	2,629	+1,040	+84.8
<u>TOTAL</u>	<u>4,406</u>	<u>5,347</u>	<u>6,544</u>	<u>6,836</u>	<u>7,573</u>	<u>---</u>	<u>+3,167</u>	<u>+71.9</u>
Average Number of Employees per Establishment:								
Wholesale Trade	4.67	5.45	5.71	4.95	5.50	6.31	+0.83	+17.8
Retail Trade	3.59	3.77	4.41	4.06	4.84	4.88	+1.25	+34.8
Finance, Insurance, and Real Estate	4.07	4.13	3.78	4.42	5.05	---	+0.98	+24.1
Services	6.59	7.18	7.53	7.79	8.43	9.04	+1.84	+27.9
<u>TOTAL</u>	<u>4.60</u>	<u>5.0</u>	<u>5.39</u>	<u>5.15</u>	<u>5.84</u>	<u>---</u>	<u>+1.24</u>	<u>+27.0</u>
Average Payroll per Employee (dollars):								
Wholesale Trade	7,308	8,289	8,756	9,979	9,201	9,800	+1,893	+25.9
Retail Trade	4,452	4,546	6,120	5,630	5,695	6,415	+1,243	+27.9
Finance, Insurance, and Real Estate	7,035	8,303	9,088	9,524	9,375	---	+2,340	+33.3
Services	4,231	4,858	5,431	5,489	5,843	6,058	+1,612	+38.1
<u>TOTAL</u>	<u>5,233</u>	<u>5,812</u>	<u>6,671</u>	<u>6,676</u>	<u>6,708</u>	<u>---</u>	<u>+1,475</u>	<u>+28.2</u>

<sup>a</sup>0 indicates data are not presented to avoid disclosure of confidential data.

SOURCE: U.S. Department of Commerce, Bureau of the Census, County Business  
Patterns, North Dakota, (Washington, D.C.: U.S. Government Printing Office,  
1974-1979 issues).

An analysis performed by the University of Wyoming also suggests substantial increases in both the number of McLean County trade and service establishments and the gross sales per establishment during the early years of Coal Creek construction (Appendix Table 8).

Interviews with local business and community leaders provided additional information concerning growth of the local trade and service sector. Several new businesses were established in both Washburn and Underwood during the project construction period, and many local leaders cited the construction stimulus to the local economy as one of the major factors contributing to the growth. The consensus, however, was that most major consumer purchases were made from Bismarck establishments with local firms filling largely a convenience function. Most of the new or expanded trade and service facilities were operated by local people or by individuals native to the area who had returned in response to the new opportunities. Competition from new firms was not often mentioned as a problem except in Washburn where a new restaurant has provided stiff competition for two existing establishments.

Development of energy-linked industry in McLean County has been modest to date.<sup>24</sup> Two mining supply firms (Austin Powder Company and Hawkins Chemical Company) have established outlets in the county. If additional energy-linked businesses are established in the area, the decision is expected to be more in response to the overall level of energy development activity than to this particular project.

An aspect of the project's development that was a matter of concern for many local residents was the intense competition for labor and resulting increases in wage and salary levels.<sup>25</sup> As has been observed in many energy development areas, initiation of construction activities led to a substantial increase in the demand for local labor. Both local business establishments and public agencies found it difficult to compete with the project for skilled, experienced workers, and so lost some of their most valuable employees. Local businesses had difficulty in

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<sup>24</sup>Energy-linked industry is defined as those firms which supply inputs directly to, or process the products and by-products of, energy extraction and conversion facilities. For a more detailed discussion, see Murdock and Leistritz, 1979.

<sup>25</sup>Gilmore, et al.. 1980.



competing with the wage levels offered at the site, and in order to compensate had to raise their prices. Not surprisingly, higher prices for locally purchased goods and services (for example, groceries) was another problem frequently cited by the local leaders who were interviewed. (In evaluating these expressions of concern, however, it is also necessary to bear in mind not only that the average trade and service payroll per employee in 1978 was substantially lower for McLean County than for the state as a whole but also that the rate of growth of this indicator for the period 1974-1978 was much lower for the county than for the state [Table 18 and Appendix Table 7].)

### Other Economic Impacts

Changes in a number of economic indicators for McLean County and the entire six county Coal Creek Station impact area are summarized below:

Indicator <sup>26</sup>	McLean County			Six County Impact Area		
	1970	Most Recent	Percent Change	1970	Most Recent	Percent Change
Personal income (millions)	\$31.1	\$70.0 (1977)	+125.1%	\$459.8	\$999.0 (1977)	+117.3%
Per capita income	\$2,755.0	\$5,720.0 (1977)	+107.6	\$3,288.0	\$6,353.0 (1977)	+93.2
Taxable Sales (based upon sales tax collections-millions)	\$21.3	\$65.0 (1979)	+205.2	\$507.0	\$1,458.4 (1979)	+187.7
Commercial bank deposits (millions)	\$20.2	\$62.1 (1979)	+207.4	\$259.4	\$826.3 (1979)	+218.5
Savings and Loan association savings (millions)	---	\$10.1 (1980)	---	\$188.1	\$442.2 (1980)	+135.1

For all of the indicators listed, except commercial bank deposits, McLean County's rate of growth exceeded that of the region.

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<sup>26</sup>For detailed data and sources, see Appendix Tables 9, 10, 11, and 12.

### Population Effects

The construction of the Coal Creek Station led to substantial population growth in several McLean County communities (Table 19). The county's population

TABLE 19. POPULATION AND POPULATION CHANGE OF SELECTED MCLEAN COUNTY COMMUNITIES, 1970 AND 1975-1980

Community	Population <sup>a</sup>							Population Change, 1970-1980 (percent)
	1970 <sup>b</sup>	1975 <sup>c</sup>	1976	1977	1978	1979	1980 <sup>b</sup>	
Washburn	804	819	1,323	1,397 <sup>d</sup>	1,690	1,745 <sup>d</sup>	1,767	119.8
Underwood	781	789	1,092	1,152 <sup>d</sup>	1,425	1,175	1,329	70.2
Garrison	1,614	1,574	1,650	1,760	1,840	1,889 <sup>d</sup>	1,830	13.4
Turtle Lake	712	742	724	775	818 <sup>d</sup>	820	707	- 0.7
Coleharbor	78	114					150	92.3
Wilton	695	785					950	36.7
McLean County	11,251	11,662	12,389	12,984	13,673	13,429	12,288	9.2

SOURCE: <sup>a</sup>Population figures not footnoted are from Gilmore, et al., 1980.

<sup>b</sup>U.S. Census of Population, 1970 and 1980.

<sup>c</sup>Current Population Reports, Series P-25, No. 682 (Washington, D.C.: U.S. Census Bureau, 1977).

<sup>d</sup>From special censuses.

increased 9.2 percent between 1970 and 1980. Washburn and Underwood experienced the greatest population growth with population increases of 120 percent and 70 percent respectively between 1970 and 1980. Garrison, Turtle Lake, and other McLean County communities experienced lesser population impacts.

An interesting feature of the population changes associated with the Coal Creek construction period is that the population decline at the end of the construction period was very modest. Two factors may account for this phenomenon. First, as the construction work force decreased, the permanent work force increased. Permanent workers tend to live in communities closer to the

project site than is the case for construction workers, and the average number of dependents per worker is greater for a permanent work force.<sup>27</sup> Because of these characteristics, the influx of population associated with the buildup of the permanent work force may have offset a substantial part of the outmigration of construction workers and their dependents. Secondly, it appears that a substantial portion of the Coal Creek construction work force may have remained in McLean County and obtained employment at power plant construction sites in Mercer County. For example, it is reported that during August 1981, 259 of the workers employed at Mercer County construction projects were commuting daily from McLean County.<sup>28</sup>

Projected and actual population impacts for McLean County communities are compared in Table 20. The initial population projections prepared by North

TABLE 20. PROJECTED AND ACTUAL POPULATION IMPACTS OF THE COAL CREEK STATION, MCLEAN COUNTY COMMUNITIES, 1978

Community	Projected		Actual <sup>c</sup>
	NDSU <sup>a</sup>	REAP <sup>b</sup>	
Washburn	572	1,040	885
Underwood	556	710	661
Garrison	91	62	266
Turtle Lake	85	38	120
McLean County	1,585	1,995	2,745

SOURCES: <sup>a</sup>Toman, et al., 1976.

<sup>b</sup>North Dakota Regional Environmental Assessment Program, Unpublished printout, Bismarck, North Dakota, 1977. (Projection based on 1978 construction work force peak level of 1,800.)

<sup>c</sup>Gilmore, et al., 1980.

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<sup>27</sup>J. S. Wieland, F. L. Leistritz, and S. H. Murdock, "Characteristics and Residential Patterns of Energy-Related Work Forces in the Northern Great Plains," Western Journal of Agricultural Economics, 4; July 1979, pp. 57-68.

<sup>28</sup>Curt Pearson, ITAT Construction Work Force Report for August 1981, (Bismarck, North Dakota: Interindustry Technical Assistance Team, 1981).

Dakota State University underestimated the McLean County population impact by about 40 percent. This underestimate was in turn attributable to the underestimation of project work force requirements. Subsequently, projections from REAP utilized more realistic employment estimates but still underestimated the impacts on McLean County. The REAP projections also substantially underestimated impacts on Garrison and Turtle Lake but overestimated impacts on Washburn.

### Public Service Effects

Population growth associated with the construction of the Coal Creek Station led to increased demands on a variety of public services and facilities, including: (1) schools, (2) housing, (3) water and sewer, (4) public safety, (5) transportation, and (6) social services.

#### Schools

Substantial increases in school enrollment in the Washburn and Underwood School Districts during the period 1975-1979 can be attributed directly to construction of the Coal Creek Station. Changes in school enrollments for four McLean County school districts are summarized in Table 21, together with estimates of the enrollments which would have been experienced had the project not been built. Without the project, these districts were expected to experience enrollment decreases of about 10 percent over the period. Actual enrollment changes ranged from an increase of 46 percent for the Washburn District to a decrease of 7 percent for the Turtle Lake-Mercer District.

Both the Washburn and Underwood districts built additions to their schools to accommodate enrollment increases. The greatest increase for both has been in the elementary grades. Washburn financed its nine-room addition through a Coal Impact Office grant and a loan from the State School Construction Fund, and by increasing its mill levy by another 10 mills. Additions to the Underwood Elementary School were financed through a combination of local bond issues, Coal Impact Office grants, and state loans. Over the period 1975-1980, the Washburn School District received a total of \$569,356 in grants from the Coal Impact Office (Appendix Table 13). During the same period, the Underwood School District received a total of \$520,845 in Coal Impact Office grants, as well as a loan of \$34,601 from the Coal Severance Tax Trust Fund.

TABLE 21. SCHOOL ENROLLMENTS FOR MCLEAN COUNTY SCHOOL DISTRICTS, 1974-1975 TO 1980-1981

School District	School Year						
	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Washburn:							
Actual	328	361	383	448	480	474	499
Without Project	<u>328</u>	<u>319</u>	<u>310</u>	<u>302</u>	<u>294</u>	<u>286</u>	<u>278</u>
Difference	0	42	73	146	186	188	221
Underwood:							
Actual	270	266	280	324	378	395	392
Without Project	<u>270</u>	<u>263</u>	<u>256</u>	<u>249</u>	<u>242</u>	<u>235</u>	<u>228</u>
Difference	0	3	24	75	136	160	164
Wilton:							
Actual	308	295	319	312	317	302	323
Without Project	<u>308</u>	<u>300</u>	<u>292</u>	<u>284</u>	<u>276</u>	<u>268</u>	<u>260</u>
Difference	0	-5	27	28	41	34	63
Turtle Lake-Mercer:							
Actual	401	404	398	381	372	365	358
Without Project	<u>401</u>	<u>390</u>	<u>379</u>	<u>369</u>	<u>359</u>	<u>349</u>	<u>339</u>
Difference	0	14	19	12	13	16	19
Total Additional Enrollment	0	54	143	261	376	398	467

SOURCES: Actual enrollments are from North Dakota Educational Directory, Department of Public Instruction, Bismarck, North Dakota, 1973-74 to 1980-81. Enrollments without the project were estimated by assuming that enrollment in each district would follow a trend similar to that estimated by Murdock and Ostenson, 1976, for McLean County school age population for the period 1975-1980.

