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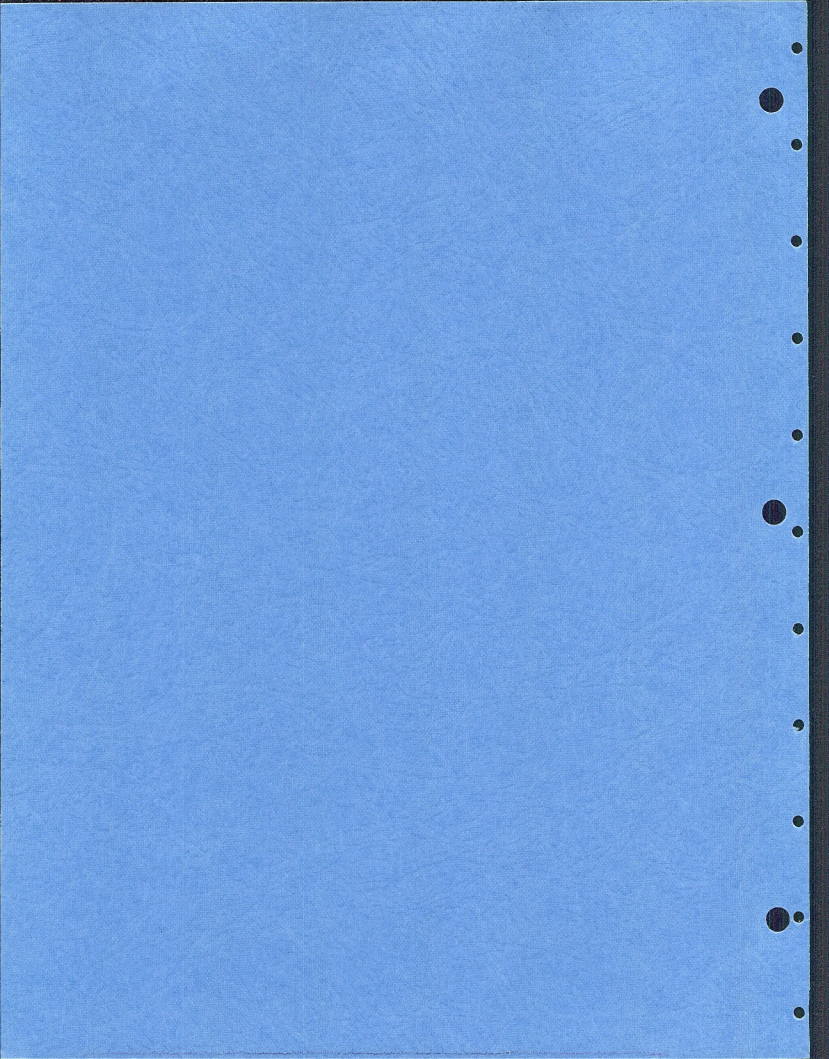
ANTICIPATED SOCIO-ECONOMIC IMPACTS
IN THE UINTAH BASIN OF UTAH RESULTING FROM
OIL SHALE DEVELOPMENT IN THE AREA

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by

R. Logan
A. Wiseman
S. Albrecht
B.D. Gardner

This report emanates from a study funded by
the Bureau of Land Management, Department of Interior,
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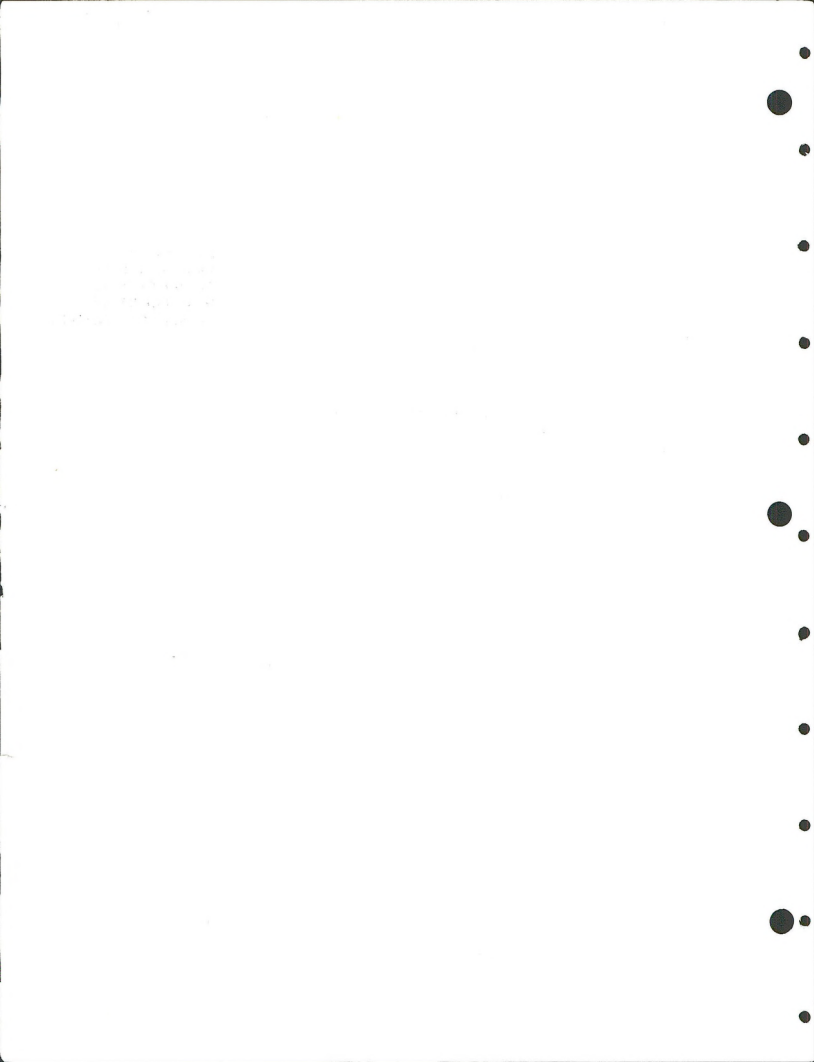


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EXECUTIVE SUMMARY

Personnel of the Utah office of the Bureau of Land Management sponsored this study because they did not want another boom town to be created as a result of oil shale development in Utah. The Bureau of Land Management chose Utah State University because the University was already engaged in complementary research in the Uintah Basin. At several conferences held during the preparation of this report, officials of the Bureau stated that they wanted the study to include an examination of ways to mitigate the potential adverse impact of rapid population growth. Emphasis was to be placed on identifying methods usable by the people and local government officials of Uintah County and Vernal City.

Basic to any analysis of ways to mitigate adverse impacts is an estimate of the expected magnitude and timing of the population in relation to the existing conditions. The mining, crushing, and retorting of oil shale to produce crude oil is currently (1976) not considered economically feasible. Development hinges on the prospect of a federal government subsidy, and the Congress has already rejected one such proposal.

The continued uncertainty about whether the White River Oil Shale project will materialize places an onerous burden on local government. The Uintah Basin Energy Planning Council (created by executive order of Governor Calvin L. Rampton of Utah), Uintah County, and Vernal City have all expended time and resources to



prepare for an oil shale industry. Protraction of the waiting process will increase the cost to the indigenous population.

The second and third chapters of this report present a profile of Uintah County and projections of population and employment changes that will accompany oil shale development. The county is rural in nature with agriculture and natural resource extraction the basis of the local economy. The mountainous geography of the area tends to isolate the Uintah Basin. Highway travel is difficult in winter, and no railroads serve the Basin.

The population increase expected to occur with the currently proposed oil shale project should not present unsolvable problems to Uintah County and Vernal City. The absence of a proven commercial size retort will force the company to proceed in stages. The demonstration stage will have minor impact, but will increase the tax base of the county. The construction stage will have a substantial impact, and warrants careful advanced planning. During the commercial stage, resources will be adjusted as the work force shifts from construction workers to permanent operating personnel.

Chapter four presents the socio-cultural impacts of oil shale development in Utah. This chapter is divided into two major sections. The first provides a perspective with which to view the current setting of this rural, predominantly Mormon community situated in the midst of the Ute Indian tribe. The second section deals primarily with the quality of life in today's boom towns of the West. Instances of mental health problems, inadequate medical facilities, increased crime (both violent and against property), and other



degradations in the quality of life are documented.

Chapter five deals with settlement patterns and new community development. Rangely, Colorado is the community nearest to the site. Political boundaries can create a combination of barriers and incentives that cause people to locate in communities other than the one nearest the job site. Discussion of this issue is continued in chapter six. The choice of residence location is shown to depend upon such factors as transportation and journeys to work, costs of establishing residences, and aesthetics and recreational opportunities. The advantages claimed for creating a new town to service oil shale are judged doubtful, with many workers expected to choose to locate in existing communities. The analysis then considers the ability of a new town to provide community services. The conclusion is that more specialized and higher quality services could be provided at lower cost through the expansion of Vernal than through creation of a new town. In addition, it is demonstrated that the private sector of the area's economy would be more diversified and of greater magnitude if Vernal is the growth center. Chapter five ends with a discussion of the legal and political factors that operate in building a new town.

Chapter six discusses the problems associated with development from a planning perspective. Contrary to most socio-economic studies, this report asserts that the local communities and their governments are masters of their own fate. The citizens of Uintah County are shown to have a choice as to the type of growth that will occur. With a growth management system, communities can determine



the nature of the localized social and economic impacts they will sustain.

The growth management system described in this report is based on the Ramapo plan. Essentially, the plan divides a political jurisdiction, such as Uintah County, into districts defined by different levels of public services. New dwelling units can be constructed in districts that can immediately provide services. In districts in which an expansion of public services is planned, construction is limited to units which are accompanied by cash payments or donations of goods and services sufficient to cover the cost of providing the dwelling units with adequate public services. The level of adequacy is to be determined by the local government. In districts for which no public services are planned, construction of dwelling units is prohibited.

Such a growth management system, when supported by the local and state governments, can effectively minimize the adverse impacts of a substantial, rapid increase in population. Land use policies that minimize government costs are simply combined with the encouragement of front-end money from sources outside the county by prohibiting construction when services are lacking. Utah has already enacted legislation to support growth management in any energy-impact area. It remains for the local units of government to recognize that they have the power to control growth. With that power, of course, goes a responsibility to enforce some control over growth to safeguard the public safety, health, and general welfare.

Effective control of growth in the Uintah Basin will require



cooperation among state and local governments, the White River Oil Shale Corporation, and the Bureau of Land Management. The builders of the Jim Bridger Electric Power Plant, near Rock Springs in Sweetwater County, Wyoming, have now asked for rate increases based on labor productivity problems. Rock Springs is a notorious boom town, and the labor productivity problem has been blamed on conditions in the town. Preplanning can preclude a repeat of this wasteful situation with oil shale. Preplanning is also necessary if the Bureau of Land Management is to assure that public lands are not developed in an inefficient and wasteful manner. Therefore, it is incumbent upon the federal, state, and local governments along with the White River Oil Shale Corporation to continue to work closely through the Uintah Basin Energy Planning Council to minimize localized social and economic impacts.

In chapter seven, we examine specific sectors of public services in light of projected revenues, expenditures, and anticipated housing needs of the incoming population. The major conclusion is that if all responsible parties cooperate, any incoming population can be provided high-quality and efficient public services.



CHAPTER 1
INTRODUCTION

National Situation

In the early 1970's, the United States began to experience rapidly rising energy costs. The reversal of the previous declines in real cost of fossil fuel and other energy sources was brought about by a number of coincident but unrelated events. First, increased environmental concern became embodied in legislation such as the 1969 Environmental Protection Act and the 1970 Clean Air Act. These acts limited the construction of new hydroelectric power and nuclear plants as well as coal-fired electrical generating facilities. They also helped delay the construction of the Trans-Alaskan pipeline and postpone offshore drilling and exploration for new crude oil and natural gas. Strip mining was subjected to increased controls, and stricter safety standards were applied to mining operations. These practices decreased the availability and raised the cost of coal.

Second, price ceilings imposed on natural gas became increasingly effective in the early 1970's, thereby reducing supply incentives. The slowed rate of expansion of coal, hydroelectric, nuclear, and natural gas energy sources encouraged a substantial shift away from these sources and an increase in the demand for oil.

Then came the formation of an effective price-fixing cartel by the Organization of Petroleum Exporting Countries (OPEC) resulting in a large increase in the international price of oil. Also on



the supply side of the market, the oil import quota program together with price controls on petroleum products acted to reduce supplies despite a rapidly increasing demand. The effect of the price controls was to generate shortages by stimulating demand and reducing supply incentives by means of lower-than-free-market prices. From the early 1970's to the present, the "energy crisis" has become an actively debated political issue.

In response to the nation's energy problems, President Nixon suggested these steps in his "Special Message to Congress on Energy and Resources" on April 18, 1973:

- "-increase domestic production of all forms of energy;
- act to conserve energy more effectively;
- strive to meet our energy needs at the lowest cost consistent with the protection of both our national security and our natural environment;
- act in concert with other nations to conduct research in the energy field and to find ways to prevent serious shortage; and
- apply our vast scientific and technological capacities--both public and private--so we can utilize our current energy resources more wisely and develop new sources and new forms of energy." (Goodwin, 1974: 250)

President Nixon proposed the development of domestic energy resources of natural gas, oil, oil shale, coal, and nuclear energy. The President also stated:

In determining how we should expand and develop these resources . . . we must take into account not only our economic goals, but also our environmental goals and our national security goals. . . . It is essential that we strike the right balance among these priorities. (Goodwin, 1974: 249)

The resulting policy, which came to be called "Project Independence" was designed to supply the needs of the United States in energy and to make the U.S. self-sufficient in energy by 1980. The development of domestic energy resources was encouraged to avoid



excessive dependence on foreign supplies and promote national security and economic prosperity.

Oil Shale

As previously noted, one of the domestic energy resources proposed for development in "Project Independence" was oil shale. The United States oil shale deposits lie in Colorado, Wyoming, and Utah. Most of these deposits are on federal land.

Oil shale is a laminated maristone rock containing a tar-like organic material called kerogen. When heated to 450 degrees-600 degrees Centigrade, kerogen undergoes pyrolysis (decomposition) to yield raw shale oil. The viscous petroleum-like material can be refined into a complete line of petroleum products by conventional refinery techniques. (Federal Energy Administration, 1974: 129)

The yield is 10 to 40 gallons of oil per ton (GPT) of processed shale. The oil shale deposits in the Green River Formation of Colorado, Wyoming, and Utah are estimated to contain a yield of more than 2 trillion barrels of oil. An estimated 600 billion of those barrels are contained in shale averaging 25 gallons or more per ton (GPT) in strata 10 feet or more thick (U.S. Government Printing Office, 1974: 2).

In his "Special Message to Congress on Energy and Resources," the President asked the Department of the Interior to develop an oil shale leasing program. In response, the Department developed the Prototype Oil Shale Leasing Program and offered six tracts for lease, two each in Colorado, Wyoming, and Utah. Mr. Rogers Morton, Secretary of the Interior, stated that:

The prototype program was designed with these goals in mind:

1. To develop a new source of energy to the nation by



- stimulating the development of commercial oil shale technology by private industry;
2. to insure the environmental integrity of the affected areas and at the same time to develop a full range of environmental safeguards and restoration techniques that will be incorporated into the planning of a mature oil shale industry, should one develop;
 3. to permit an equitable return to all parties in the development of this public resource; and
 4. to develop management expertise in the leasing and supervision of oil shale development in order to provide the basis for future administrative procedures. (U.S. Government Printing Office, 1974: 70)

The announced goal of the Leasing Program to assure an equitable return to the companies that develop the oil shale involves two important problems. First, the cost estimates of oil shale production facilities are subject to uncertainty. Second, the future level of crude oil prices is equally unpredictable (Mead, 1975: 5, 7). These problems stem from the unknown effects of the coming onstream of Alaskan, North Sea, and increased off-shore oil on prices, the projections of the technological and economic feasibility of other synthetic fuel sources such as tar sands and coal gasification. Given current costs and technology, profitable production of oil from shale can occur only if oil is priced at \$8 to \$10 per barrel (estimated 1978 prices). The average price in March, 1976, of crude oil to refiners is \$11.50 per barrel. Thus, it seems currently feasible to produce oil from shale. However, the uncertainties about future technological and environmental developments make the long-term profitability of such a project questionable.

Oil Shale Development and Uintah County

On March 12, and April 12, 1974, the Department of the Interior leased two oil shale tracts in Uintah County, Utah, designated "Ua



and Ub," under the Prototype Oil Shale Leasing Program. Phillips Petroleum and Sun Oil Companies submitted the highest bid for the 5,120 acre site tract, Ua, \$75,596,800. Ub, also a 5,120 acre site, received a high bid of \$45,107,200 submitted by the White River Shale Oil Corporation, a combine of Phillips Petroleum, Sun Oil, and Sohio Petroleum Companies. The leases are to pay the sums bid in five equal annual installments. If the companies relinquish or surrender their rights after three years, they are released from any obligation to pay the fourth and fifth installments. In addition,

the Lessee may credit against the fourth bonus installment any expenditures prior to the third Anniversary Date directly attributable to operations under this lease on the Leased Lands for the development of the Leased Deposits, but not any expenditures attributable to the preparation of a development plan . . . Upon the credit of an expenditure, the Lessee shall be relieved of the duty of paying the equivalent amount of the fourth bonus installment. (Department of the Interior, Bureau of Land Management, 1974: 12)

This credit provision is also applied to the fifth bonus installment. The lease is for a period of 20 years. It is renewable if there is production in commercial quantities¹ subject to readjustment of terms and conditions of the lease.²

The impact of the oil shale industry on Uintah County depends upon the level and method of production. There are two methods of producing oil shale--mining and crushing, and "in-situ." In the

¹"Commercial Quantities" means quantities sufficient to provide a return after all variable costs of production have been met.

²For more detail see: United States Department of the Interior, Bureau of Land Management, Final Environmental Statement for the Prototype Oil Shale Leasing Program, Vol. III, Chapter V. U.S. Government Printing Office, Washington, D.C., 1973.



former, the shale is mined and crushed by standard techniques, after which the crushed shale is placed in a retort. The kerogen, or oil shale, content is recovered either by directly applying heat in the retort or indirectly by passing heated gasses through the retort. In the "in-situ" method the hydrocarbon content is gathered by heating the shale in place underground. Representatives of Phillips Petroleum and Sun Oil indicated on March 12, 1974, that they plan to produce oil from shale in Utah by using the retorting method, with an anticipated production of 50,000 barrels of crude oil per day (Salt Lake Tribune, Salt Lake City, March 13, 1974: 23). The White River Oil Shale Corporation currently anticipates a production level approaching 100,000 barrels per day over an 11-year period. Employment of 2,500 operating workers is envisaged after that time. The schedule is discussed further in Chapter III.



CHAPTER II
UINTAH COUNTY: PROFILE

General

Uintah County, in the northeast portion of Utah, has an area of 4,480 square miles and a population of about 17,500 (1975). It is bordered by Colorado on the east, Daggett County on the north, Grand County on the south, and Carbon and Duchesne Counties on the west. The county seat is Vernal (population 4,924 in 1973). Northern Uintah County and parts of Duchesne County are within the Uinta Basin, a relative lowland south of the Uintah Mountains and east of the Wasatch Mountains. The Uinta Basin has a semi-arid environment characterized by low relative humidity and a wide range of temperatures. The economy of Uintah County is based on oil production, mining, livestock production, dairying, agriculture, and lumbering. The Bureau of Reclamation completed the Flaming Gorge Dam just north of Uintah County in 1962. Although the ninety-one-mile-long reservoir is not in Uintah County, it has stimulated tourist and recreational industries of the county. Agriculture has long been one of the county's leading industries. The average growing season is about four months, beginning in late May and running into late September.

In 1948, the Ashley Valley Oil Field was discovered, and oil production began to occupy an important position in the economy of the area. The "Energy Crisis" of the early 1970's generated an oil boom. Exploration drilling and the discovery of new oil fields in



Uintah and Duchesne Counties brought increases in population and economic activity. Recently, however, the elimination of the depletion allowance and other factors have led to an abrupt decline in exploratory drilling. As a result, the area's economic expansion has slowed considerably.

Population Size

The growth of the Uintah County population over the past several decades is compared with that of Utah and the nation in Table 1. The population of Uintah County up to 1970 was declining relative to that of Utah and the United States. Between 1970 and 1974, however, Uintah County had a higher rate of population increase than did either the state or the nation. Uintah County's population increased by 27 percent over this period compared to 10 percent for Utah and 4 percent for the U.S. The explanation is in the oil industry expansion.

The smaller a region is geographically, the greater is the importance of in- and outmigration relative to natural increase in affecting population changes. This has been the case historically in Uintah County. Total population increased at an average annual rate of about 1 percent per year between 1920 and 1970. Between 1950 and 1960, the population growth rate was 1.2 percent; between 1960 and 1970, it fell to an annual average annual increase of 0.95. This decline can also be taken as an indication of a somewhat stagnant economy. When the economy of a county fails to grow, young people must search elsewhere for jobs. That this occurred in Uintah County between 1960 and 1970 is shown in Table 2.



Table 1. Population of Uintah County, State of Utah and the U.S. for selected years, 1940-1974.

Year	Uintah		Utah		U.S.		Uintah County Population As Percent Of Utah Population
	Population	Percent Change From Earlier Year	Population	Percent Change From Earlier Year	Population	Percent Change From Earlier Year	
1940	9,898		550,310		132,164,569		1.8
1950	10,300	4.1	688,862	25.2	151,325,798	14.5	1.5
1960	11,582	12.5	890,627	29.3	179,323,175	18.5	1.3
1970	12,684	9.5	1,059,273	18.5	203,211,926	13.3	1.2
1971	13,300	4.9	1,095,000	3.4	206,212,000	1.5	1.2
1972	14,400	8.3	1,128,000	3.0	208,230,000	1.0	1.3
1973	15,200	5.6	1,150,000	1.9	209,844,000	.8	1.3
1974	16,100	5.9	1,174,000	2.1	211,390,000	.7	1.4

Source: U.S. Bureau of the Census, Census of Population 1940-1970 and Current Population Report (Washington, D.C., U.S. Government Printing Office).