The Wilton School District has been able to absorb its small increases in enrollment due to the Coal Creek Station and the Falkirk Mine because of declining enrollment in years prior to energy development. Also, a new elementary school built prior to Coal Creek helped to minimize potential problems. Any impacts from pupils new to the Turtle Lake-Mercer system because of Coal Creek or the Falkirk Mine were offset due to the district's declining enrollment.

A comparison of projected and actual enrollment impacts for selected McLean County school districts is shown in Table 22. While a tendency to underestimate the effects on the Turtle Lake-Mercer and Wilton districts is evident, the projected and actual enrollments for Underwood and Washburn were quite similar.

TABLE 22. PROJECTED AND ACTUAL SCHOOL ENROLLMENT IMPACTS OF THE COAL CREEK STATION, SELECTED MCLEAN COUNTY COMMUNITIES, 1978-1979

School District	Projected <sup>a</sup>	Actual <sup>b</sup>	Difference	
			Number	Percent
Turtle Lake-Mercer	5	13	- 8	-61.5
Underwood	130	136	- 6	- 4.4
Washburn	203	186	+17	+ 9.1
Wilton	<u>5</u>	<u>41</u>	<u>-36</u>	<u>-87.8</u>
TOTAL	343	376	-33	- 8.8

SOURCE: <sup>a</sup>North Dakota Regional Environmental Assessment Program, Unpublished printout, Bismarck, North Dakota, 1977.

<sup>b</sup>See Table 20.

### Housing

The demand for housing in McLean County has fluctuated with employment at the Coal Creek Station. Until the mid-1970's housing demand in the county was declining with the population. By 1975, the year construction began on Coal Creek, demand for housing in McLean County had begun to rise. This upward trend continued and finally peaked in 1978, the year of peak employment at Coal Creek.

Housing demand later tapered off and began to stabilize as the project neared completion. With the construction work force gone, demand is primarily for conventional single-family homes.

The types of housing utilized by the Coal Creek construction work force were examined in the work force survey conducted in 1976. The survey indicated that the work force made substantial use of four types of housing: single-family houses, apartments, mobile homes, and other temporary quarters (Table 23). The survey results are also compared with projected housing patterns in Table 23.

TABLE 23. ACTUAL AND PROJECTED DISTRIBUTION OF HOUSING FOR CONSTRUCTION WORKERS IN MCLEAN COUNTY, 1976

Type of Housing	McLean County	
	Projected <sup>a</sup>	Actual <sup>b</sup>
Single Family	20%	17%
Apartments	20	21
Mobile Homes	60	30
Temporary (motels, recreational vehicles, boarding houses)	--	<u>32</u>
TOTALS	100%	100%

SOURCE: <sup>a</sup>Toman, et al., 1976.

<sup>b</sup>Institute for Policy Research, 1977.

Overall, the projections were quite accurate for the first two of the four housing categories. However, preferences for mobile homes were projected to be twice as high as they actually were, and no allowance was made for workers who preferred more temporary quarters such as rooming houses or recreational vehicles. The likely explanation is that an unexpectedly large proportion of the workers were weekly commuters. For workers whose permanent residences were in other parts of the state or in neighboring states, temporary quarters were apparently preferable to mobile homes, even though mobile home spaces were generally available (with the exception of the peak period in 1978) in McLean County.

Housing in McLean County was generally developed on a laissez faire basis once construction was underway, rather than in anticipation of the project. For example, the peak building year was in 1977, two years after construction had started on Coal Creek. Due to unexpected slippages in the construction schedule, there were at times too many permanent single-family homes and too few temporary quarters. However, the general consensus of local observers is that imbalances in the market were only temporary and that housing has never been a serious problem.<sup>29</sup>

Although there has not been a total absence of local entrepreneurial skills in McLean County, local response has been fairly limited due to the modest production capability of the small developers in these communities. A typical local developer may only construct five or six single-family homes per year, and these are often custom-built homes. While local developers have been limited by inadequate working capital and labor, skepticism toward future demand has also acted as a constraint. Most of the trailer parks were constructed or expanded by local developers; generally because a shortage was already occurring, thereby reducing the financial risks.

Major housing projects in McLean County, including apartment buildings and subdivisions, have been undertaken by developers from larger cities such as Bismarck, Minot, or Fargo. These developers have usually obtained their financing outside of the local area. Nonlocal response has also lagged somewhat, often about a year from the time when the demand was sufficiently high for a given project. Even though there seemed to be sufficient demand for a type of bachelors' quarters in either Washburn or Underwood, there was no response, either from local or nonlocal developers.

New housing units developed in response to the increased demand associated with the Coal Creek project were located almost exclusively in or adjacent to McLean County's incorporated municipalities. This pattern of housing development was in large part the result of local growth management decisions and was enforced through county zoning. The development of new housing in rural areas of the county was discouraged primarily because of difficulties in providing services to residents in such areas.

Land availability was not a direct constraint to housing supply. The single lots in the older sections of communities were absorbed most rapidly,

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<sup>29</sup>Gilmore, et al., 1980.



causing most larger housing developments to take place on the outskirts of town. The cost of lots rose steeply though, due to some speculation and the extra costs of extending utilities to the building sites.

Housing prices in McLean County increased considerably during the Coal Creek construction period. While much of this increase has been attributed to the project, it should be remembered that this period was one of rapidly escalating housing prices nationwide. Charges for rental units reportedly tripled during the Coal Creek construction period, and prices of single-family homes doubled, ranging from \$45,000 to \$85,000, but averaging \$50,000. Rising housing costs have been a problem for the elderly and other low-income individuals (primarily predevelopment residents of the area), and low-income rental units have recently been built in some communities.

Due to growth from the Coal Creek project the communities in McLean County had their water and sewer systems expanded and upgraded. Generally, the developers had to lay water and sewer pipes out to their subdivisions if they were not there already. A few of the local developers cited this as one of their major problems.<sup>30</sup>

#### Water and Sewer

Both Washburn and Underwood needed to substantially expand their water and sewer systems to accommodate the needs of a growing population. In both communities the existing facilities were less than adequate to meet the needs of the existing population, and substantial capital expenditures were required to upgrade the facilities. Grants from the state Coal Impact Office were important in financing these facilities in both towns. Over the period 1975-1980, Washburn received a total of \$329,775 for water and sewer facilities while Underwood received grants totaling \$225,014 for similar purposes.

The towns of Turtle Lake and Wilton also expanded their sewage treatment facilities during the Coal Creek construction period, and both received some assistance from the Coal Impact Office (Appendix Table 13).

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<sup>30</sup>Gilmore, et al., 1980.

## Public Safety

The McLean County Sheriff's Department not only serves the rural areas of the county but also provides law enforcement services by contract to all the communities. In addition, from 1975 to mid-1979, the Sheriff's Department was responsible for security at the Coal Creek site under contract with UPA/CPA. Statistics reflecting the activities of the department from 1974 to 1980 are summarized in Table 24. The biggest increases were in the number of people logged into jail, in civil services, and in arrests, including juvenile offenses. Accidents investigated went up 51 percent. The other two categories also increased.

The most notable impact of the Coal Creek project on local law enforcement services resulted from the substantial increase in traffic on U.S. Highway 83, the principal access route to the site from Bismarck and Minot. The Sheriff's Department added additional officers and vehicles to more effectively control the increased traffic and to cope with other demands for increased services. The department staff increased from 13 in 1974 to 23 in 1979 and 25 in 1980, and then dropped to 23 in 1981.

The substantial increases in arrests and in numbers of persons jailed during the construction period also were primarily associated with traffic-related problems. Sheriff's Department personnel indicated that the offenses which most frequently led to incarceration were Driving While Intoxicated (DWI) and Driving While Under Suspension (DWUS). Persons arrested for DWI were often placed in jail for a period of detoxification and were thus reflected in the jail log even though they were not sentenced to jail terms. The Sheriff's Department also indicated that county judicial policies in effect during 1978 and 1979 placed increased emphasis on short jail sentences for a number of offenses and that this policy change substantially increased the number of persons jailed.

The Coal Impact Office provided much of the funding needed to expand the county's law enforcement capabilities. Over the period 1975-1980, Coal Impact Office grants totaling \$806,939 were received by the county for law enforcement functions. In addition, the Sheriff's Department increased the amounts charged to the towns for contract services. For example, Washburn's fee went from \$10,800 for fiscal year 1975 to \$19,800 for fiscal year 1980.

The Sheriff's Department has experienced some difficulty in retaining its officers because of the pay scales offered by the county. Base pay for a trained

TABLE 24. SHERIFF'S DEPARTMENT CASES FOR MCLEAN COUNTY, 1974-1980

	1974	1975	1976	1977	1978	1979	1980	Change, 1974-1980	
								Number	Percent
Civil Services	285	274	335	590	574	492	549	264	92.6
Arrests and Juvenile	583	725	1,162	1,286	2,369	1,338	1,105	522	89.5
Accidents Investigated	154	223	205	217	277	325	233	79	51.3
Jail Log (Prisoners)	32	74	123	141	161	183	133	101	315.6
Miles Traveled	168,987	216,000	265,766	261,000	269,354	279,368	249,735	80,748	47.8
Offences Reported (Complaints)	446	566	433	462	558	613	517	71	15.9

SOURCE: McLean County Sheriff's Office, County Courthouse, Washburn, North Dakota, 1981.

officer increased from about \$750 in 1974 to \$1,000 per month in 1979. But this was still barely enough to cover living expenses. The pay differential was the main reason the department made a bid to provide security at the construction site. An outside security company might have drawn away most of its officers by offering higher wages.

Population growth associated with the Coal Creek Station also led to increased needs for fire protection and emergency services (e.g., ambulance). Washburn, Underwood, Garrison, and Wilton all expanded their service capabilities in this area during the project construction period, and Washburn moved from a volunteer fire department to one with paid personnel. As in other service areas, grants from the Coal Impact Office covered a substantial portion of the costs of additional facilities. Grants received by McLean County jurisdictions during the period 1975-1980 for fire and emergency equipment totaled \$120,058.

#### Transportation

A major problem for the county during the period of project construction was deterioration of the county road system. Movement of large trucks and other heavy equipment on roads near the plant and mine sites caused substantial damage to these road segments. In addition, trucks hauling gravel to the site from various locations in the county contributed to increased road repair requirements. During the early years of project construction, the County Commissioners viewed the road situation as their most serious impact problem and believed that the developers, the state, and the federal government were all ignoring the problem.<sup>31</sup>

Once the bulk of the gravel hauling and heavy equipment movement had been completed, UPA/CPA and the Falkirk Mine made substantial repairs and improvements on several roads near the plant and mine sites. At about the same time, the state Coal Impact Office provided substantial grant funds for road repair and improvement. These grants totaled \$746,884 during the period 1975-1980, of which \$460,000 was received in late 1979 and 1980. By mid-1981, it appeared that the McLean County road problems had been substantially alleviated.

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<sup>31</sup>Gilmore, et al., 1980.

### Social Services

Utilization of various social service programs by McLean County residents is summarized in Table 25. Examination of this table reveals few clear trends in service utilization, except for the Child Abuse and Neglect Program. The number of such cases reported in McLean County increased from nine in fiscal year (FY) 1975-76 to 31 in FY 1980-81. Further examination of child abuse reports indicates that much larger increases in such cases have been observed in McLean and Mercer Counties than in other nearby counties and that the rates of such cases per 1,000 population in FY 1980-81 were also greater in McLean and Mercer Counties (Appendix Table 14). State Social Service Board personnel responsible for this program expressed the opinion that part of the increase could be attributed to the effects of power plant development. In particular, feelings of isolation experienced by some new residents and economic stress imposed on some existing residents by project-induced increases in living costs were believed to be contributing factors.

When interviewed in 1979, the director of the McLean County Social Services Department indicated that, while some increases in social service case loads could be attributed to power plant development, the most severe problem for this department came from cuts the federal government made in the funding of Title XX programs. This forced the department to reduce the number of social workers to three, averaging about 50 cases per person. Categories of programs were not cut from services; rather the group continued to offer a variety of services but was forced to become totally crisis-oriented, offering no preventive programs. Money from the Coal Impact Office was not available for social service programs (because of specific restrictions incorporated in the enabling legislation).