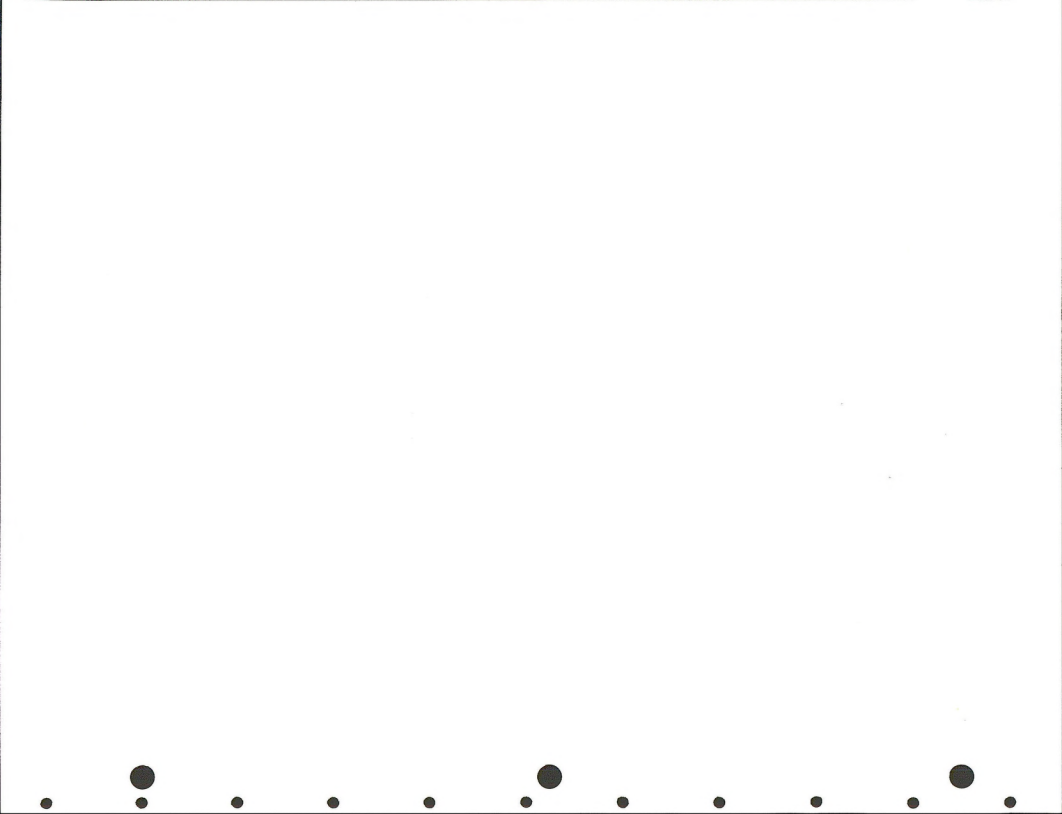


Table 2 indicates that during this ten-year period there were 3,178 births and 886 deaths recorded in Uintah County, giving the county a net natural increase for the period of 2,292. The population grew, however, by only 1,102 because net migration out of the county was -1,190 (a rate of -10.3 percent). Economic growth capable of sustaining a 2 percent¹ growth rate in population would have been necessary in order to have a net migration level of zero between 1960 and 1970.

Population Characteristics

Between 1950 and 1970 the U.S. rural population decreased from 36 percent to 26 percent of the total population. In Utah the decline was from 35 percent to 20 percent. In Uintah County, the rural percentage of population declined between 1950 and 1960, but increased between 1960 and 1970. Over the 20-year period the county's rural percentage declined only from 72 percent to 69 percent. In other words the city of Vernal has been gaining population at about the same rate as the remainder of the county.

A significant portion of the Uintah and Ouray Indian Reservation extends into the southwest region of Uintah County. The tribal headquarters are located at Fort Duchesne in Uintah County although most of the reservation is located in Duchesne County. The Indian population has remained at about 10 to 11 percent of the total population for the last thirty years (Table 2). The majority of the Indian population lives on reservation lands.

¹Net natural increase (2,292)/1960 population (11,582) = 2 percent.

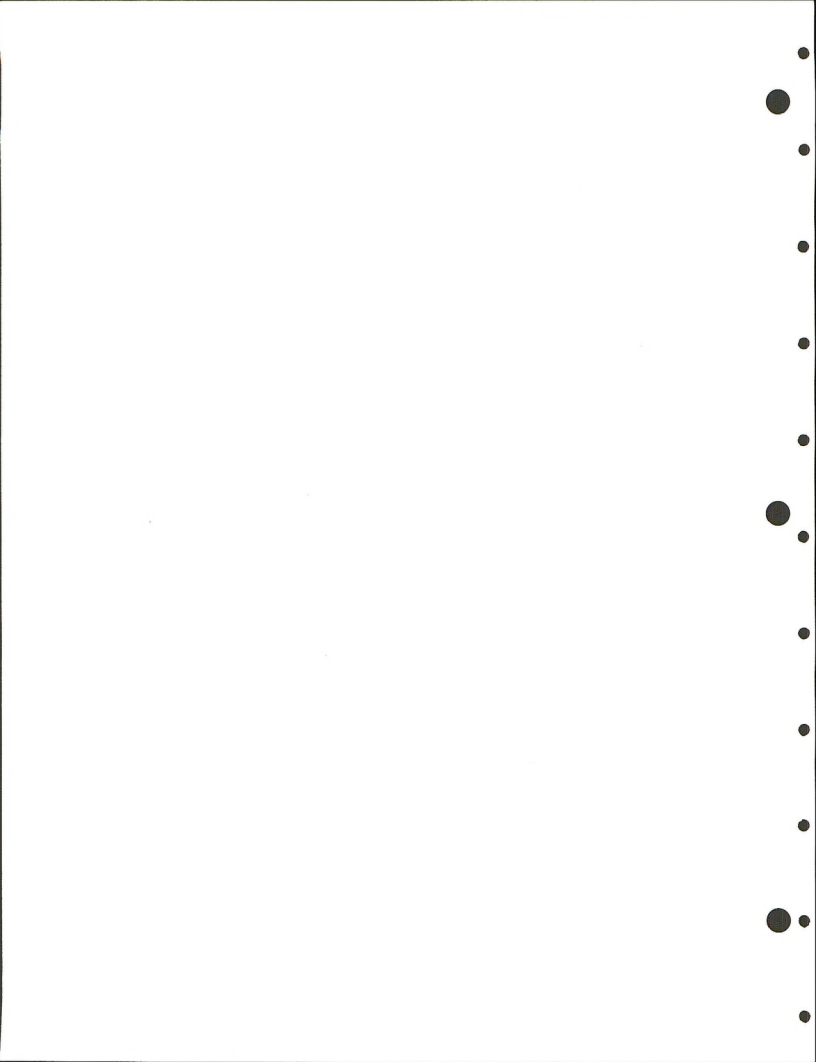


Table 2. Net migration for Uintah County, 1960 to 1970

	Population
Population, April 1, 1970	12,684
Population, April 1, 1960	11,582
Net change in population, 1960-1970	1,102
Births, 1960-1970	3,178
Deaths, 1960-1970	886
Net natural increase	2,292
Net migration: Net population change minus net natural increase	-1,190
Net migration rate: Net migration as a percentage of population in 1960	-10.3%

Sources: U.S. Department of Commerce, Bureau of the Census, U.S. Census of Population (Washington, D.C.: Government Printing Office, 1960, 1970); Utah State Department of Health, Utah Vital Statistics, Annual Report (Salt Lake City, Utah: Utah State Department of Health, 1960-1969).



Table 3 shows the age dependency ratio for Uintah County, Utah, and the United States in 1970. In general, people under eighteen years of age attend school and are therefore not in the labor force most of the time. People over sixty-five are generally retired and, therefore, excluded from the labor force. Many of those people over sixty-five receive social security or have saved money for retirement and are not dependent upon younger local people for support. Nevertheless, generally speaking, both students and retirees contribute little to the local economy and therefore are considered to be supported by those people between eighteen and sixty-five years of age. In 1970, 51.4 percent of the Uintah County population was under eighteen or over sixty-five. This is 4.1 percent higher than the state average of 47.3 and 7.3 percent higher than the national average of 44.1. Given the county's high rate of net outmigration, however, a higher than average age dependency ratio during the 1960's is to be expected.

In 1970, the median age for Uintah County, 22.4, was lower than the state median age of 23.1 and much lower than the national median age of 28.1 (Table 3).

In 1970, 84.7 percent of the Uintah County population 25 years of age and over had completed at least one year of high school compared to 76 percent in 1960 (Table 4). Although this figure is higher than that for the state in 1970 (78.3), the percentage of the Uintah County population with post-high school education is less than that for the state.



Table 3. Age dependency ratio for the United States, Utah, and Uintah County, 1970.

	Uintah County	Utah	United States
Persons under 18:			
Number	5,637	423,850	69,644,081
Percent	44.4	40.0	34.3
Persons over 65:			
Number	877	77,561	20,065,502
Percent	6.9	7.3	9.9
Total:			
Number	6,514	501,411	89,709,583
Percent	51.4	47.3	44.1
Median age	22.4	23.1	28.1

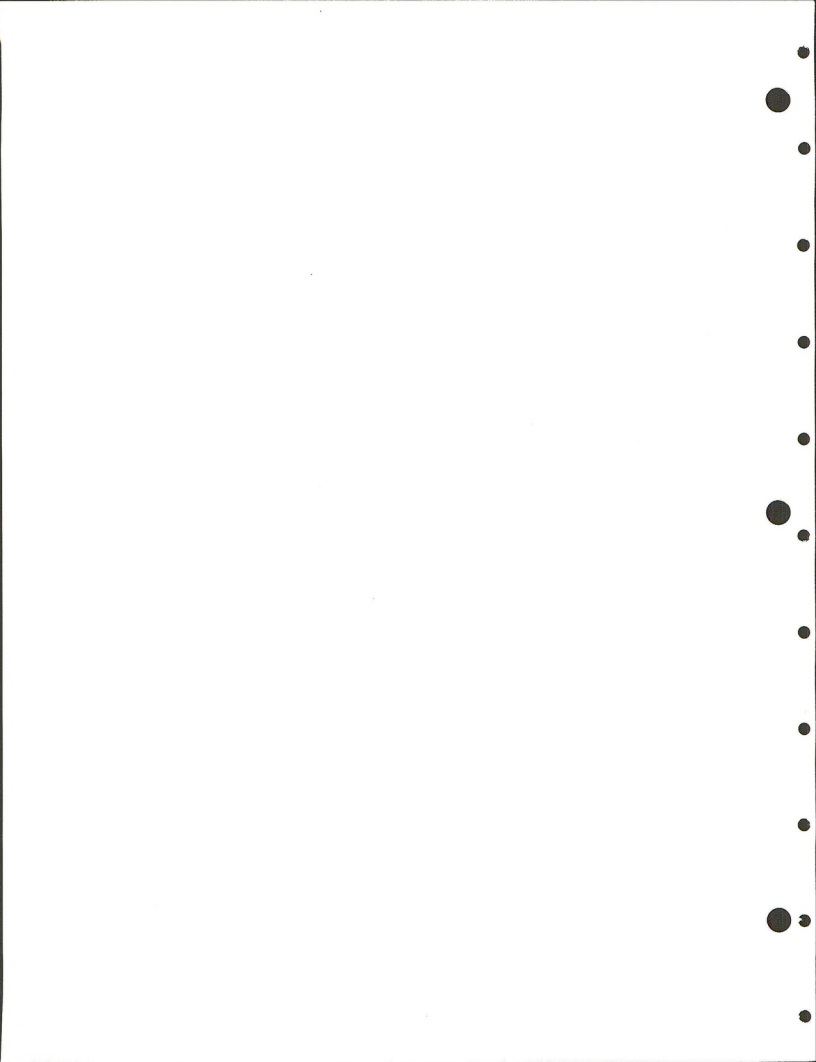
Source: U.S. Department of Commerce, Bureau of the Census, U.S. Census of Population (Washington, D.C.: Government Printing Office, 1970), Tables 20, 35.



Table 4. Percent distribution of population by years of school completed for persons 25 years old and over for Uintah County and Utah, 1960-1970.

	Uintah		Utah	
	1960	1970	1960	1970
No. school years completed	1.5	.7	.8	.8
Elementary: 1 to 4 years	2.2	1.4	2.0	2.0
5 to 8 years	20.3	13.2	18.8	18.8
High School: 1 to 4 years	60.8	62.7	53.1	53.1
College: 1 to 3 years	9.1	13.4	15.0	15.0
4 years +	6.1	8.6	10.2	10.2

Source: U.S. Bureau of Census, Census of Population, 1960-1970, Washington, D.C., U.S. Government Printing Office).



Income

Mean family income for Uintah County (\$8,925) was \$1,503 lower than the state average when the U.S. census was taken in 1970. Until recently, both the level and the growth rate of per capita income in Uintah County has been lower than those of Utah and the nation (Table 5). From 1970 to 1974, however, per capita income grew dramatically in the county. In 1974, it was \$4,400 having increased by 50.2 percent from 1970 to 1974. Utah's per capita income increased by 32.2 percent over the same period to a level of \$4,480. (Utah Department of Employment Security, Newsletter, Salt Lake City).

The most recent data on the distribution of income in the county were accumulated just prior to the recent economic expansion (Table 6). In 1970, 13.9 percent of the families in the county were below the "poverty level," as compared with 9.1 percent for the state. The poverty index is calculated by the Bureau of the Census. It takes into account not only income levels but size of family, sex of family head, number of children under eighteen years of age, and farm and nonfarm residence. The definition of poverty is derived on a national basis and does not reflect regional or state differences in living costs.

Employment

The percentage distribution of employed persons by industry group (Table 7) indicates that agricultural employment in 1970 constituted almost 12 percent of the total county employment--high relative to Utah and national levels. Recently, however, agricultural employment in Uintah County has been following the national trend of both



Table 5. Per capita income of Uintah County, Utah and the U.S., 1960-1970.

	1960 Per Capita Income (\$)	1970 Per Capita Income (\$)	Percent Change 1960-1970
Uintah County	1840	2780	59.2
Utah	1970	3200	72.1
U.S.	2216	3933	77.5

Source: Bureau of Economic and Business Research, Statistical Abstract of Utah, 1973. (Center for Economic and Community Development, University of Utah, Salt Lake City.)



Table 6. Income characteristics of families for Utah and Uintah County, 1970.

Annual Income	Uintah County		Utah	
	Number of Families	%	Number of Families	%
Less than \$3,000	303	10.1	22,031	8.8
\$3,000-\$5,999	525	17.4	38,459	15.4
\$6,000-\$9,999	1,154	38.3	77,728	21.1
\$10,000-\$14,999	700	23.2	69,116	27.7
\$15,000 and over	331	11.0	42,407	17.0
All families	3,013	100.0	249,741	100.0
Median family income	\$8,082		\$9,320	
Mean family income	\$8,925		\$10,428	
Less than poverty level	419	13.9	22,802	9.1



Table 7. Percent distribution of employed persons by industry group for Uintah County, State of Utah, and the U.S., 1960-1970.

	Uintah		Utah		U.S.	
	1960	1970	1960	1970	1960	1970
Agriculture, Forestry and Fisheries	19.15	11.8	6.1	3.8	6.7	3.7
Mining	16.3	17.5	4.4	3.1	1.0	0.8
Construction	9.2	6.5	6.9	5.4	5.9	5.9
Manufacturing	5.0	5.5	16.0	14.5	27.1	25.9
Railroad and Railway Sources	--	--	2.9	1.5	1.5	0.8
Trucking Services and Warehousing	2.1	1.6	1.6	1.6	1.4	1.4
Other Transportation	0.6	0.8	0.8	0.7	1.4	1.4
Communications	1.17	1.1	1.3	1.2	1.3	1.4
Utilities and Sanitary Services	2.29	2.1	1.5	1.5	1.4	1.6
Wholesale Trade	1.4	3.4	3.9	4.5	3.4	4.1
Food and Dairy Products Stores	1.6	2.6	2.6	2.5	2.6	2.5
Eating and Drinking Places	2.6	3.5	3.0	3.6	2.8	3.0
Other Retail Trade	10.9	13.5	10.4	10.8	9.4	10.5
Finance, Insurance and Real Estate	1.3	2.5	4.0	4.2	4.2	5.0
Business Services	0.3	--	0.9	1.3	1.2	1.7
Repair Services	2.1	1.9	1.3	1.4	1.3	1.4
Private Households	1.9	0.7	1.7	0.7	3.0	1.5
Other Personal Services	4.1	2.7	3.1	3.1	3.0	3.2



Table 7. (continued)

	Utah		Utah		U.S.	
	1960	1970	1960	1970	1960	1970
Entertainment and Recreation Services	0.5	0.4	0.9	1.0	0.8	0.8
Educational Services	6.5	8.8	7.8	11.7	5.2	8.0
Welfare, Religious and Nonprofit Membership Organizations	1.9	0.7	1.4	1.6	1.3	1.5
Hospitals	0.6	3.1	2.4	5.0	2.6	5.5
Other Professional and Related Services	1.5	1.0	2.4	2.2	2.5	2.6
Public Administration	4.2	8.1	10.4	12.6	5.0	5.5
Industry not Reported	2.1	--	2.7	--	4.0	--

Source: U.S. Bureau of Census, Census of Population 1960-1970, (Washington, D.C., U.S. Government Printing Office).



relative and absolute decline. Starting from a large base, the relative size of this decline has been quite marked within the county. The fact that agricultural employment, which is largely self-employment, dropped from 19 to 12 percent of the labor force may explain the concomitant large shift in income source toward wage and salary income in the 1960-1970 period. In 1960, 67.3 percent of the personal income was obtained from wages and salaries compared to 86.9 percent in 1970.

The high mining employment in the county reflects the importance of the oil industry, with the other major mining products being gilsonite and phosphate rock. Eighty-five percent of the known gilsonite deposits of the world are found in Duchesne and Uintah Counties. Gilsonite is a hydrocarbon mineral which until recently was used mostly in paints, varnishes, and asphalt roads. With modern refining techniques, oils and raw gasoline have been produced from it. Up until approximately 1961, gilsonite was the main product of the Uintah mining industry (excluding petroleum). In 1961, large deposits of phosphate rock were discovered close to Vernal.

The manufacturing sector, a prime source of employment at the national level, is of little importance in Uintah County (Table 8). Although manufacturing increased by 96 percent, it constituted only 6.6 percent of non-agricultural employment in 1973. In contrast, the national level was over 26 percent in 1970. Since 1970 there have been substantial increases in the county's construction, trade, utilities and services industries. This shows a surprisingly rapid response to growth in the basic sectors of mining and manufacturing.



Table 8. Employees on non-agricultural payrolls by major industry group for selected years.

Year	Total	Mining	Manu- facturing	Construc- tion	Transporta- tion, commu- nication and public utilities	Trade	Finance, insurance and real estate	Services and misc.	Government
1960	3001	838	165	376	166	523	59	235	649
1965	3023	884	117	132	143	615	66	260	806
1968	3163	712	125	157	162	660	74	377	896
1969	3419	817	189	188	172	691	72	449	841
1970	3510	711	249	180	177	711	74	548	860
1971	3852	779	318	150	210	824	79	666	826
1972	4655	950	316	255	300	1001	95	838	900
1973*	4910	980	325	240	370	1115	110	915	855
1974	5439	W	333	317	416	1221	W	976	954

*Utah Industrial Development Information System: County Economic Facts, 1974, Uintah County.
W - Withheld for Disclosure of Individual Firm Data.

Source: Utah Department of Employment Security, Utah Labor Market Information, 1960-1974.



Housing

Most of the available information on housing is contained in the 1970 Census of Housing. However, some information has been gathered about housing characteristics in 1974 and 1975.

There were 3,700 year-round housing units in Uintah County in 1970 and that total year-round housing increased by 1,913 units to 5,613 in 1975 (Table 9). This represents an increase of 51.7 percent for the five-year period, or 10.3 percent per year. Mobile homes accounted for 679 of the new units (35.5 percent of the growth). In 1975, mobile homes accounted for 17.4 percent of all housing units. The 1970 percent of mobile homes in Uintah County (8.0 percent) can be compared with the state figure of only 2.6 percent. This gap seems to have grown even wider in 1975, though data for the state are not available.

Of the 3,700 housing units in Uintah County in 1970, 3,130 (84.6 percent) were single-family structures. This is much higher than the state percentage of 75.2. Multiple family units numbered 570, or 15.4 percent of all housing units as compared to 24.8 percent for the state. Of the year-round housing units, 2,565 (69.3 percent) were owner-occupied, which is about typical for the state as a whole. Renter-occupied units accounted for 23.5 percent of all units compared with 29.3 percent for the state.

In 1970, vacancy rates for units that were for sale only or for rent were 2.0 percent for Uintah County, which is only slightly lower than the state vacancy rate. The "other vacant" category for the state includes units that were rented or sold which were waiting occupancy, units held for occasional use, and other vacant



Table 9. Selected housing characteristics for Uintah County and Utah, 1970 and 1975

	Uintah County		Utah
	1970 ^a	Jan. 1975	1970 ^a
Total year-round housing units	3,700	5,613 ^b	311,814
Single family units:			
Number	3,130 ^c	NA ^d	234,484
Percent	84.6	NA	75.2
Multiple family units:			
Number	570	NA	77,330
Percent	15.4	NA	24.8
Mobile homes:			
Number	297	976 ^b	8,232
Percent	8.0	17.4	2.6
Owner occupied:			
Number	2,565	NA	206,570
Percent	69.3	NA	66.2
Renter occupied:			
Number	868	NA	91,364
Percent	23.5	NA	29.3
Vacant for sale only or for rent:			
Number	73	NA	6,947
Percent	2.0	NA	2.2
Other vacant:			
Number	194	NA	6,933 ^e
Percent	5.2	NA	2.2

^aU.S., Department of Commerce, Bureau of the Census, U.S. Census of Housing (Washington, D.C.: Government Printing Office, 1970), Part 46, Tables 1, 2, 29, 60.