### Fiscal Effects

An important aspect of the effects of any resource development project is the change it produces in the revenues and expenditures of local governmental units. The principal fiscal effects of the Coal Creek Station are presented in this section. First, the major taxes which can be expected to provide additional revenues to local governments in coal development areas are reviewed. Secondly, a summary of the major categories of revenues which McLean County and its cities and school districts received as a result of development of the Coal

TABLE 25. SOCIAL SERVICE CHARACTERISTICS IN MCLEAN COUNTY

Social Service	Year	
<u>Aid to Families with Dependent Children</u>	<u>FY1975</u>	<u>FY1980</u>
Number of Families	102	106
Number of Recipients	311	309
Number of Adults	80	83
Number of Children	231	226
Persons per Family	3.06	2.92
Total Amount Paid	\$244,120.00	\$324,580.50
Monthly Payment per Family	200.26	265.18
Monthly Payment per Recipient	65.50	95.92
<u>Food Stamp Program</u>	<u>FY1979</u>	<u>FY1980</u>
Total Payments	\$108,191.00	\$150,745.00
<u>Child Abuse and Neglect Program</u>	<u>FY1975-1976</u>	<u>FY1980-1981</u>
Number of Reports	9	31
<u>Foster Care</u>	<u>FY1979</u>	<u>FY1981</u>
Number of Children	30	24
Total Months of Care	1,591	1,099
Average Number of Months of Care	53	46

SOURCE: Social Service Board of North Dakota, State Capitol, Bismarck, North Dakota.

Creek Station and Falkirk Mine is presented. Thirdly, a comparison of the revenues and expenditures of McLean County and the communities of Washburn and Underwood over the period 1975-1980 is presented. Finally, a comparison of the actual net fiscal impacts of the project with those projected early in the construction period is presented.

### Local Revenue Sources

State and local taxes that provide additional revenues to North Dakota communities affected by coal resource development and related population growth include the following:

1. Coal severance tax--As discussed earlier, a severance tax with a base rate of \$0.85 per ton (indexed to inflation) is applied to all coal mined in the state.<sup>32</sup> The proceeds of the tax are then distributed to the state general fund (30 percent), the Coal Impact Fund (35 percent), the Coal Severance Tax Trust Fund (15 percent), and the county where the coal is mined (20 percent). The county's share is then further distributed to the county general fund (40 percent), the incorporated municipalities (30 percent), and the school districts (30 percent).

The Coal Impact grant and loan programs have been a key component of the state's effort to assist impacted communities. During the period 1975-1980, a total of \$17,624,292 was granted by the Coal Impact Office to various political subdivisions in the coal impact area (Appendix Table 15). During the same period, \$4.2 million in coal trust fund loans were issued. Thus, the state's severance tax/impact finance program made more than \$21.8 million of "front-end financing" available to communities affected by coal development.

2. Coal conversion tax--A tax rate of 0.25 mills per kilowatt-hour of electricity produced for sale is applied to electric generating plants with a capacity of 120 MW or greater. The proceeds are allocated to the state general fund (65 percent) and the county where the facility is located (35 percent). The county's share is further subdivided using the same formula which applies to the coal severance tax.

3. Ad valorem property taxes--Coal mines and power plants are largely exempt from local property taxes in North Dakota. For mines, taxes are levied only on the land, buildings, and other permanent improvements, and for plants, only on the land on which the facility is located. Thus, the local property taxes paid by these facilities are very modest.<sup>33</sup> Local jurisdictions experiencing population growth caused by energy development can, however, expect some increases in their tax bases as new residential and business property is added to the tax roles.

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<sup>32</sup>After adjustment for inflation, the effective severance tax rate in the second quarter of calendar year 1981 was \$0.96 per ton.

<sup>33</sup>For a more detailed discussion, see S. W. Voelker, State and Local Taxes Affected by Energy Developments in Selected Western States, EPA-600/7-81-005, (Washington, D.C.: U.S. Government Printing Office, 1981). S. W. Voelker, F. R. Taylor, and T. K. Ostenson, The Taxation and Revenue System of State and Local Government in North Dakota (revised), Ag. Econ. Rpt. No. 128, (Fargo: North Dakota Agricultural Experiment Station, 1978).

4. User fees--These charges are assessed by municipalities primarily to cover the cost of providing water, sewer, and solid waste services. User fee revenues should be responsive to local population growth.

5. Special assessments--These charges are imposed principally by municipalities to pay for capital improvements, usually in the areas of streets and roads, water and sewer, and solid waste disposal. While special assessment revenues potentially can be responsive to growth, voter approval generally must be obtained, and this can require substantial lead time.

6. Transfer payments--Included in this category are school foundation program payments, federal revenue sharing, highway fund payments, and cigarette and tobacco tax distributions. Revenues from all of these sources should increase as a community's population grows. Substantial time lags may occur, however, before local population growth affects the community's allocation under these programs. Further, the specific factors considered by a particular program's distribution formula (e.g., local tax effort) may have a substantial effect on the amount of additional revenue, if any, which an impacted community will receive from these programs.

#### McLean County Revenues

Coal Impact Office grants were a substantial source of additional revenue for McLean County and its municipalities and school districts during the Coal Creek construction period. McLean County jurisdictions received a total of \$5.38 million of such grants during the period 1975-1980 (Table 26). Other coal-related revenues accruing to McLean County jurisdictions during this period included coal trust fund loans (\$790,129), coal severance tax distributions (\$763,679), and coal conversion tax distributions (\$287,329).

Coal impact grants and loans clearly played a key role in alleviating the potential fiscal problems of McLean County jurisdictions. These fiscal resources not only were substantial in magnitude but also were available early in the project construction period when the need for front-end financing of public facilities and services was particularly great (Appendix Table 13). Another factor which increased the utility of the coal impact grants and loans in meeting local needs was that the review process was generally expeditious. Once needs were clearly identified, funding decisions could be made with only limited delay.

Local property taxes were another source of increased revenue for local governments in McLean County. The assessed valuation for McLean County and for the towns of Washburn, Underwood, Wilton, Garrison, and Turtle Lake for the period 1974-1980 are shown in Table 27. The county's total assessed valuation



TABLE 26. COAL IMPACT FUND GRANTS, COAL SEVERANCE TAX TRUST FUND LOANS, COAL SEVERANCE TAX DISTRIBUTIONS, AND COAL CONVERSION TAX DISTRIBUTIONS RECEIVED BY MCLEAN COUNTY JURISDICTIONS, 1975-1980

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Coal Impact Fund Grants: <sup>a</sup>	
McLean County	\$1,995,991.00
City of Washburn	755,776.00
Washburn School District	569,356.00
Washburn Park Board	54,554.00
City of Underwood	708,456.00
Underwood Fire District	37,800.00
Underwood School District	520,845.00
Underwood Park Board	60,995.00
City of Wilton	150,700.00
Wilton School District	190,000.00
Wilton Park Board	16,090.00
Wilton Fire District	7,750.00
City of Turtle Lake	106,379.00
City of Garrison	36,693.00
Other McLean County Jurisdictions	165,400.70
TOTAL, McLean County Jurisdictions	<u>\$5,376,785.70</u>
Coal Severance Tax Trust Fund Loans: <sup>b</sup>	
City of Underwood	\$ 338,820.66
Underwood School District	34,601.49
City of Washburn	337,231.15
City of Max	79,476.13
TOTAL, McLean County Jurisdictions	<u>\$ 790,129.43</u>
Coal Severance Tax Distributions: <sup>c</sup>	
TOTAL, McLean County Jurisdictions	\$ 763,679.39
Coal Conversion Tax Distributions: <sup>c</sup>	
TOTAL, McLean County Jurisdictions	<u>\$ 287,329.94</u>
TOTAL, Grants, Loans, and Tax Distribution	<u>\$7,217,924.46</u>

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SOURCES: <sup>a</sup>Coal Development Impact Office, 1979-81 Biennium Legislative Report, December 4, 1980. (Bismarck: Coal Development Impact Office, 1980.)  
<sup>b</sup>State Land Department, "Coal Severance Tax Trust," (Bismarck: State Land Department, 1981).  
<sup>c</sup>North Dakota, Office of the Tax Commissioner, Unpublished worksheets, (Bismarck: Office of the State Tax Commissioner, 1981).

TABLE 27. ASSESSED VALUATION IN MCLEAN COUNTY AND SELECTED COMMUNITIES, 1974-1980

County/Community	Unit	Year							Percent Change, 1974-1980
		1974	1975	1976	1977	1978	1979	1980	
McLean County	Millions of dollars	25.1	25.4	25.7	30.5	31.2	32.5	33.1	+ 31.9
Washburn	Thousands of dollars	721	782	972	1,217	1,527	1,703	1,880	+160.7
Underwood	Thousands of dollars	538	610	652	884	1,041	1,328	1,386	+157.6
Wilton	Thousands of dollars	481	510	532	623	650	608	598	+ 24.3
Garrison	Thousands of dollars	1,331	1,439	1,411	1,604	1,627	2,052	2,140	+ 60.8
Turtle Lake	Thousands of dollars	479	503	509	543	590	695	726	+ 51.6

SOURCE: North Dakota State Tax Department, Statistical Report; Property Taxes Levied and Property Valuation, (Bismarck: North Dakota State Tax Department, 1970 through 1980 editions). Unpublished data obtained from Tax Department.

increased 31.9 percent during the period. Among the towns, Washburn and Underwood showed the greatest gains, 160.7 and 157.6 percent respectively. This pattern likely reflects the fact that most of the new residential and business property associated with Coal Creek development was built in Washburn and Underwood.

Changes in property tax collections in McLean County (including cities, school districts, and special purpose districts), for the period 1974-1979 are shown in Table 28. All categories of property tax collections increased during the period, as was true statewide. The greatest increase was in the special assessments category, reflecting the substantial capital improvements projects undertaken during this period. The overall increase in property tax collections was 67.5 percent. When this figure is contrasted with a statewide increase of 60.3 percent during the same period,<sup>34</sup> it appears that McLean County residents did not experience a substantial

<sup>34</sup>North Dakota State Tax Department, 1975 through 1980 editions.

TABLE 28. PROPERTY TAXES LEVIED BY MCLEAN COUNTY JURISDICTIONS, 1974-1979

Type of Tax	Year						Percent Change, 1974-1979
	1974	1975	1976	1977	1978	1979	
County General Property Taxes	601,883	651,367	664,135	784,305	803,863	887,791	+ 47.5
City General Property Taxes, Total	102,274	113,630	127,761	151,491	167,797	161,420	+ 57.8
School Taxes, Total	1,100,879	1,192,965	1,357,810	1,555,755	1,696,931	1,866,804	+ 69.6
Special Assessments	90,570	92,804	131,825	231,018	289,930	274,160	+202.7
Other Property Taxes	160,051	174,898	184,788	211,799	235,256	253,265	+ 58.2
Total General and Special Taxes and Special Assessments	2,055,657	2,225,664	2,466,319	2,934,368	3,193,777	3,443,440	+67.5

SOURCE: North Dakota State Tax Department, 1975-1980.

increase in their tax burdens during the Coal Creek construction period. This conclusion is supported when the property tax collections of Washburn and Underwood are examined:

<u>General Property Tax Collections</u>	<u>Washburn</u>	<u>Underwood</u>
FY 1974-75	\$15,644	\$14,918
FY 1979-80	35,583	21,878
Percent Change	+127.4%	+46.7%

Thus, in both communities, municipal budget data indicate that general property tax collections increased by a smaller percentage than assessed valuation (Table 27). For Washburn, these collections increased by only a slightly larger percentage than the population, while for Underwood, general property taxes grew by a substantially smaller percentage than the population (Table 19).

#### Comparison of Revenues and Expenditures

In this section, the additional revenues received by local governments in McLean County are compared with the additional costs these units incurred. Attention is focused on county government and on the towns of Washburn and Underwood where the most extensive project-related population growth occurred.