^bFrom an unpublished study done by Mr. Jerrol L. Syme, Planning Advisor for Uintah Basin Association of Governments.

^cIncludes only occupied mobile homes.

^dNA = not available.

^eIncludes units rented or sold, awaiting occupancy, and units held for occasional use and other vacant units.



units. The category "other vacant" is composed mostly of dilapidated housing units that lack plumbing facilities and are undesirable to most people as dwelling units. As can be seen, the percentage of "other vacant" units in Uintah County is higher than in that of the state. The difference would be even greater if units held vacant for occasional use and units sold or rented but not yet occupied were eliminated from the state's "other vacant" category. Field observation by the authors and interviews with real estate agents in Vernal in August, 1974, and June, 1975, indicate that recently vacancy rates have been near zero.

Housing characteristics (Table 10) were less favorable in Uintah County in 1970 than in the rest of the state. Uintah County has a higher percentage of housing units in one unit structures than the state due to the more rural population distribution in the county than the state. Facilities such as telephone, plumbing and air conditioners in Uintah County are less numerous than elsewhere in the state. This is in part explained by the comparatively low average income that has existed in the past in the county.

Government

Uintah County is governed by a three-member board of commissioners who are elected to carry out the executive and the legislative functions of the county government. Continuity of county government is provided in the staggered terms of office of the commissioners--two are elected for four years and one for two years. Thus, every two years in a county-wide partisan election, two commissioners are elected at large. The form of government of Uintah County is typical of



Table 10. Selected housing characteristics for Uintah County and Utah, 1970.

	Uintah		Utah	
	Number	Percent	Number	Percent
All year round housing units	3,700	100.0	311,814	100.0
Units in structure				
one	3,085	83.4	234,476	75.2
two or more	318	8.6	69,106	22.2
mobile home or trailer	297	8.0	8,232	2.6
Year structure built				
1965-March 1970	486	13.1	37,362	12.0
1960-1964	504	13.6	45,984	14.7
1950-1959	810	21.9	73,471	23.5
1940-1949	759	20.5	46,228	14.8
1939 or earlier	1,141	30.8	108,937	34.9
Source of water				
public system or private company	3,057	82.6	296,114	94.9
individual well	284	7.7	12,329	3.9
other	353	9.6	3,431	1.1
Sewage disposal				
public sewer	1,622	43.9	258,649	82.9
septic tank or cesspool	1,875	50.8	49,249	15.9
other	197	5.3	3,976	1.2
Telephone				
available	2,988	87.0	271,470	91.1
none	455	13.0	26,464	8.9
Air conditioning, room unit				
one	255	6.9	39,364	12.6
two or more	--	--	5,775	1.8
central system	180	4.8	35,485	11.4
none	3,259	88.2	231,250	74.0
Plumbing facilities				
with all plumbing facilities	3,484	94.2	303,257	97.3
lacking some or all plumbing facilities	216	5.8	8,557	2.7
lacking only hot water	--	--	1,059	0.3
lacking other plumbing facilities	216	5.8	7,998	2.4



Table 10. (continued)

	Uintah		Utah	
	Number	Percent	Number	Percent
Piped water in structure				
hot and cold	3,540	95.7	307,391	98.6
cold only	39	1.1	2,077	0.7
none	121	3.3	2,346	0.8
Flush toilet				
for exclusive use of household	3,495	94.5	305,391	97.9
also used by another household	--	--	2,323	0.7
none	205	5.5	4,100	1.3
Complete kitchen facilities				
for exclusive use of household	3,513	94.9	304,608	97.7
also used by another household	--	--	330	0.1
no complete kitchen facilities	187	5.1	6,876	2.2
Persons per room				
all occupied units	3,433	100.0	297,934	100.0
1.00 or less	2,949	85.9	268,052	90.0
1.01 to 1.50	336	9.9	24,231	8.1
1.51 or more	148	4.2	5,651	1.9

Source: U.S. Bureau of the Census, Census of Housing, 1970 (Washington D.C.: U.S. Government Printing Office).



non-metropolitan areas. A national survey conducted by the International City Management Association found that 84 percent of non-metropolitan counties are governed by a board with no recognized administrator.

The form of and legal basis for the Uintah County government are stipulated in the state constitution, which also outlines the offices of a county government. A majority of administrative officials are popularly elected, including the county auditor, treasurer, clerk, recorder, sheriff, assessor, council (legal advisor), and engineer. Organizational powers of most elected officials in Uintah County include the authority to supervise, direct, and control all staff functions, appoint the chief administrator, heads of each county department, members of county boards and commissions, and other appointive offices with the advice and consent of the county board.

The board of county commissioners may contract for or purchase necessary rights of way for county roads over private property. Responsibility for construction, maintenance, and control of county roads and highways, sidewalks and bridges within the county but outside of incorporated cities rests with the county commissioners.

Services provided by Uintah County are functions common to a majority of counties in the country. Specific public services include limited fire and police protection, in addition to jails and detention homes for persons under 18. Welfare of general assistance is the responsibility of the state not of Uintah County. Assistance to crippled children and medical assistance are available to residents of Uintah County. Provisions are made for public and mental health facilities. The county, in cooperation with Vernal, provides for and



maintains a library, and makes expenditures for animal control. Ambulance service is not included in the hospital operation and maintenance costs. Uintah County does not operate or maintain a sewerage system, collect refuse and garbage, regulate air or water pollution, or have a mosquito abatement program. Uintah County does not make allowance in its annual budget for expenditures for parks and recreation operation and maintenance, including natural resources, flood and drainage control, irrigation, soil conservation or fish and game needs. This listing of several of the services frequently financed at the county level of government does not necessarily imply that they should be undertaken by the county.

Although the absolute size of the revenues and expenditures for Uintah County in a recent year (Table 11) would understate current levels, they indicate the relative importance of the various categories. The dominance of property tax receipts and highway expenditures is evident.

The county has a Planning Commission and Industrial Development Agency. In 1974, the Utah governor established the Planning and Development Advisory Council to deal specifically with energy issues and problems. The council is under the direction of the Executive Director of the Uintah Basin Association of Governments.

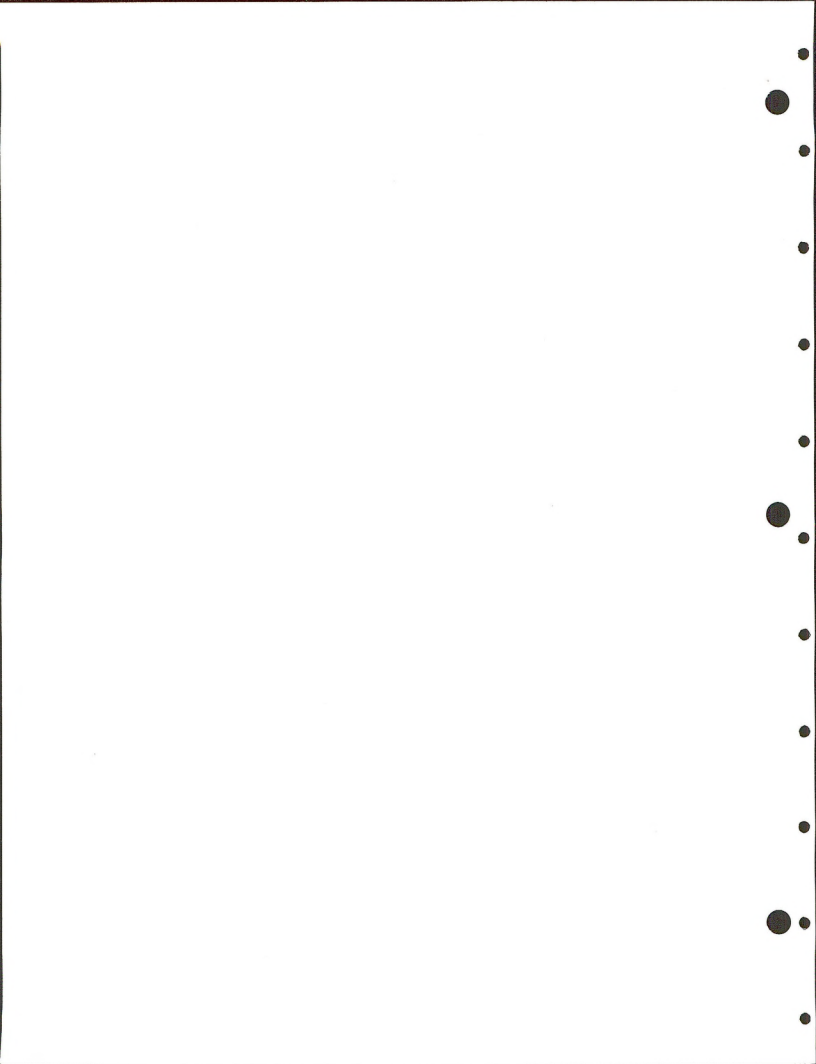
The municipal government of Vernal is vested in a mayor and city council, consisting of five members, all elected at large. The mayor and city council constitute the legislative and governing body, and as such, have the authority to exercise and discharge all rights, powers, and privileges accorded a third-class city and to perform all duties required of them by law.



Table 11. Revenue sources and expenditure categories for Uintah County, 1972.

Item	Uintah
Total Revenues	710,729
General property taxes	358,783
Other local taxes	44,132
Licenses and permits	2,527
Fines and forfeitures	23,317
Revenues from use of money and property	21,283
Revenue from other agencies	188,533
Charges for current services	71,111
Other revenues	1,043
Total Expenditures	780,677
Commissioners	15,379
Judicial	10,307
Administrative Planning	73,116
Education and public relations	25,711
General government building	15,362
Non-departmental	
Public safety	71,060
Highways	290,743
Weed control	23,003
Airports	892
Health and hospitals	42,420
Public welfare	7,252
Parks and recreation	23,916
Cemeteries	15,391
Bond issues	32,891
County library	19,688
Miscellaneous expenditures	
Capital outlay	