The McLean County general fund increased 144 percent during the five-year period 1975-1980. During that time, general government expenditures increased 110 percent (Table 29). A large expenditure increase was for public safety, up from \$171,000 in 1975 to \$487,000 in 1980, an increase of 185 percent. As mentioned earlier, coal impact grants have offset most of the increase in public safety expenditures. Revenues have kept up with expenditures on an operating basis, but the county experienced substantial shortfalls during the early years of Coal Creek construction in the area of capital improvements (primarily roads). This problem has now been substantially alleviated by coal impact grants.

Operating expenditures for the city of Washburn have remained relatively stable during the past five years. During fiscal year 1980, total operating expenditures were \$174,000. Of this amount, 37 percent went for general government operation, 37 percent for public works, 14 percent for public safety,

TABLE 29. GENERAL FUND REVENUES AND EXPENDITURES FOR MCLEAN COUNTY, FISCAL YEARS 1975-1980 (THOUSANDS OF DOLLARS)

	1975	1976	1977	1978	1979	1980
<u>Revenues</u>						
Beginning Balance <sup>a</sup>	\$ 269	\$ 244	\$ 232	\$ 77	\$ 247	\$ 280
Property Taxes	293	430	442	454	373	367
Other Revenues	185	457	751	834	1,046	1,178
<b>TOTAL</b>	<b>\$ 747</b>	<b>\$1,131</b>	<b>\$1,425</b>	<b>\$1,365</b>	<b>\$1,666</b>	<b>\$1,825</b>
<u>Expenditures</u>						
General Government	364	456	555	584	761	764
Public Safety	171	384	530	560	654	782
Relief and Charities	185	262	310	181	197	219
Other	27	29	30	40	54	60
<b>TOTAL</b>	<b>\$ 747</b>	<b>\$1,131</b>	<b>\$1,425</b>	<b>\$1,365</b>	<b>\$1,666</b>	<b>\$1,825</b>

<sup>a</sup>Although the county budgets to spend all revenues each year, in actual practice this does not happen. Therefore there is an annual surplus that becomes the beginning balance for the following years.

SOURCE: McLean County budgets, selected years.

and 11 percent for other expenditures. Property taxes accounted for 28 percent of total revenues and intergovernmental revenue transfers represented 43 percent of all operating revenues. The Coal Impact Office has contributed substantial capital financing grants, including monies for a new city hall, construction of the water treatment plant, and extension of the water and sewer lines. Through December 1980, Washburn received over \$755,000 from the Coal Impact Office. The Washburn public schools have received over \$569,000 in grants from the Coal Impact Office. The majority of these revenues have gone for construction of new classrooms and physical education facilities. These additions were made necessary by energy-related growth.

The general fund operating budget for Underwood is \$67,900 for fiscal year 1980. Operating expenditures have not increased significantly during the past five years. Since November 1975, over \$700,000 has been granted to Underwood through the Coal Impact Office. Major capital projects completed with these funds include sewer lift stations, sewer, water, and street improvements, and construction of a new city hall. Over \$500,000 has been granted to the

Underwood Public Schools for construction of a new elementary school, remodeling the high school, and construction of a vocational education building.

Overall, while McLean County jurisdictions experienced substantial increases in expenditures associated with construction of the Coal Creek Station, revenue sources have generally kept pace. Major sources of additional revenue have been coal impact grants and loans, property taxes, and, recently, coal severance and conversion tax distributions. No extraordinary fiscal burdens have been placed on local residents as a whole, primarily because of the coal impact grants and loans. It is possible, however, that specific groups, such as the elderly and low-income individuals, may have experienced some hardships resulting from increased property taxes and special assessments. Additional analysis of the distribution of project-related benefits and costs among various groups would clearly be desirable.

#### Comparison of Projected and Actual Impacts

Two sets of anticipatory projections prepared during the early stages of Coal Creek construction included estimates of the project's effects on revenues and expenditures of local governments.<sup>35</sup> It is difficult to compare these anticipatory projections directly with local budget data as the projections are expressed in terms of additional revenues and expenditures attributable to coal development while local budgets deal with total revenues and expenditures of the respective jurisdictions. An evaluation is possible, however, by comparing the net fiscal deficits (i.e., the extent to which increased revenues of local jurisdictions fail to cover increased costs incurred) projected in the anticipatory studies with the amount of grants and loans made to McLean County jurisdictions. [The validity of such a comparison rests largely on the assumption that the total amount of grants and loans is a reasonable measure of the additional fiscal burden placed on local jurisdictions. It appears to be the consensus of local officials and knowledgeable observers that this is in fact the case (i.e., grants and loans roughly offset the additional costs incurred, after taking increased tax revenues into account).<sup>36</sup>

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<sup>35</sup>See Toman, et al., 1976. North Dakota Regional Environmental Assessment Program, unpublished printouts, various issues, 1977-1978.

<sup>36</sup>Gilmore, et al., 1980.

The North Dakota State University study's estimate of cumulative net fiscal balance for McLean County jurisdictions for the period 1975-1980 was a negative \$1.88 million, expressed in 1972 price levels.<sup>37</sup> This figure was adjusted to the price levels of the period when the bulk of actual expenditures were made (using an escalation factor of 1.7) to give an adjusted value of -\$3.2 million. A comparable figure from the REAP projections is -\$3.9 million.<sup>38</sup> Both of these estimates of fiscal burden are a function of the amount of immigration projected to be associated with the project, and the immigration projections were in turn a function of the initial construction work force estimates. When the fiscal balance estimates are adjusted to take the differences in work force and immigration estimates into account, the following estimates are obtained:

	<u>NDSU Projection</u>	<u>REAP Projection</u>
Net fiscal balance, adjusted for inflation	-\$3.2 million	-\$3.9 million
Adjustment for difference in estimated and actual immigration (actual ÷ estimated) (from Table 19)	1.73	1.38
Adjusted fiscal balance	-\$5.5	-\$5.4

Both of the anticipatory analyses, then, provided estimates of net fiscal balance (fiscal burden) that were somewhat less than the total of grants and loans, even after adjusting for inflation and differences between estimated and actual levels of immigration. Examination of the assumptions and methods of these studies suggests that this difference is primarily attributable to the tendency of both studies to underestimate the additional costs incurred by McLean County, particularly in the areas of road maintenance and law enforcement.

To summarize, the comparison of projected and actual fiscal impacts indicates, as is true for other impact categories, the impact projections were conditioned by the initial estimates of construction work force requirements.

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<sup>37</sup>Toman, et al., 1976.

<sup>38</sup>REAP, 1977-1978.

Because the initial work force estimates were low, the net fiscal impacts on McLean County jurisdictions also were underestimated. After adjustment to take the differences in underlying immigration estimates into account, the methods and assumptions employed in the anticipatory analyses appear to provide a reasonable approximation of the fiscal burdens associated with development. The major shortcoming of both sets of anticipatory fiscal projections was their tendency to underestimate the costs of road maintenance and law enforcement incurred by the county government.

### Residents' Perceptions and Attitudes

Among the impacts of energy development most often dramatized in the press and evident in levels of public concern are those involving basic changes in the way of life, in the value systems, and in the forms of interaction in rural areas.<sup>39</sup> In this section, three studies dealing at least in part with McLean County residents' perceptions and attitudes regarding the effects of energy development are reviewed. The first of these studies was conducted by North Dakota State University personnel using survey data collected in 1975.<sup>40</sup> The second, conducted by a research team from the University of Wyoming, was based on data collected principally in 1977.<sup>41</sup> The third was based on data collected principally in 1979 and was conducted by personnel of the Denver Research Institute.<sup>42</sup> The three studies differed both in their scope and procedures and in the geographic detail with which the results were reported. These differences limit both the conclusions which can be drawn from a specific study and the comparisons which are possible between studies.

The North Dakota State University survey covered six communities that had already experienced some effects from coal development and could be expected to receive additional impacts in the near future. These towns were Washburn and

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<sup>39</sup>Murdock and Leistritz, 1979.

<sup>40</sup>Eldon C. Schriner, Faye Keogh, and Tom Gallagher, The Social Impacts Associated With An Electric Generating Plant Located in Mercer County, North Dakota, (Fargo: North Dakota State University, Department of Sociology, 1976).

<sup>41</sup>Institute for Policy Research, Socioeconomic Longitudinal Monitoring Project, Vol. 1 - Summary Report, (Laramie: University of Wyoming, 1978).

<sup>42</sup>Gilmore, et al., 1980.



Underwood in McLean County, Beulah, Hazen, and Stanton in Mercer County, and Center in Oliver County. Study participants responded to a number of questions concerning their perceptions of their present community environment and their views regarding the major benefits and problems associated with coal development, changes in community services, and other quality of life factors resulting from past energy development.

When asked, "Do you think your community is improving, staying about the same, or going downhill?" the total group of respondents answered as follows: "improving" (51.7 percent), "staying about the same" (36.3 percent), "going downhill" (10.0 percent), and "do not know" (2.0 percent). Residents of Washburn and Underwood were less likely to feel that their community was improving (37.7 percent) and more likely to feel it was staying about the same (52.2 percent).<sup>43</sup>

Responses of area residents concerning the benefits and problems associated with power plant construction are summarized in Table 30. The benefits most frequently mentioned were improved employment opportunities, community improvements associated with population growth, and increased business activity. Problems mentioned most frequently included public and community costs, friction between new and old residents, and increased competition for goods and labor. It is interesting to note that almost half (46.4 percent) of the respondents perceived no problems associated with development.

When queried concerning their attitudes toward selected aspects of development, almost two-thirds of the respondents in the three county area indicated they would be in favor of local zoning laws to control use of land for residential, community, or industrial purposes. This response is particularly significant because both McLean and Mercer Counties have since made extensive use of local zoning to control development patterns.

The University of Wyoming study included a household survey of McLean County residents.<sup>44</sup> The household survey was conducted in both 1976 and 1977 and included a number of questions designed to measure residents' attitudes and perceptions concerning energy development and its effects. The responses of McLean County residents were also compared with answers to the same questions

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<sup>43</sup>Schriner, et al., 1976.

<sup>44</sup>Institute for Policy Research, 1978.

TABLE 30. PERCEPTIONS OF WEST-CENTRAL NORTH DAKOTA RESIDENTS CONCERNING BENEFITS AND PROBLEMS ASSOCIATED WITH CONSTRUCTION OF POWER PLANTS, 1975

Item	Responses	
	Number	Percent
Benefits:		
Employment opportunities, etc.	45	28.1
Improved the community and increased population	35	21.7
Business revenues increased	28	17.4
Improved facilities and recreation	9	5.6
Increased tax base	1	0.5
Other	4	2.5
No benefits from development	<u>39</u>	<u>24.2</u>
TOTAL	161	100.0
Problems:		
Public and community costs	36	26.1
Problems between new and old residents	16	11.6
Increased competition for goods and labor	12	8.7
Physical environment concerns	8	5.8
Energy/agricultural conflicts	2	1.4
No drawbacks to development	<u>64</u>	<u>46.4</u>
TOTAL	138	100.0

SOURCE: Eldon C. Schriener, Faye Keogh, and Tom Gallagher, 1976, p. 90.

provided by residents of two "control counties." The control counties (Wheatland County, Montana, and Kimball County, Nebraska) were selected because they were similar to McLean County in various socioeconomic characteristics but were not expected to be influenced by major development projects during the study period. For reasons of brevity, only the findings of the 1977 survey are summarized here.

Salient findings of the study fall into the following categories: (1) perceptions of economic benefits, (2) perceptions of social changes, (3) concern regarding crime, and (4) satisfaction with community services. These findings are reported at the county level only, so it is not possible to compare the perceptions of residents of the various communities within McLean County.

Residents of McLean County perceived development as a source of economic benefits, including employment opportunities, improved incomes, better community

services, and increased tax revenues. About two-thirds (66 percent) of McLean County residents believed that economic benefits result from development.<sup>45</sup>

McLean County residents also believed that some undesirable social changes, including a less friendly and united community atmosphere and an increase in crime and illegal drugs, are associated with development. Responses of McLean County residents on this topic were more negative in 1977 than in 1976 and also were more negative than the responses of residents of the control counties.

When questioned specifically about crime problems in their county, however, it did not appear that McLean County residents were any more concerned than their counterparts in the control counties. In response to the question, "Do you think there is a crime problem in McLean County today?" 42 percent responded "Yes." In each of the control counties, 52 percent of the residents surveyed answered "Yes" to the same question about the county where they lived.

McLean County residents were also asked to rank crime problems for their county. The ranking was: (1) narcotics, (2) larceny, (3) vandalism, (4) robbery, and (5) alcohol. Residents of the control counties also named these problems among the top five, and no clear difference is discernable in the rankings of these problems among the three counties.

Another set of questions posed to McLean County residents concerned their satisfaction with community services. Responses of McLean County residents are summarized and compared with responses by residents of the control counties in Table 31. In general, the responses appear to indicate a high level of satisfaction with local services and facilities among McLean County residents. Further, there does not appear to be a substantial difference in levels of service satisfaction between McLean County and the control counties. These findings appear significant as the survey was conducted at a time (1977) when Coal Creek-related immigration was nearing its peak, and the strains on local services should have been nearing peak levels also.

The study conducted by the Denver Research Institute in 1979 also considered residents' attitudes toward development and perceptions of its

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<sup>45</sup>Institute for Policy Research, 1978, p. 163.

TABLE 31. SATISFACTION WITH COMMUNITY SERVICES AND FACILITIES, MCLEAN COUNTY RESIDENTS, 1977 (ALL FIGURES ARE THE PERCENTAGE OF INDIVIDUALS RESPONDING TO THE QUESTIONS.)

Type of Service	Degree of Satisfaction					Percent "Extremely Satisfied" or "Satisfied"	
	Extremely Satisfied	Satisfied	Neutral	Dissatisfied	Extremely Dissatisfied	McLean County	Average for Control Counties <sup>a</sup>
<b>Schools:</b>							
Grade Schools	20	58	12	8	1	78	85.5
Junior High Schools	18	55	18	8	2	73	81.5
Senior High Schools	17	54	18	9	3	71	78.5
<b>Protection:</b>							
Police	10	55	17	16	3	65	50.5
Sheriff	10	55	20	14	2	65	47.0
Fire	26	59	12	2	1	85	93.0
<b>Medical:</b>							
Hospital	18	37	14	19	11	55	82.0
Physicians	22	35	15	19	9	57	80.0
Dentists	15	29	17	27	12	44	78.0
Ambulance	30	51	14	4	2	81	91.0
<b>Social Services</b>	7	36	34	16	7	43	47.5
Mental Health Services	7	35	42	12	4	42	47.0
Retail/Shopping	10	45	14	23	8	55	50.5
Religious Services/Churches	33	59	6	2	0	92	90.0
Household Services	9	47	16	23	5	56	56.0
City Services	21	60	18	6	1	81	77.5
County Government	9	40	29	17	6	49	62.5
City Government	11	49	25	11	3	60	64.0

<sup>a</sup>The control counties for this study were Wheatland County, Montana, and Kimball County, Nebraska.

SOURCE: Institute for Policy Research, 1978.

salient effects.<sup>46</sup> This study differed from the two just reviewed, however, in two respects. First, the individuals interviewed in this study did not represent a cross-section of county residents but instead were primarily public officials and local merchants. Secondly, the interviews did not consist of a standard set of questions to which all individuals were asked to respond. Rather, each person interviewed was asked specific questions concerning his/her jurisdiction, agency, or business and also asked to comment generally on salient effects of the project on the community. For these reasons, the results of the Denver Research Institute study are not strictly comparable to those from the earlier surveys. They do, however, provide a useful indication of local views toward the project at the time when construction was nearing completion.

Almost all of the persons interviewed indicated that the construction of the Coal Creek Station had a very positive effect on the county.<sup>47</sup> The major benefits cited were increased job opportunities and business opportunities for local residents. Many also indicated that public sector facilities had been greatly improved and that such improvements had been possible without placing undue burdens on local taxpayers. One negative effect, mentioned by a high percentage of those contacted, was the impact on the wage structure. There were increased employer-employee strains, and turnover was high due to the much higher wages paid by construction companies. Local government and businesses could not compete on a salary basis. For example, the County Engineer noted that he had run a training ground for heavy equipment operators for the mine and power plant. On the other hand, two negative effects which had been identified in earlier studies (conflicts between new and long-term residents and crime problems) were seldom mentioned by persons interviewed in the Denver Research Institute survey. Overall, then, the individuals interviewed felt that growth had been orderly and that most of the long time residents of the county had welcomed it.

In comparing perceptions of local residents before, during, and near the end of the Coal Creek construction period, several observations appear appropriate. First, the belief that power plant construction provides economic benefits to the area was consistent throughout the project's duration. Second,

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<sup>46</sup>Gilmore, et al., 1980.

<sup>47</sup>Gilmore, et al., 1980.

the pre-development view that development would provide some benefits in the form of community facility improvements was largely realized. Third, the most prevalent pre-development concern, increased public sector costs, was to a large extent alleviated by the extensive program of impact grants. Finally, the impact of development on the local labor market was cited much more frequently as a problem in the post-development interviews than in the pre-development study. Three possible explanations are:

- (1) The persons interviewed in the post-development study were primarily public officials and merchants. These individuals would be more likely to perceive rising wage rates and job changes as problems than would other local residents.
- (2) Because Coal Creek was substantially larger than previous projects in the area, the labor market effects of the project also may have been more extensive.
- (3) Because the impact grants/loans program had been effective in alleviating the development-related problem formerly perceived as most serious (i.e., increased public sector costs), labor market impacts may have assumed a greater relative importance in the view of local observers.

### Conclusions and Implications

Although caution must be exercised in generalizing from a single analysis, the information presented in this case study has implications for delineation of the impacts of energy facility construction and operation, evaluation of the assessment process, and design of impact mitigation programs. The purpose of this section is to briefly discuss some of these implications by: (1) delineating the major impacts of the Coal Creek Station and indicating similarities and differences between the impacts experienced in this case and those reported elsewhere in the impact literature; (2) presenting an overall assessment of the accuracy of the various aspects of the impact projection procedure and indicating areas where additional information is needed to allow adequate impact assessments; and (3) examining the effectiveness of mitigation measures employed in connection with the Coal Creek project and the implications of the Coal Creek experience with respect to the design of future mitigation programs.

### Delineation of Major Impacts

Construction of the Coal Creek Station led to many socioeconomic changes in nearby communities, some of which are only beginning to become evident. The evidence to date, however, does allow several generalizations about the overall effects of the project and comparisons of the impacts of Coal Creek construction with those reported elsewhere.

The socioeconomic effects of the Coal Creek project have been substantial, particularly in the communities of Underwood and Washburn. These two communities experienced rates of population increase that are often associated with severe growth management problems and social disruption.<sup>48</sup> Yet, in the McLean County setting, the impacts never appeared to become unmanageable. The fact that a high percentage of the construction work force commuted from residences outside McLean County, primarily in Bismarck, Mandan, and Minot, clearly eased the pressures on the communities near the site. Equally important in facilitating effective response to the demands imposed by rapid growth, however, were two other factors: (1) timely impact information updated as conditions changed, and (2) state grants and loans made available in both amounts and time frames consistent with local needs. Thus, local governments were able to develop and implement realistic plans for responding to growth-related needs. Further, because state coal impact grants and loans were sufficient to offset a large portion of the costs of expanded community infrastructure, development of the Coal Creek project did not impose substantial fiscal burdens on local governments and taxpayers.

The actual patterns of socioeconomic change associated with the development of the Coal Creek Station differed from those frequently suggested in the impact literature. In particular, substantial differences can be noted in such areas as: (1) the extent to which local workers participated in project-related employment opportunities; (2) the commuting pattern of project-related workers; and (3) the pattern of population change as the construction period ended.

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<sup>48</sup>For discussions of these problems and their relationship to the rate of growth, see S. Albrecht, "Socio-Cultural Factors and Energy Resource Development in Rural Areas of the West," Journal of Environmental Management, 7; 1978, pp. 78-90. J. S. Gilmore, "Boom Towns May Hinder Energy Resource Development," Science, 191, 1976, pp. 535-540.

Local workers obtained a substantial percentage of the new jobs associated with Coal Creek development. During the construction phase, about half of the workers were previous residents of the impact area. During the operation phase, almost all of the workers were previous residents of the state, and many appear to have been residents of the impact area. The rate of local hiring which occurred at Coal Creek was substantially higher than that observed at many energy facility sites in other western states.<sup>49</sup>

The commuting pattern of the construction work force was more extensive than has generally been assumed in connection with energy facility construction projects. Examination of worker commuting and residential patterns indicates the importance of labor union jurisdictional boundaries in explaining settlement patterns and the configuration of impact area boundaries.

Whereas most impact studies have forecast rapid population growth during the period when the construction work force is growing to its peak level, almost all of these analyses have also projected a rapid population decline as the construction phase ends and the operation phase begins.<sup>50</sup> The communities that experienced substantial growth during the Coal Creek construction phase, however, did not experience substantial population decline when construction was completed. Rather, the principal impact communities, Washburn and Underwood, experienced a period of relative population stability during this period. Several factors may have contributed to stabilizing the populations of these communities, but the influence of other construction projects in the area clearly played a major role. In conducting an impact assessment, then, it is imperative to consider the influence of other projects being developed in the area.

#### Implications for Impact Assessment

The analysis presented in earlier sections of this report has implications for the accuracy and reliability of several phases of the impact

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<sup>49</sup>For comparable data for other states, see Mountain West Research, 1975. R. L. Little and S. B. Lovejoy, "Energy Development and Local Employment," The Social Science Journal, 16; 1979, pp. 27-49.

<sup>50</sup>For a review of these studies, see Murdock and Leistritz, 1979. Denver Research Institute, 1979.



assessment process. In assessing employment impacts, for example, it was evident that the initial estimates of the construction work force required to complete the project were much too low. Such a wide discrepancy between estimated and actual work force levels has very serious implications for the overall usefulness of an anticipatory impact assessment (as estimates of other socioeconomic impacts also will be too low). The problems associated with the initial work force estimates were largely alleviated, however, when the developer prepared revised estimates in 1977. An update of all other socioeconomic impact estimates was then prepared using the new information. The need for a system for ongoing monitoring of work force levels and other key project and community indicators as well as periodic updating of impact estimates is thus clearly demonstrated.<sup>51</sup>

Projections of other work force characteristics tended to be relatively reliable. The rates of local hiring during both construction and operation phases appear to be consistent with those estimated in the initial impact projections. The construction workers' residential patterns also were relatively close to those projected, particularly as relates to the percentage of relocating workers who lived in McLean County.<sup>52</sup> Significant discrepancies were found for some communities, however, indicating that more attention must be given to discerning factors affecting the distribution of impacts.

Evaluation of the assessments of secondary economic effects of the project demonstrates a difficulty inherent in any retrospective impact analysis--the problem of attribution. The essence of this problem is that, while a given change may have occurred in an area during the same period when an energy project was being developed, it may not be appropriate to attribute all of this change to the effects of the project. Further, while attribution problems exist with respect to all impact categories, they are exacerbated in the case of secondary economic effects by limitations in the economic data which are readily available for small rural areas. Thus, while observed changes in trade and service sector employment and personal income in McLean County during the Coal Creek

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<sup>51</sup>For further discussion of such monitoring systems, see Leistritz and Chase, 1981.

<sup>52</sup>It should be noted that the initial projections of both local hire rates and settlement patterns were based on data from similar projects located in comparable areas. The need for such data as a basis for realistic assessments thus appeared to be supported.

construction period appear generally consistent with those projected, it is clear that this is an area requiring additional study. Present data sources clearly limit the degree of precision possible in estimating these and other impact categories. Planners and decision makers should thus interpret impact projections as general planning guidelines rather than as highly exact forecasts of future conditions, and impact analysts should consider presenting their results in terms of ranges rather than single-valued estimates for the various indicators.

Projections of population effects and public service and fiscal impacts also appeared to be generally consistent with observed changes. As in the case of impact dimensions discussed earlier, the projections of overall effects, such as population and school enrollment changes for the county, tended to be more accurate than the projections for individual communities. This again suggests the need to give greater attention to factors influencing the distribution of impacts.