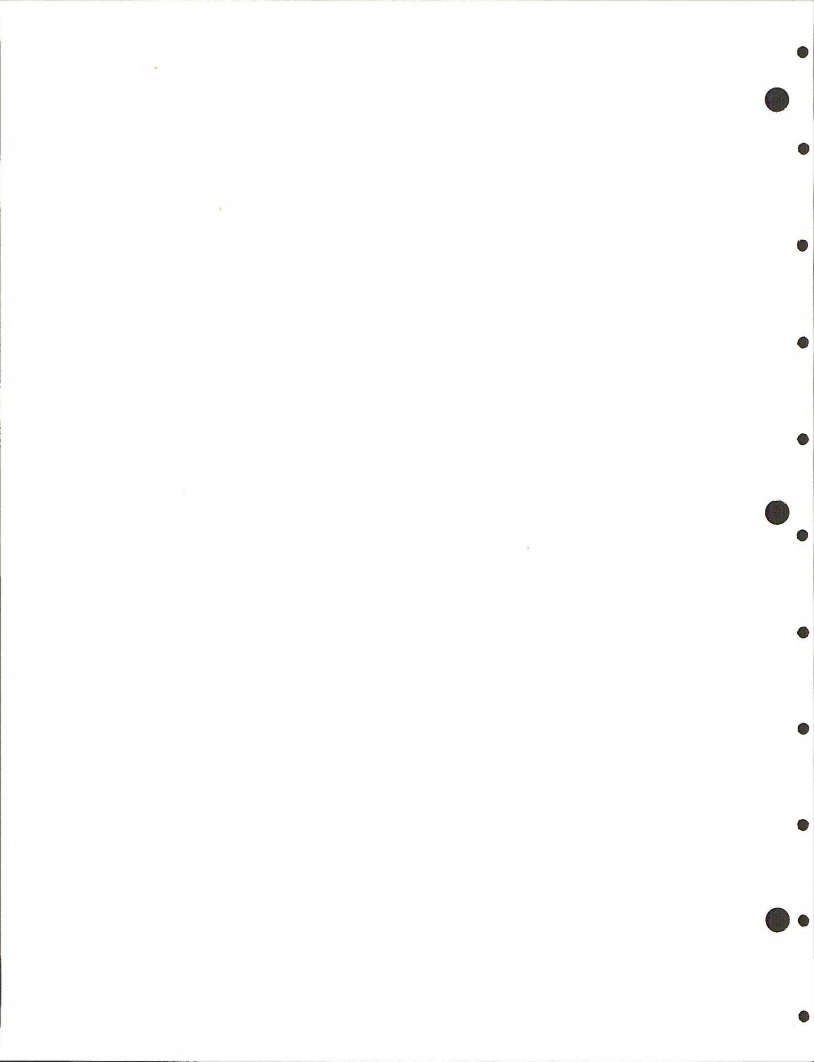
Source: Department of Housing and Urban Development, 1972.



In Vernal, as in all third-class cities in Utah, the mayor presides over all city council meetings, but is only allowed to cast a decisive vote in an instance of a tie vote in the council when filling a council vacancy. The mayor exercises the power to maintain peace within the city limits, performs all duties set down by law or ordinance, and sees to it that the laws and ordinances of Vernal City are executed. Occasionally, the mayor reports to the city council on the affairs of Vernal and recommends needed measures. If a vacancy occurs in the office of mayor, the city council appoints someone to serve until the next municipal election at which time a successor is elected.

Under the Utah Code, the mayor, with the advice and consent of the city council, is authorized to appoint a qualified elector to each of the offices of city recorder, city treasurer, and justice of the peace (where no city court exists). Under identical stipulations, the Vernal mayor may also make appointments to all offices provided by law or ordinance; public works director, city planning director, police chief, fire chief, sexton, and building inspector. The city attorney and engineer are under contract to the city of Vernal.

Vernal City is responsible for providing all necessary services that are not the responsibility of the county, to individuals residing within the city limits. In addition to less-than essential services such as establishment and maintenance of the city jail, cemetery, streets, playgrounds and parks, the city of Vernal provides sewerage and sanitation services as well as the water supply to the residents. Police and fire protection are also considered essential services.

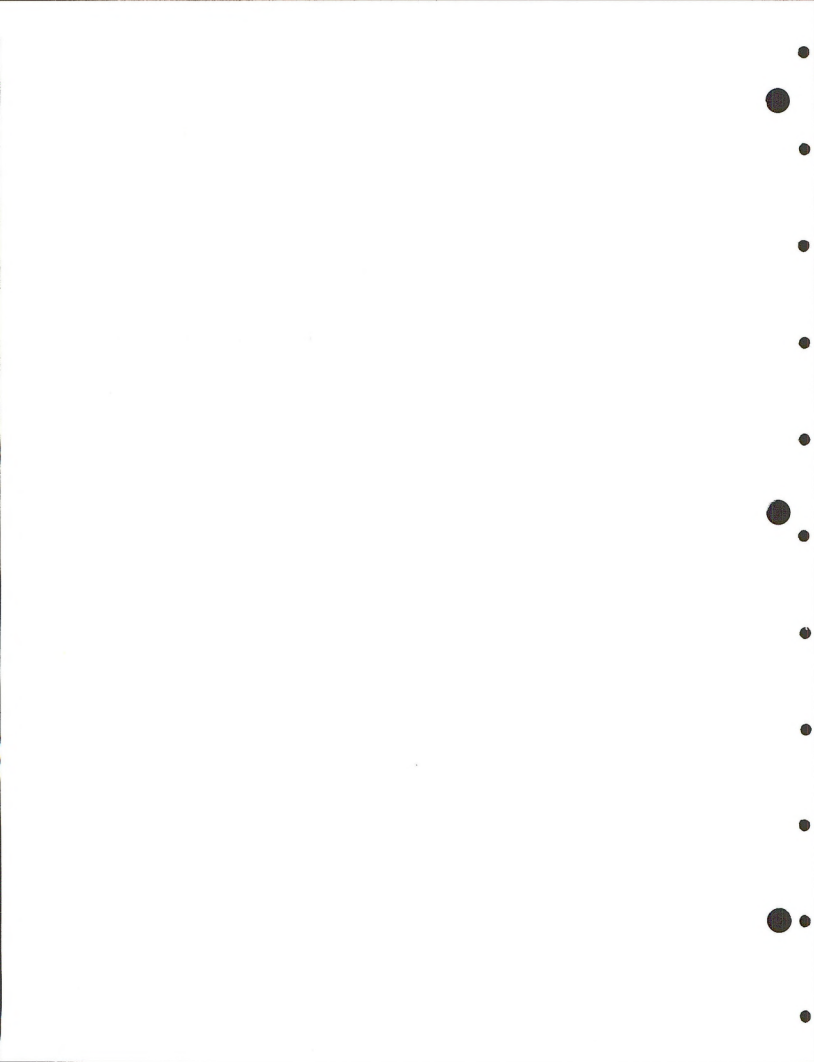


Summary: Recent Growth

The growth in Uintah County during the 1950's was significantly higher than the period prior to World War II. The major reason was the exploration for and production of oil. The rapid growth rate leveled off during the 1960's when oil production stabilized at approximately 5 million barrels of oil per year.

Between 1971-1974, due to burgeoning activities of oil and gas exploration and production, the more apparent economic indices of population, employment, income, etc. have been increasing at significantly higher rates than those of the 1968-1970 period.

Finally, within the past one to two years, growth appears to have slowed substantially in response to reduced oil drilling activity and completion of the bulk of the construction activity associated with storage and transportation facilities.



CHAPTER III
PROJECTED IMPACT ON EMPLOYMENT,
POPULATION, AND INCOME

This chapter records the results of a regional base analysis which was applied to Uintah County, Utah. The base method begins with the assumption that the extent of non-basic activities in a region depends upon the size and extent of its basic activities. The basic sector includes all those industries that export services or goods outside the area boundaries, or alternatively, all those economic activities which are paid for by persons, firms, or organizations outside the area. The non-basic sector (local services activities) includes all those industries that sell services or goods within the local market, i.e., goods which are paid for by residents of the area. According to regional base analysis, the basic sector is considered the determinant factor or motivating force in the expansion of the economy of an area.

Economic Base Multiplier

A central concept in regional base analysis is that of the employment multiplier. In general terms, the regional multiplier may be estimated from the following formula:

$$M = \frac{\Delta E_t}{\Delta E_b}$$

Where M is the multiplier, ΔE_t is a change in total employment within a region, and ΔE_b is a change in employment in the basic sector.



This can be used to estimate the change in total employment resulting from a given change in basic employment, since

$$\Delta E_b \times M = \Delta E_t.$$

As an example, a regional employment multiplier value of 3 means that if basic employment in a region increases by 1 unit, total employment is predicted to increase by 3 units. Since

$$\Delta E_t = \Delta E_b + \Delta E_n,$$

where ΔE_n is a change in non-basic employment, the change in non-basic employment implied by the example is 2. From the first equation given above, it is clear that it is necessary to estimate the change in total employment associated with a change in basic employment as part of the multiplier estimation process. The usual procedure in other studies is simply to use estimates from other sources. The problem with this approach is that estimates may vary widely from area to area depending on particular characteristics of individual regions. For example, a study of small, remote areas of Canada that were impacted by mining and smelting operations showed that the implied multipliers as measured by the actual changes in employment that occurred in the areas varied from approximately 1.06 to 2.74 for ten different areas.¹

In the present study an employment multiplier for Uintah County was estimated by using the procedure discussed in detail in Appendix A.

¹Graham Armstrong and Andrew J. Freeman, Cost-Benefit Analysis of a Lead-Zinc Smelter in the Northwest Territories, Economic Staff Group, Department of Indian Affairs and Northern Development, Government of Canada, 1969, p. F-2.



In brief, this procedure consisted of gathering data on approximately 200 counties in the western United States which had populations ranging in size from 10,000 to 40,000 persons. The reason for selection of counties in this population size range was to span the anticipated population change of Uintah County. Multiple regression analysis was used to analyze the relationship between employment (by category) and population size for the sample of counties. On the basis of the statistical results a regional employment multiplier for Uintah County was estimated to be approximately 1.8. This estimate is considerably below that of most regional employment multipliers applied to similarly sized regions. As a check on the accuracy of this estimate, a subsample of ten counties was selected from the original sample. These counties experienced unusually rapid growth during 1960-1970 due to impacts such as large construction projects, development of recreational facilities, and unusually rapid industrial growth. In these counties, the actual change in employment divided by the change in basic employment over the period averaged 1.83--very close to the multiplier derived by regression analysis in the present study. If the multiplier used in this study had been used to estimate employment growth in any of these counties, the estimation error would have been quite small. In no case would the error have been greater than 10 percent and in seven of the ten cases it would have been less than 5 percent.

Construction and Operating Employment

The estimated levels of construction and operating employment upon which this study are based are engineering estimates provided



by the White River Oil Shale Project. These estimates (Table 1) are based upon the following sequence: the first two years involve construction of a commercial module demonstration project which consists of one retort having a capacity of approximately 14,000 barrels per day of synthetic crude. This retort will be operational by year three. In year five, construction of additional retorts will begin. By year ten, construction will have been completed on an oil shale mining and processing facility having a capacity of approximately 100,000 barrels per day. Employment of operating personnel will reach a maximum of 2,500 by year ten and will remain at that level subsequently.

Local Service Employment

Regional multiplier analysis suggests that the change in local service employment associated with the changes in basic employment described above will ultimately reach the level of 2,000 persons. This level will be reached by approximately the twelfth year after the inception of the oil shale project. Changes in local service employment are shown in Table 2 and Figure 1.

Although base employment will fluctuate considerably during the construction phase, local service employment will grow at a fairly constant rate until it reaches its equilibrium level after about twelve years.¹ This means that the employment multiplier over the construction phases will vary considerably from year to year. In

¹By assuming that local service employment will grow along a straight-line growth path in Figure 1, this study implicitly assumes a slightly declining percentage rate of growth over the twelve-year period.



Table 1. Basic sector employment levels: construction and operating employment by year for oil shale development in Uintah County.