To summarize, comparison of the impacts projected to those which actually occurred indicates the impact assessment procedures employed generally provided reasonable approximations of the changes which the affected communities would experience. Evaluation of the impact projections, however, also suggests several areas in which the reliability and usefulness of such assessments can be increased. First, more detailed analysis of the factors affecting the distribution of project effects is clearly needed. Second, it appears that detailed information concerning the effects of similar projects in comparable areas can serve to strengthen many aspects of an impact assessment and that studies which will provide such information should be pursued. Third, given the uncertainties inherent in impact assessment, impact analysts should give greater attention to presenting their analyses in terms of multiple scenarios and ranges of impacts. Finally, but perhaps most importantly, the need for an effective system of impact monitoring and periodic reassessments throughout the project construction phase is clearly evident, and such systems should be implemented in connection with all major projects.

#### Implications For Impact Mitigation

Construction of the Coal Creek Station represents an initial, somewhat experimental attempt at effective socioeconomic impact management on the part of

the developer, local communities, and the state. Representatives of all three groups have suggested that they learned important lessons in the course of Coal Creek construction and that this experience would be valuable in their future impact management efforts. Nevertheless, impact mitigation efforts undertaken in connection with the development of the Coal Creek project appear to have been quite successful. Three key aspects of the Coal Creek impact management effort were the availability of community-specific impact projections and updates, the existence of a mechanism for providing needed front-end financing for community services and facilities, and effective use of county zoning authority to control local growth patterns. Similar mechanisms should be considered in designing impact management programs for future projects.

The overall impression of the project's effects, then, is one of well-managed growth with little evidence of the "boom town" phenomena often popularly associated with large-scale energy development projects. The management of this growth has not been without strain on local officials, but the affected communities have adapted effectively to the needs associated with project-related growth. Local residents feel that the project's overall effects have been positive for the area's economy and that these benefits have exceeded project-related costs. At the same time, they affirm the absolute necessity for careful planning and preparation for such projects and for developer and community cooperation in preparing for development impacts. The evidence to date thus suggests that the Coal Creek Station is an example of growth successfully and beneficially managed by the public and private sectors.

## APPENDIX

APPENDIX TABLE 1. TONS OF COAL SEVERED IN NORTH DAKOTA, BY COUNTY, FY1976-FY1981

County	FY1976	FY1977	FY1978	FY1979	FY1980	FY1981
Adams	14,020.52	8,936.78	36,468.81	25,891.41	35,433.26	49,819.10
Bowman	2,020,513.00	2,597,624.00	2,294,505.00	2,954,004.00	2,874,730.00	2,770,682.50
Burke	330,153.00	453,665.00	517,111.00	440,638.00	472,487.00	418,072.00
Grant	4,157.00	3,227.30	3,765.00	5,101.00	4,690.00	6,940.11
McLean	--	--	127,162.00	696,923.00	2,117,310.00	3,235,485.00
Mercer	4,117,785.00	5,546,839.00	5,255,383.00	5,717,468.00	5,096,876.00	3,772,138.02
Oliver	1,447,894.00	2,353,238.00	3,563,225.00	4,493,679.00	4,874,768.00	6,255,507.03
Stark	101,200.00	123,948.00	135,024.00	154,385.00	218,890.00	155,745.00
Ward	343,384.00	337,821.00	309,137.00	290,606.00	326,291.00	355,153.75
Williams	--	--	--	--	80,765.00	17,838.00
ND TOTAL	8,379,106.52	11,425,299.08	12,241,780.81	14,778,695.41	16,102,240.26	17,037,380.51

SOURCE: North Dakota, Office of the Tax Commissioner, Tax Department Records, (Bismarck: Office of the Tax Commissioner, 1975-1981).

APPENDIX TABLE 2. POPULATION CHANGE AND NET MIGRATION TO AND FROM SELECTED NORTH DAKOTA COUNTIES, 1960-1970

County	Population		Population Change, 1960-1970 Rate <sup>a</sup>	Components of Change			Rate of Net Migration <sup>b</sup>
	1960	1970		Births to Resident Mothers	Deaths to Residents	Net Migration	
	Number				Number		
Burleigh	34,016	40,714	+19.7	8,576	2,514	+ 636	+ 1.9
McLean	14,030	11,251	-19.8	2,278	1,225	-3,832	-27.3
Mercer	6,805	6,175	- 9.3	1,191	581	-1,240	-18.2
Morton	20,992	20,310	- 3.2	4,787	1,778	-3,691	-17.6
Oliver	2,610	2,322	-11.0	442	155	- 575	-22.0
Ward	47,072	58,560	+24.4	15,566	3,799	- 279	- 0.6
TOTAL	125,525	139,332	+11.0	32,840	10,052	-8,981	- 7.1

<sup>a</sup>Population change expressed as a percent of 1960 population.

<sup>b</sup>Net migration expressed as a percent of 1960 population. A plus sign (+) indicates net immigration and a minus sign (-) indicates net outmigration.

SOURCE: S. W. Voelker, Population Change and Net Migration by Counties in the Great Plains States, 1960-1970, Great Plains Agricultural Council Report No. 52, (Fargo: North Dakota State University, Agricultural Experiment Station, 1971).

APPENDIX TABLE 3. POPULATION CHANGE AND NET MIGRATION TO AND FROM THE COAL CREEK STATION PRIMARY AND SECONDARY IMPACT AREAS, 1970 TO 1980

Area & County	Population		Population Change, 1970-1980		Components of Change			Rate of Net Migration**
	1970	1980	Amount	Rate*	Births to Resident Mothers	Deaths to Residents	Net Migration	
	Number	Number	Number	Percent	Number		Percent	
McLean County	11,251	12,288	1,037	9.2	1,860	1,216	+393	+3.5
Burleigh County	40,714	54,811	14,097	34.6	8,247	2,782	+8,632	+21.2
Morton County	20,310	24,177	4,867	24.0	3,994	1,822	+2,695	+13.3
Subtotal, Primary Impact Area	72,275	91,276	20,001	27.7	14,101	5,820	+11,720	+16.2
Mercer County	6,175	9,378	3,203	51.9	1,078	635	+2,760	+44.7
Oliver County	2,322	2,495	173	7.5	365	170	-22	-0.9
Ward County	58,560	58,392	168	-0.3	12,908	3,720	-9,356	-16.0
Subtotal, Secondary Impact Area	67,057	70,265	3,544	5.3	14,351	4,525	-6,618	-10.0
TOTAL	139,332	161,541	23,545	16.9	28,452	10,345	+5,102	+3.7

Note: \*Population change expressed as a percent of 1970 population.

\*\*Net migration expressed as a percent of 1970 population. A plus sign (+) indicates net immigration and a minus sign (-) indicates net outmigration.

SOURCES: U.S. Bureau of the Census, 1980, U.S. Census of Population: Advance Reports, PHC80-V-36, March 1981; and John P. Smith and Elmer C. Vangsness, Net Migration and Population Change in North Dakota, 1970-1980, 12-AECO-6, North Dakota State University, Fargo, April 1981.

APPENDIX TABLE 4. LAND IN FARMS AND NUMBER OF FARMS FOR SELECTED NORTH DAKOTA COUNTIES, 1959 AND 1978

County	1959			1978			Percent Change, 1959-1978		
	Land in Farms (ac.)	Number of Farms	Average Farm Size (ac.)	Land in Farms (ac.)	Number of Farms	Average Farm Size (ac.)	Land in Farms (ac.)	Number of Farms	Average Farm Size (ac.)
McLean	1,329,597 ac.	1,687	788 ac.	1,209,048 ac.	1,270	952	- 9.1%	-24.7%	20.8%
Burleigh	1,037,450	1,022	1,015	912,695	829	1,101	-12.0	-18.9	8.5
Morton	1,241,931	1,284	967	1,193,584	1,032	1,157	- 3.9	-19.6	19.6
Mercer	666,748	759	878	549,231	579	949	-17.6	-23.7	8.1
Oliver	421,115	466	904	412,863	386	1,070	- 2.0	-17.2	18.4
Ward	<u>1,274,103</u>	<u>1,719</u>	741	<u>1,217,217</u>	<u>1,359</u>	896	- 4.4	-20.9	20.9
TOTAL	5,970,944	6,937	861	5,494,638	5,455	1,007	- 8.0	-21.4	17.0

SOURCE: U.S. Department of Commerce, Bureau of the Census. Census of Agriculture. (North Dakota). Washington, D.C.: U.S. Department of Commerce, Bureau of the Census, 1959 and 1978.



APPENDIX TABLE 5. POPULATION OF SELECTED NORTH DAKOTA COUNTIES AND INCORPORATED AREAS, 1920-1980

Area	Population						
	1920	1930	1940	1950	1960	1970	1980
BURLEIGH COUNTY	15,578	19,769	22,736	25,673	34,016	40,714	54,811
Bismarck	7,122	11,090	15,496	18,640	27,670	34,703	44,485
Wilton (Part)	108	149	117	134	105	116	262
MCLEAN COUNTY	17,266	17,991	16,082	18,824	14,030	11,251	12,288
Coleharbor	--	--	--	315	210	112	150
Garrison	714	1,024	1,117	1,890	1,794	1,614	1,830
Turtle Lake	395	579	632	839	792	712	707
Underwood	453	488	613	1,061	819	781	1,329
Washburn	558	753	901	913	993	804	1,767
Wilton (Rest)	918	852	734	662	634	579	688
MORTON COUNTY	18,714	19,647	20,184	19,295	20,992	20,310	25,177
Mandan	4,336	5,037	6,685	7,298	10,525	11,093	15,513
MERCER COUNTY	8,224	9,516	9,611	8,686	6,805	6,175	9,378
Beulah	552	913	942	1,501	1,318	1,344	2,878
Hazen	520	689	662	1,230	1,222	1,240	2,365
Stanton	325	358	370	571	409	517	623
OLIVER COUNTY	4,425	4,262	3,859	3,091	2,610	2,322	2,495
Center	--	293	509	492	476	619	900
WARD COUNTY	28,811	33,597	31,981	24,782	47,072	58,560	58,392
Minot	10,476	16,099	16,577	22,032	30,604	32,290	32,843
Totals	93,018	104,782	104,453	110,351	125,525	139,332	162,541
North Dakota Totals	646,872	680,845	641,935	619,636	632,446	617,792	652,695

SOURCE: U.S. Department of Commerce, Bureau of the Census, Census of Population, North Dakota, 1920-1980.

APPENDIX TABLE 6. RESIDENCE OF COAL CREEK STATION CONSTRUCTION WORKERS, BY CRAFT, BY COMMUNITY, AUGUST 1979

Place	Electricians	Pipefitters (Welders)	Sheet Metal	Laborers	Support Personnel Admin., acct., janitor, sales drafting vending, deliveries, etc.	Engineers	Ironworkers	Supervisor (Foreman, Proj. Mgr.)	Operators (Heavy Equip.)	Boilermakers	Carpenters	Millwrights	Insulators	Construction	Painters	Mechanics	Teamsters (Truck Drivers)	Others, brick layers, cement finishers, machinists, oiler surveyors, asbes- tos workers, load counters	Total
Bismarck	115	58	25	12	23	33	10	20	15	6	13	4	6	7	3	5	3	6	364
Minot	83	43	15	31	3	1	12	2	5	1	3	2	1	3	9	-	-	2	216
Mandan	35	30	14	20	6	-	1	1	6	6	5	12	-	9	1	1	1	4	152
Washburn	35	33	11	3	10	6	-	8	2	10	1	2	4	-	1	1	-	2	129
Underwood	17	26	4	7	14	7	4	8	1	3	6	1	-	-	8	1	1	-	108
Garrison	8	12	5	3	4	2	12	8	5	5	3	3	-	-	-	-	4	-	74
Stanton	9	6	-	1	4	-	-	-	1	5	1	2	1	-	2	-	-	2	34
Wilton	6	7	3	1	3	1	1	2	2	-	2	-	1	2	-	-	-	2	33
Turtle Lake	8	8	2	4	3	1	2	-	1	1	1	-	-	1	-	-	-	-	32
Hazen	5	11	-	1	1	-	1	1	3	1	1	3	-	1	-	1	-	-	30
Center	3	5	2	1	3	-	-	1	2	-	-	-	6	-	-	-	-	-	23
Subtotal	324	239	81	84	74	51	43	51	43	38	36	29	19	23	24	9	9	18	1,195
Other ND	97	76	50	20	13	5	27	10	14	6	17	10	15	10	3	5	1	8	387
Outstate	65	34	10	3	5	22	4	7	1	9	-	8	4	3	3	-	1	2	181
TOTAL	486	349	141	107	92	78	14	68	58	53	53	47	38	36	30	14	11	28	1,763

NOTE: Plant construction workers only. Excludes permanent plant workers, UPA and Black & Veatch construction management personnel, and Falkirk Mine Employees (both construction and permanent).

SOURCE: Internal records of UPA, August 1979.

APPENDIX TABLE 7. NUMBER OF ESTABLISHMENTS, EMPLOYEES, AND PAYROLL, NORTH DAKOTA TRADE AND SERVICE FIRMS, 1974 and 1978

Item	1974	1978	Change, 1974-1978	
			Number	Percent
Number of Establishments:				
Wholesale Trade	2,275	2,021	-11.2	
Retail Trade	4,470	4,776	+ 6.8	
Finance, Insurance, and Real Estate	1,212	1,454	+20.0	
Services	<u>3,224</u>	<u>3,565</u>	<u>+10.6</u>	
TOTAL	11,181	11,816	+ 5.7	
Number of Employees:				
Wholesale Trade	15,909	17,473	+ 9.8	
Retail Trade	35,847	44,739	+24.8	
Finance, Insurance, and Real Estate	8,187	10,462	+27.8	
Services	<u>33,088</u>	<u>42,833</u>	<u>+29.5</u>	
TOTAL	93,031	115,507	+24.2	
Annual Payroll (\$1,000):				
Wholesale Trade	149,789	221,156	+47.6	
Retail Trade	183,762	292,676	+59.3	
Finance, Insurance, and Real Estate	64,392	113,613	+76.4	
Services	<u>178,337</u>	<u>327,531</u>	<u>+83.7</u>	
TOTAL	576,280	954,976	+65.7	
Average Number of Employees per Establishment:				
Wholesale Trade	6.99	8.65	+23.7	
Retail Trade	8.02	9.37	+16.8	
Finance, Insurance, and Real Estate	6.75	7.20	+ 6.7	
Services	<u>10.26</u>	<u>12.01</u>	<u>+17.1</u>	
TOTAL	8.32	9.78	+17.5	
Average Payroll per Employee:				
Wholesale Trade	9,415	12,657	+34.4	
Retail Trade	5,126	6,542	+27.6	
Finance, Insurance, and Real Estate	7,865	10,860	+38.0	
Services	<u>5,390</u>	<u>7,647</u>	<u>+41.9</u>	
TOTAL	6,194	8,268	+33.5	

SOURCE: U.S. Department of Commerce, Bureau of the Census, County Business Patterns, North Dakota, (Washington, D.C.: U.S. Government Printing Office, 1974 and 1978 issues).

APPENDIX TABLE 8. NUMBER OF TRADE AND SERVICE ESTABLISHMENTS AND SALES PER ESTABLISHMENT, MCLEAN COUNTY, 1972-1977

	1972	1974	Year 1975	1976	1977
<u>Trade Establishments</u>					
Number of Establishments	186	--	--	198	215
Average Gross Annual Sales per Establishment	--	\$380,000	\$469,000	\$433,000	--
<u>Service Establishments</u>					
Number of Establishments	67	--	--	129	146
Average Gross Annual Sales per Establishment	--	\$23,000	\$30,000	\$27,000	--

SOURCE: Institute for Policy Research. Socioeconomic Longitudinal Monitoring Project--Profile of McLean County, North Dakota. Report prepared for the Old West Regional Commission. (Laramie: University of Wyoming, 1977).

APPENDIX TABLE 9. MCLEAN COUNTY PERSONAL INCOME BY INDUSTRIAL SECTOR (THOUSANDS OF DOLLARS) AND PER CAPITA INCOME (DOLLARS), 1971-1979

Industrial Categories	1971	1972	1973	1974	1975	1976	1977	1978	1979
Agriculture	\$17,680	\$44,537	\$92,245	\$54,021	\$57,681	\$25,361	\$30,008	\$61,203	\$29,459
Mining	136	61	398	394	254	994	1,516	3,208	4,804
Construction	2,043	2,252	3,220	3,541	5,429	9,221	19,785	41,721	26,530
Manufacturing	264	261	274	363	379	400	395	503	653
Transportation and Public Utilities	703	826	973	1,035	1,233	1,470	2,915	(D) <sup>a</sup>	(D)
Wholesale and Retail Trade	3,287	3,565	3,808	4,470	5,117	5,967	6,012	3,854 <sup>b</sup>	4,555 <sup>b</sup>
Finance, Insurance, and Real Estate	417	498	501	543	714	977	1,302	1,470	1,593
Services	2,369	2,079	2,011	2,526	2,962	3,433	3,996	4,864	5,503
Federal Government	3,115	3,053	3,281	3,276	3,902	2,989	3,075	3,444	3,476
State and Local Government	2,661	2,826	2,972	3,106	3,298	3,640	4,208	4,739	5,353
Other	2,710	2,935	2,869	3,170	3,688	3,874	4,353	4,904	5,338
Per Capita Personal Income	\$ 2,899	\$ 4,303	\$ 6,882	\$ 5,725	\$ 6,466	\$ 5,585	\$ 6,429	\$ 9,020	\$ 7,921

<sup>a</sup>(D) = Not shown to avoid disclosure of confidential data.

<sup>b</sup>Retail trade only. Wholesale trade not shown to avoid disclosure of confidential data.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (REIS).

APPENDIX TABLE 10. SALES BASED UPON NORTH DAKOTA SALES TAX COLLECTIONS, SIX COUNTIES IMPACTED BY THE COAL CREEK STATION, 1970-1979

County	Thousands of Dollars									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
<u>Primary Impact Areas</u>										
McLean County	\$ 21,165	\$ 21,069	\$ 24,732	\$ 30,441	\$ 35,175	\$ 39,911	\$ 48,792	\$ 46,339	\$ 58,600	\$ 64,993
Burleigh County (Bismarck)	209,655	238,872	279,149	314,099	385,720	439,246	466,686	391,785	444,256	527,149
Morton (Mandan)	<u>62,313</u>	<u>66,794</u>	<u>69,463</u>	<u>78,939</u>	<u>98,617</u>	<u>104,602</u>	<u>122,032</u>	<u>129,189</u>	<u>156,698</u>	<u>179,811</u>
Subtotal	\$293,233	\$326,735	\$373,344	\$423,479	\$519,512	\$ 583,759	\$ 637,510	\$ 567,313	\$ 659,554	\$ 771,953
<u>Secondary Impact Areas</u>										
Mercer County	18,403	19,143	23,796	28,026	34,576	37,144	29,760	28,137	37,794	48,083
Oliver County	871	804	799	809	1,108	1,612	2,495	2,990	3,300	3,825
Ward County (Minot)	<u>194,553</u>	<u>211,639</u>	<u>243,814</u>	<u>279,065</u>	<u>355,268</u>	<u>410,671</u>	<u>454,514</u>	<u>461,547</u>	<u>524,831</u>	<u>634,524</u>
Subtotal	<u>\$213,807</u>	<u>\$231,586</u>	<u>\$268,409</u>	<u>\$307,900</u>	<u>\$390,952</u>	<u>\$ 449,427</u>	<u>\$ 476,769</u>	<u>\$ 492,674</u>	<u>\$ 565,925</u>	<u>\$ 686,432</u>
TOTAL	\$507,040	\$558,321	\$641,753	\$731,379	\$910,464	\$1,033,186	\$1,114,279	\$1,059,987	\$1,225,479	\$1,458,385

SOURCE: North Dakota State Tax Department, North Dakota Sales and Use Tax Statistical Report, (Bismarck: North Dakota Tax Department, 1975 through 1979 editions).

APPENDIX TABLE 11. COMMERCIAL BANK DEPOSITS IN THE SIX COUNTIES IMPACTED BY THE COAL CREEK STATION, 1970-1979 (DECEMBER 31, EACH YEAR)

County	Millions of Dollars										Number of Banks 1979
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	
<u>Primary Impact Areas</u>											
McLean County	\$ 20.2	\$ 22.3	\$ 26.8	\$ 31.9	\$ 36.6	\$ 42.5	\$ 45.3	\$ 54.2	\$ 58.2	\$ 62.1	5
Burleigh County (Bismarck)	93.5	112.1	124.0	138.2	144.3	174.0	202.4	240.3	264.6	295.3	5
(including Bank of North Dakota)	(215.7)	(266.1)	(292.2)	(339.1)	(397.9)	(485.7)	(564.9)	(616.6)	(667.8)	(703.6)	(6)
Morton County (Mandan)	41.7	46.4	53.1	62.2	67.5	80.7	88.7	103.4	115.5	128.4	5
Subtotal	\$155.4	\$180.8	\$203.9	\$232.3	\$248.4	\$297.2	\$336.4	\$ 397.9	\$ 438.3	\$485.8	15
(including Bank of North Dakota)	(277.6)	(334.8)	(372.1)	(443.2)	(502.0)	(608.9)	(698.9)	(774.2)	(841.5)	(894.1)	(16)
<u>Secondary Impact Areas</u>											
Mercer County	12.1	13.8	16.7	20.0	22.5	25.8	29.3	34.2	41.5	44.7	2
Oliver County (no commercial banks)	--	--	--	--	--	--	--	--	--	--	--
Ward County (Minot)	91.9	133.5	144.3	168.2	177.0	210.1	227.4	250.3	274.2	295.8	5
Subtotal	\$104.0	\$147.3	\$161.0	\$188.2	\$199.5	\$235.9	\$256.7	\$ 284.5	\$ 315.7	\$340.5	7
TOTAL	\$259.4	\$328.1	\$364.9	\$420.5	\$447.9	\$533.1	\$593.1	\$ 682.4	\$ 754.0	\$826.3	22
(including Bank of North Dakota)	(381.6)	(482.1)	(533.1)	(621.4)	(701.5)	(844.8)	(955.6)	(1,058.7)	(1,157.2)	(1,234.6)	(23)

SOURCES: Board of Governors of the Federal Reserve System, Report of Income and Report of Condition Subscription Service, (Washington, D.C.: Federal Reserve System, 1970-1979); and Annual Report: Bank of North Dakota. (Bismarck: Bank of North Dakota, 1970-1979).

APPENDIX TABLE 12. SAVINGS AND LOAN ASSOCIATION SAVINGS IN SIX COUNTIES IMPACTED BY THE COAL CREEK STATION, 1973 THROUGH 1980, AS OF SEPTEMBER 30 EACH YEAR

COUNTY	Millions of Dollars							
	1973	1974	1975	1976	1977	1978	1979	1980
<u>Primary Impact Areas</u>								
McLean County	--	--	\$ .4(1)	\$ 1.7(1)	\$ 3.4(2)	\$ 5.3(2)	\$ 8.1(2)	\$10.1(2)
Burleigh County (Bismarck)	\$ 71.0(4)	\$ 83.6(4)	98.5(5)	113.7(5)	129.3(5)	143.3(5)	158.1(5)	168.7(6)
Morton County (Mandan)	<u>3.7(1)</u>	<u>4.5(1)</u>	<u>6.8(2)</u>	<u>9.1(2)</u>	<u>11.2(2)</u>	<u>13.5(2)</u>	<u>16.8(2)</u>	<u>20.6(2)</u>
Subtotal	\$ 74.7(5)	\$ 88.1(5)	\$105.3(7)	\$122.8(7)	\$140.5(7)	\$156.8(7)	\$183.0(9)	\$199.4(10)
<u>Secondary Impact Areas</u>								
Oliver County	--	--	--	--	--	--	--	--
Mercer County	--	--	1.1(2)	2.3(2)	3.0(2)	4.6(2)	6.3(2)	8.5(2)
Ward County (Minot)	<u>113.4(2)</u>	<u>136.3(3)</u>	<u>162.4(3)</u>	<u>177.0(4)</u>	<u>191.8(4)</u>	<u>210.4(4)</u>	<u>225.9(4)</u>	<u>234.3(5)</u>
Subtotal	<u>\$113.4(2)</u>	<u>\$136.3(3)</u>	<u>\$163.5(5)</u>	<u>\$179.3(6)</u>	<u>\$194.8(6)</u>	<u>\$215.0(6)</u>	<u>\$232.2(6)</u>	<u>\$242.8(7)</u>
TOTAL	\$188.1(7)	\$224.4(8)	\$268.8(12)	\$302.1(13)	\$335.3(13)	\$371.8(13)	\$415.2(15)	\$442.2(17)

Note: Numbers in ( ) represent number of S & L offices.