	Year	Construction	Operating	Total
Demonstration Project Stage				
	1	400	---	400
	2	400	---	400
	3	---	300	300
	4	---	300	300
Construction Stage				
	5	500	300	800
	6	1000	300	1300
	7	1500	300	1800
	8	2000	1500	3500
	9	1500	1500	3000
	10	500	1500	2000
Commercial Stage				
	11	---	2500	2500
	12+	---	2500	2500

Source: White River Oil Shale Project



Table 2. Local service employment by year resulting from oil shale development in Uintah County.

	Year	Local Service Employment
Demonstration Project Stage	1	170
	2	330
	3	500
	4	660
Construction Stage	5	810
	6	1000
	7	1170
	8	1330
	9	1500
	10	1670
Commercial Stage	11	1830
	12	2000
	13+	2000



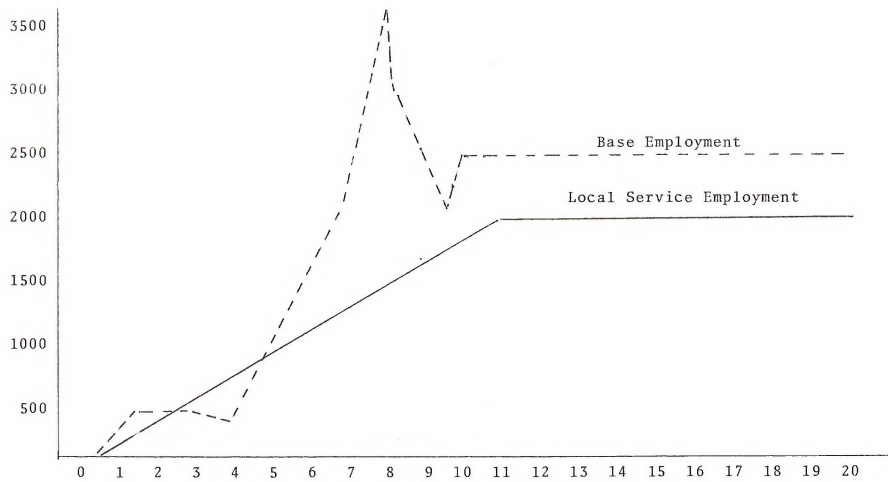


Figure 1. Local service and base employment by year resulting from oil shale development in Uintah County.



fact, the multiplier will reach a maximum of about 3.2 in the fourth year after the inception of the project, while in the seventh through ninth years the employment multiplier will be unusually low. It appears that in the seventh through tenth years problems associated with rapid, "boom town" type growth will be most acute in the Uintah Basin. In terms of Figure 1, the divergence between base employment and local service employment in these years indicates the extent to which local service facilities fail to keep pace with large increases in employment and associated population.

In examining the employment profiles of other counties in the process of calculating the employment multiplier for Uintah County, it was possible to derive coefficients which allow the estimation of changes in employment by industrial category for the local service sector (Table 3). The employment changes shown are the full changes that will have occurred approximately twelve years after the beginning of the project. Estimates for individual years during the construction phases are not shown, since yearly projections by industry are subject to too great an error to be useful. (The sum of the changes in Table 3 does not quite equal 2,000 due to rounding error.)

Table 3 does not illustrate one of the significant features of employment trends in impacted areas. On the basis of the experiences of other areas, it is very likely that there will be a longer time-lag in employment in the professional and skilled technical local service areas than clerical, blue-collar and other job areas. This may result from immobilities or employment practices. Whatever the cause, impacted areas have typically experienced substantial changes in local labor force composition which often results in serious



Table 3. Total change in local service employment by industry resulting from oil shale development in Uintah County.

Industry	Change in Employment
Communications	45
Utilities and sanitary services	56
Banking and credit agencies	45
Insurance, real estate, and other finance	90
Private household	101
Construction	213
Trucking services and warehousing	34
Other transportation	11
Wholesale trade	56
Food bakery and dairy store	90
Eating and drinking places	78
General merchandise retailing	67
Motor vehicle retailing and service stations	101
Other retail trade	202
Business and retail service	67
Other personal service	112
Entertainment and recreation services	11
Hospitals	67
Health services, except hospitals	67
Education	247
Welfare, religion and non-profit membership organizations	78

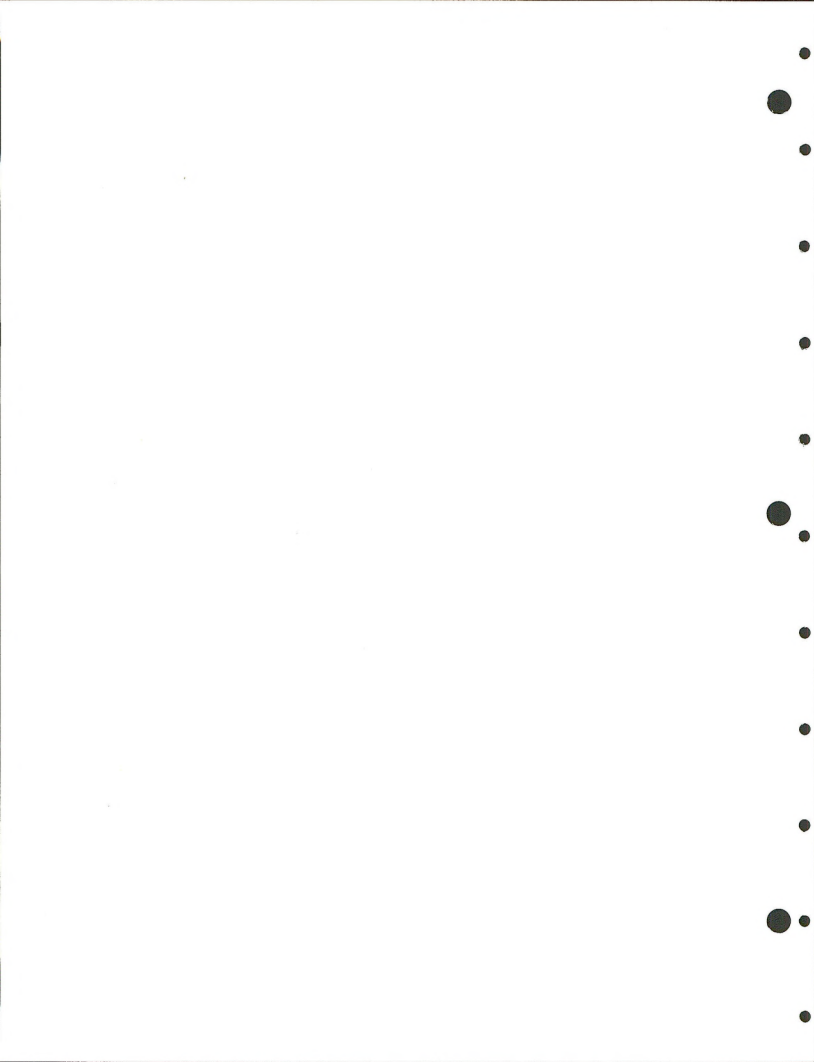


Table 3. (continued)

Industry	Change in Employment
Legal, engineering, and miscellaneous professional services	56
Public administration	112
Total	2006



"bottlenecks" in the provision of certain local services.

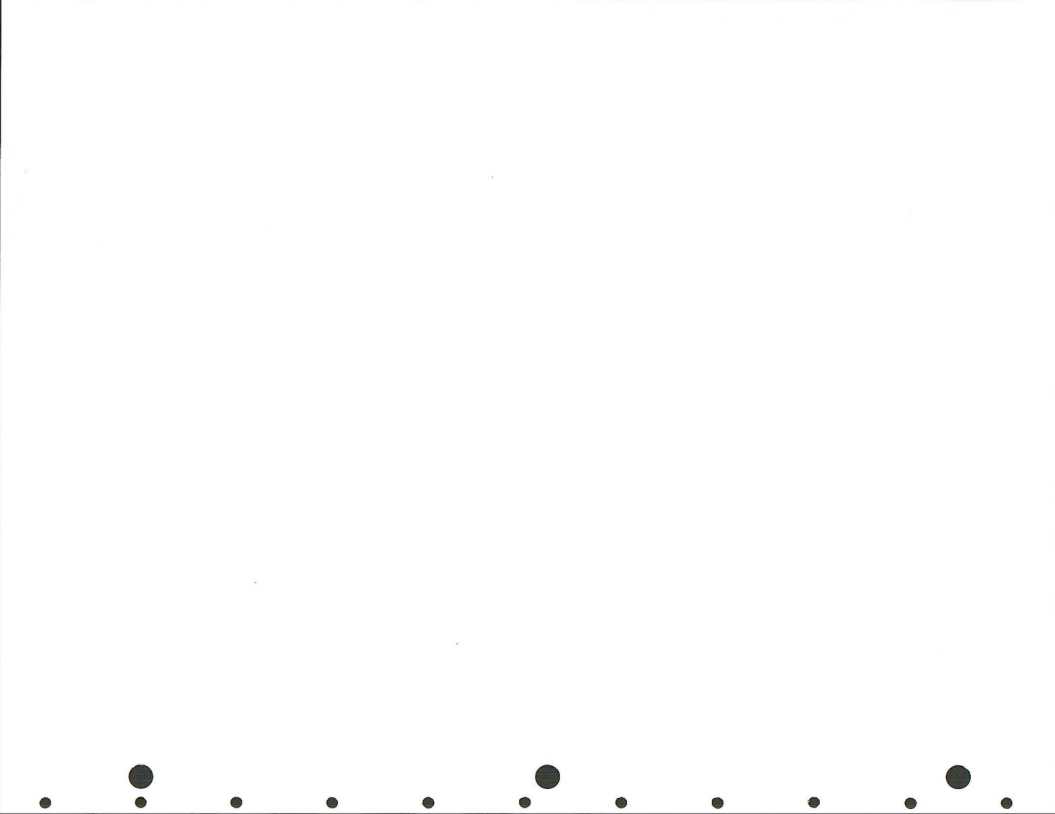
It is desirable to compare the projected effects of oil shale development on population and employment with projections of levels of population and employment that would prevail in various years in the absence of shale development. In the present study, estimates are compared with projections prepared by the State Planning Coordinator's Office known as "alternative future zero." This is specified by the Planning Coordinator's Office "as the projected set of basic employment events viewed as most likely to occur during the projection period (1970-1990) along with total employment and demographic impacts projected to result from these events. Thus, it serves as a baseline projection against which the impacts of [other events] . . . can be measured."¹ Although the alternative future zero estimates are given only for five-year intervals, for purposes of this study, constant rates of change have been assumed between years for which estimates are provided. A summary of the employment comparison through year 1990 is shown in Table 4. (The table is predicated on the assumption that the oil shale project begins in about 1977.) As the final column indicates, the estimated level of employment in the case of oil shale development is approximately 50 percent higher than the level predicted in the absence of oil shale development. Clearly, the impact of the shale development project on Uintah County will be of a substantial magnitude.

¹Utah State Planning Coordinator's Office, Report on the Economic and Demographic Projections of the Utah Process Economic and Demographic Impact (UPED) Model for Alternative Future Zero for the State of Utah and its Multi-County Districts, 1974, p. 7.



Table 4. Comparison of oil shale related employment change with projected employment by year without oil shale development.