SOURCE: Federal Home Loan Bank Board, Summary of Savings Accounts by Geographic Area: FSLIC-Insured Savings and Loan Associations, (Washington, D.C.: Federal Home Loan Bank Board, 1973 through 1980 editions).



APPENDIX TABLE 13. SUMMARY OF GRANTS APPROVED BY THE COAL DEVELOPMENT IMPACT OFFICE TO MCLEAN COUNTY AND RELATED CITIES AND SCHOOL DISTRICTS THROUGH DECEMBER 4, 1980

COUNTY City/School	Date	Amount	Purpose
McLEAN COUNTY	11/75	\$ 45,900	Planning services for county, cities, school
	11/75	30,420	Law enforcement
	4/76	30,000	Addition to jail and sheriff's office
	6/76	63,060	Law enforcement
	7/76	56,250	Road Maintenance equipment (1 grader)
	8/76	21,300	Addition to jail & sheriff's office
	11/76	6,735	Required social assistance matching funds
	2/77	63,616	One 3-yard, front-end loader
	5/77	115,839	Law enforcement--8 vehicles
	6/77	68,785	Road maintenance and gravelling in construction area
	6/77	14,200	Assistant State Attorney--1 year salary
	6/77	7,083	R C & D services of Land Use Administrator & Tax Equalization Specialist
	6/77	7,161	County Auditor's desk clerk--1 year salary
	7/77	2,500	Library materials
	10/77	17,149	Fund County Tax Equalization Office to 10/31/78--90%
	10/77	6,000	Law Enforcement supplement for 8 vehicles
	10/77	5,397	County Highway Department--pickup truck
	11/77	6,880	Remodeling State Attorney's office
	5/78	118,160	Law Enforcement--1 year
	5/78	15,100	Assistant State Attorney--1 year salary
	5/78	47,567	Purchase tractor & trailer
	5/78	18,790	Sanitarian and Nurse--1 year salaries
	6/78	7,577	Auditor's clerk--1 year salary
	8/78	11,244	Land Use Analyst--1 year salary
	8/78	12,650	Assistant to Director of Equalization--7 months
	9/78	6,594	Second Auditor's Clerk
	9/78	21,785	Purchase 18-yard gravel trailer
	10/78	5,500	Road Improvement
	10/78	17,984	Road Improvement

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APPENDIX TABLE 13. (CONTINUED)

COUNTY City/School	Date	Amount	Purpose
McLEAN COUNTY	10/79	154,290	Law Enforcement
	10/79	17,700	Full-Time States Attorney--Salary
	10/79	15,000	Public Health Nurse--Salary
	10/79	16,710	Land Use Analyst--Salary
	10/79	7,800	Auditor's Clerk--Salary
	10/79	5,885	Auditor's Clerk--Salary
	10/79	18,655	Director of Tax Equalization--Salary
	10/79	200,000	Road Improvement
	4/80	196,290	Law Enforcement
	4/80	18,655	Director of Tax Equalization--Salary
	4/80	16,710	Land Use Analyst--Salary
	4/80	7,800	Auditor Clerk (Bookkeeper)--Salary
	4/80	17,700	Full-time States Attorney--Salary
	4/80	7,800	Court Clerk--Salary
	4/80	60,000	Road Construction
	11/80	200,000	Road Construction
	11/80	168,770	Mined Land Reclamation Project
	11/80	15,000	Public Health Nurse--Salary
City of Washburn	11/75	4,000	Law Enforcement
	2/76	18,000	Water & Sewer Extension
	2/76	100,000	Construct Water Treatment Plant
	2/76	100,000	Construct Water Tower
	8/76	9,000	Ambulance
	6/77	13,500	Repair & Remodel City Pool
	6/77	22,100	Recreation Equipment for Parks
	6/77	13,200	City Coordinator--1 Year Salary
	7/77	9,075	Extend Water Lines
	7/77	37,800	Street Maintenance Equipment
	7/77	16,012	Warning System, Paging & Radio Equipment
	8/77	90,650	Construction--Waste Treatment
	8/77	29,100	Storm Sewer & Dike School Property
	10/77	3,600	Supplement Above
	11/77	3,950	Training and Ambulance Equipment
	1/78	9,160	Snow Blower
	4/78	117,000	Construct New City Hall
	5/78	14,400	City Coordinator--1 Year Salary
	6/78	9,750	Paving
	6/79	36,000	Purchase Front-End Loader
	10/79	70,000	Interceptor Sanitary Sewer Lines
	10/79	15,000	Auditor/Coordinator--Salary

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APPENDIX TABLE 13. (CONTINUED)

COUNTY City/School	Date	Amount	Purpose
City of Washburn	7/80	\$ 2,179	Sidewalk/Bikeway
	11/80	5,400	Ambulance Service Equipment
	11/80	15,000	Auditor/Coordinator--Salary
Washburn Schools	5/76	328,000	School Building Addition
	4/77	120,000	School Building Addition
	4/77	17,000	Classroom Equipment
	9/77	30,000	Classroom Equipment
	7/78	26,663	Develop Area Around Addition
	10/78	2,693	Supplement Above
	11/80	45,000	Football/Track Field Complex Completion
Washburn Park Board	10/79	45,000	Recreation Complex
	4/80	4,554	Lawn Mower
	11/80	5,000	Equipment Storage Facility
City of Wilton	5/77	69,600	Sewage Lagoon Addition
	12/77	4,200	City Auditor--Salary & Fringe
	5/78	5,000	Continue City Auditor--1 Year
	11/79	10,000	Auditor/Coordinator--Salary
	11/79	27,000	Front-end Loader
	4/80	24,900	Maintenance/Office Building
	4/80	10,000	Auditor/Coordinator--Salary
Wilton Schools	6/77	190,000	Elementary School Building
Wilton Park Board	8/77	10,650	Playground & Lighting Equipment, Tractor
	4/80	5,440	Shelter and Trees for Recreation Complex
Wilton Fire District	5/77	7,750	Ambulance & Equipment
City of Underwood	11/75	4,000	Law Enforcement
	1/76	87,500	Sewer, Water, & Street Extensions
	7/76	21,650	Sewer & Water Extension
	7/76	9,600	Sewer Lift Station
	10/76	6,971	Supplement to 2 Items Above
	2/77	15,000	Waterline & Main for New School
	5/77	13,441	Water & Sewer Expansion
	6/77	7,500	Develop Water Well

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APPENDIX TABLE 13. (CONTINUED)

COUNTY City/School	Date	Amount	Purpose
City of Underwood	7/77	\$ 13,200	City Coordinator
	9/77	7,900	Warning System (Siren)
	9/77	13,140	Used Tractor Loader
	10/77	5,000	Land for Drainage System
	3/78	141,000	New City Hall
	4/78	12,400	Feasibility Studies--Sewage Lagoon & New Water Source
	5/78	15,465	Rescue Vehicle--Multi-county Use
	6/78	14,000	City Coordinator--Salary
	6/78	11,550	Control Surface Water in House Addition
	10/78	5,715	Highway repair
	6/79	2,027	Supplement to Feasibility Study of Sewage Lagoon
	10/79	14,980	City Coordinator--Salary
	10/79	36,500	Maintenance Shop Construction
	4/80	14,980	City Coordinator--Salary
	4/80	3,500	Asst. to Maintenance Engineer--Salary
	4/80	6,250	Upgrade Wastewater Treatment Facility
	4/80	201,000	New Source of Water
	11/80	20,000	Widening Lincoln Avenue
	11/80	4,187	Upgrade Wastewater Treatment Facility (25% match with EPA)
Underwood Fire District	5/77	37,800	Fire Truck
Underwood Schools	3/76	170,580	New Elementary School & Remodel Present Building
	9/77	61,265	Labor & Supplies to Remodel High School
	6/78	64,000	Vocational Education Addition
	10/79	75,000	Additional Dining Room Space and Remodeling Kitchen
	4/80	150,000	Special Education Addition
Underwood Park Board	6/77	2,260	Wind Protection Around Pool
	6/77	6,115	Pool Operating Expenses
	7/77	3,520	Pave Pool Parking Lot
	8/78	24,600	Park Development & Maintenance
	10/79	15,000	Park Recreational Complex
	11/80	4,500	Pool Cover
City of Turtle Lake	11/80	5,000	100 Trees for Windbreak
	4/76	49,754	Sewer, Water, & Street Expansion

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APPENDIX TABLE 13. (CONTINUED)

COUNTY City/School	Date	Amount	Purpose
City of Garrison	10/78	\$ 4,000	Ambulance
	12/78	6,375	Auditor's Coordinator--1 year
	10/79	12,750	Auditor/Coordinator--Salary
	11/80	15,000	Sewer Lagoon Project
	11/80	8,500	Sewer Lagoon Land Acquisition
	11/80	10,000	Auditor/Coordinator--Salary
	6/77	7,293	Ambulance
	11/80	24,900	Construction of Storage Facility for Fire and Rescue Equipment
	11/80	4,500	Used Backup Unit for Ambulance Service
Other McLean County Jurisdictions		165,400.70	
TOTAL		\$5,376,785.70	

SOURCE: Coal Development Impact Office, 1980.

APPENDIX TABLE 14. NUMBER OF CHILD ABUSE AND NEGLECT REPORTS IN SELECTED NORTH DAKOTA COUNTIES, FY1975-76 TO FY1980-81

County	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	Population 1980	Number of Reports Per 1,000 Population, FY1980-81
Emmons	5	2	11	8	9	5	5,877	0.85
Grant	2	1	3	3	1	2	4,274	0.47
Kidder	3	6	14	10	6	3	3,833	0.78
McHenry	17	8	22	13	12	16	7,858	2.04
McLean	9	8	19	18	27	31	12,288	2.52
Mercer	4	7	8	27	31	44	9,404	4.68
Oliver	2	1	1	3	1	2	2,495	0.80
Sheridan	1	0	3	6	5	2	2,819	0.71

SOURCES: Social Service Board of North Dakota, State Capitol, Bismarck, North Dakota; and U.S. Dept. of Commerce, Bureau of the Census. Census of Population, North Dakota, 1980.

APPENDIX TABLE 15. SUMMARY OF GRANTS APPROVED BY THE COAL DEVELOPMENT IMPACT OFFICE THROUGH DECEMBER 4, 1980 CLASSIFIED BY TYPE OF USE AND COUNTY

1. School Construction/Addition and Equipment	\$ 4,995,758.25
2. Road Equipment, Road Repairs, Street Improvements, and Equipment	2,962,113.08
3. People Projects	685,562.00
4. Fire Equipment, Fire Halls, City Halls, Ambulances, Warning Systems, Maintenance/Storage Facilities, Libraries, Paging and Radio Rescue Equipment	1,910,400.00
5. Sewer, Water, and Water Treatment Facilities	4,059,560.00
6. Law Enforcement Personnel and Equipment, Law Enforcement Centers, and Jail Construction	1,199,737.00
7. Recreation Development, Equipment, and Repairs	662,700.00
8. Planning Services	177,422.00
9. Airport Projects, Hospital Projects	618,500.00
10. Miscellaneous--NDSU Experiment Station, Interest Payment Due Land Board	352,540.00
TOTAL	\$17,624,292.33
Adams County	\$ 24,000.00
Bowman County	100,300.00
Burke County	10,500.00
Dunn County	135,700.00
Grant County	9,000.00
McLean County	5,376,785.70
Mercer County	10,856,126.52
Morton County	68,000.00
Oliver County	1,043,879.36
Miscellaneous--Others	- 0 -
TOTAL	\$17,624,291.58

Total Number of Grant Applications Reviewed and Acted on, 1979-1981 Biennium:

Applications Reviewed	260 <sup>a</sup>
Denied	101
Approved in Total or in Part	159

<sup>a</sup>By comparison, 259 applications were submitted, reviewed, and acted on in the previous four years from 1975-1979.

SOURCE: Coal Development Impact Office, 1980.

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