Year	Alternative Future Zero Employment	Employment Resulting From Oil Shale Development	Oil Shale Related Employment as Percent of Alternative Future Zero
1975	8302		
1976	8451		
Demonstration Project Stage			
1977	8603	570	6.6
1978	8758	730	8.3
1979	8916	800	9.0
1980	9089	960	10.5
1981	9050	1610	17.8
Construction Stage			
1982	9020	2300	25.4
1983	8990	2970	33.0
1984	8959	4830	53.9
1985	8929	4500	50.4
1986	8849	3670	41.5
1987	8769	4330	49.4
Commercial Stage			
1988	8688	4500	51.8
1989	8609	4500	52.2
1990	8531	4500	52.8



Population

To develop estimates of population changes associated with employment growth in Uintah County, several relevant demographic characteristics must be inserted. In accordance with experience elsewhere and data provided by the U.S. Census, it is probable that approximately 50 percent of the construction workers will be single or will not have wives accompanying them to the area. Approximately 38 percent of the wives who do accompany construction and operating workers will find employment in the local services sector. It is assumed that a negligible number of females will be employed as construction and operating workers. Finally, approximately 36 percent of the operating workers will be single during the first ten years of the project. In accordance with these estimates, Table 5 provides estimates of the numbers of single and married construction and operating workers, and the number of working wives of construction and operating workers. The final column of Table 5 gives the total number of working wives of base employees. When this number is subtracted from total local service employment (Table 2), the result is the number of local service employees who are not wives of base employees. Table 6 gives this figure by year, and in addition provides a breakdown of other local service employees by sex and marital status. Again, approximately 38 percent of the wives of local service workers will themselves be employed in the local service sector.

In the United States, the average household size is 4.3 for those households whose "head" is in the 35 to 44 age group. Combining this with demographic characteristics noted in the previous



Table 5. Marital status and employment status of spouses of construction and operating workers: number of workers by year.

Year	Construction Workers		Operating Workers		Working Wives		Total
	Single	Married	Single	Married	Husband	Husband	
					Const. Worker	Oper. Worker	
Demonstration Project Stage							
1	200	200			80		80
2	200	200			80		80
3			110	190		70	70
4			110	190		70	70
Construction Stage							
5	250	250	110	190	100	70	170
6	500	500	110	190	190	70	260
7	750	750	110	190	290	70	360
8	1000	1000	540	960	380	360	740
9	750	750	540	960	290	360	650
10	250	250	540	960	100	360	460
Commercial Stage							
11			900	1600		610	610



Table 6. Composition of the increase in local service work force: number of workers by year.

Year	Wives of Basic Sector Workers	Local Service Sector Employment			Wives of Local Service Workers
		Total	Single	Other Married Male	
Demonstration Project Stage					
1	80	90	20	50	20
2	80	250	70	130	50
3	70	430	120	220	90
4	70	590	170	300	120
Construction Stage					
5	170	640	180	330	130
6	260	740	210	380	150
7	360	810	230	420	160
8	505	825	245	415	165
9	650	850	240	440	170
10	460	1210	350	620	240
Commercial Stage					
11	610	1230	360	630	240
12	610	1390	400	720	270
13+	610	1390	400	720	270



paragraph, appropriate calculations yield annual population estimates and a summary of employment totals (Table 7).

Population continues to rise even after year twelve, at which time construction will be entirely completed and the increase in local service employment due to expansion of the basic sector will have reached its maximum. The reason for continued moderate population growth is that operating workers and new local service workers will take on the demographic characteristics of the population as a whole rather than those of a more transient population. Specifically, the percentage of married persons in this group will rise from less than 50 percent to 90 percent by year twenty. In addition, children will be born to this group resulting in an average family size of 3.7 by about year twenty. Whether new spouses of this group come from outside or within the county during this period is irrelevant, since in either case county population will be larger than it would have been without oil shale development.

Table 8 compares the estimated population impacts resulting from oil shale with the alternative future zero (see "Employment" above) estimates. It is estimated that the population of Uintah County by 1990 would be approximately 60 percent larger with oil shale development than it would be in the absence of oil shale development. Although the relative impacts shown in Tables 8 and 4 are quite large, indicating an expansion of employment and population on an order of 50 to 60 percent, the relative effects are not as great as those experienced by some "boom town" areas that have already experienced energy development. For example, the population of Sweetwater County, Wyoming, which includes the Green River and Rock Springs areas,



Table 7. Summary of estimated changes in employment and population by year resulting from oil shale development in Uintah County.

Year	Construction Employment	Operating Employment	Local Service Employment	Total Employment	Population
Demonstration Project Stage					
1	400	---	170	570	1280
2	400	---	330	730	1700
3	---	300	500	800	1990
4	---	300	660	960	2420
Construction Stage					
5	500	300	810	1610	3870
6	1000	300	1000	2300	5420
7	1500	300	1170	2970	6930
8	2000	1500	1330	4830	11440
9	1500	1500	1500	4500	10770
10	500	1500	1670	3670	9020
Commercial Stage					
11	---	2500	1830	4330	10850
12	---	2500	2000	4500	11270
13	---	2500	2000	4500	11580
14	---	2500	2000	4500	11880
15	---	2500	2000	4500	12180
16	---	2500	2000	4500	12480
17	---	2500	2000	4500	12780
18	---	2500	2000	4500	13080
19	---	2500	2000	4500	13380
20	---	2500	2000	4500	13680

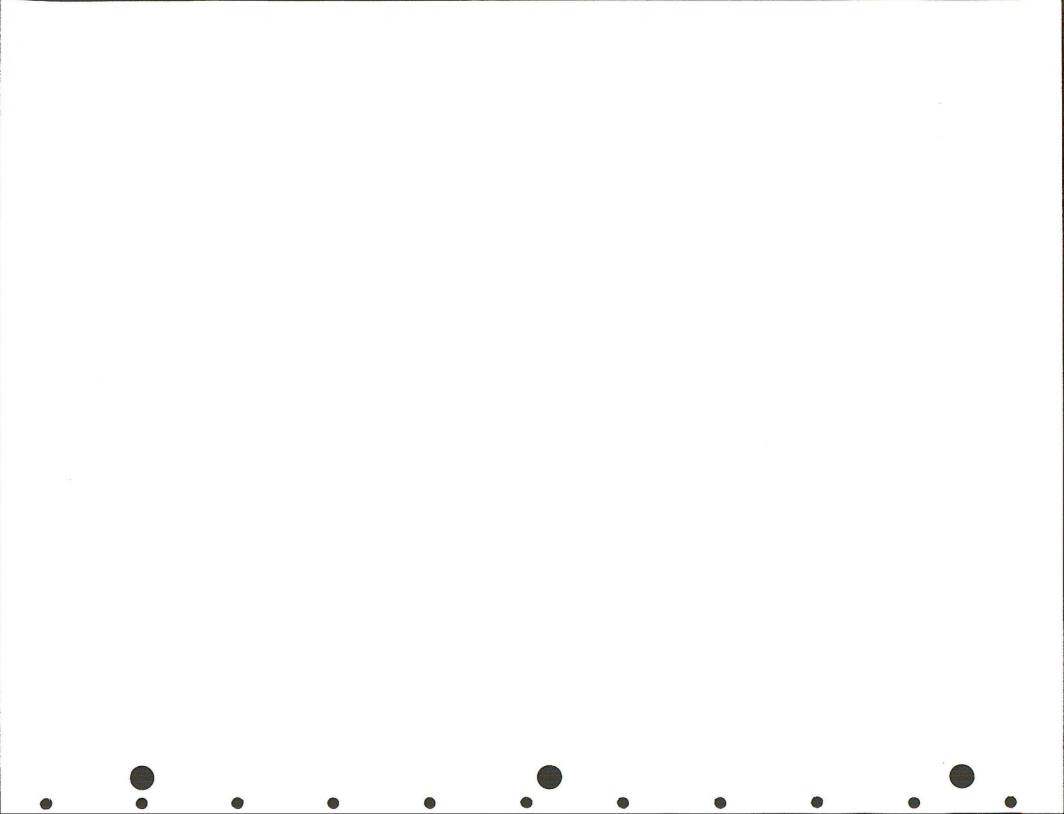
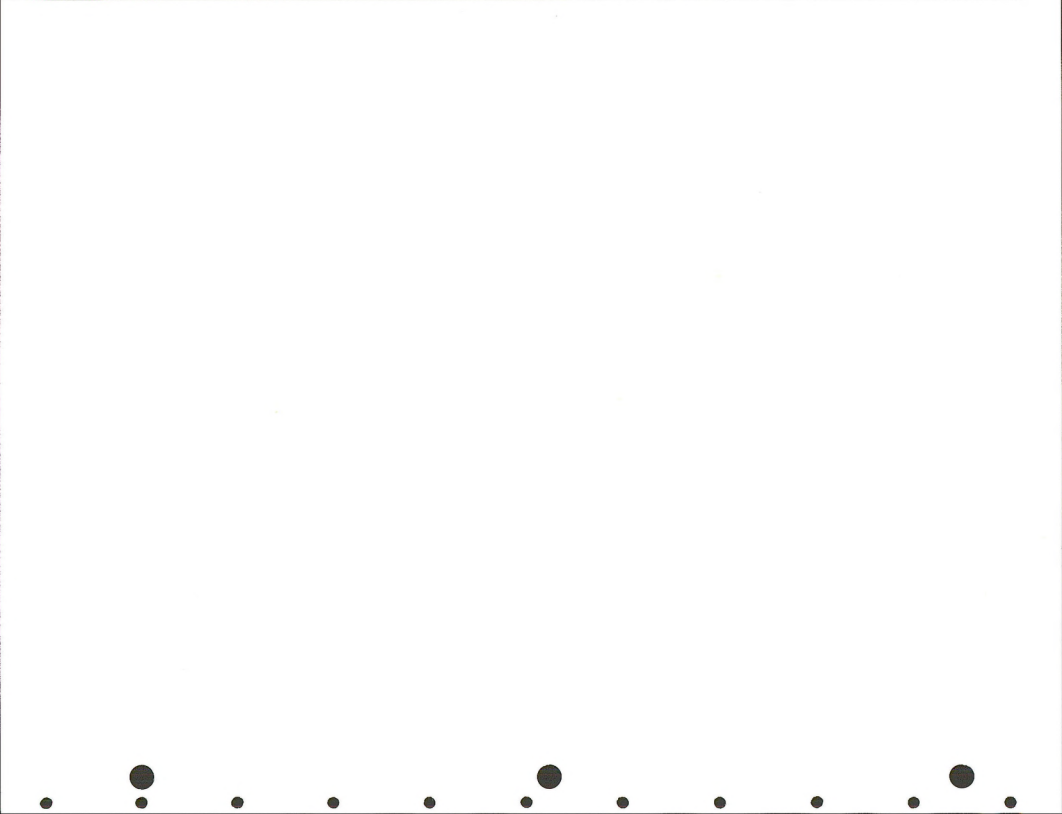


Table 8. Comparison of oil shale related population change with projected population by year without oil shale development.

Year	Alternative Future Zero Population	Population Resulting from Oil Shale Development	Oil Shale Related Population as Percent of Alternative Future Zero
1975	20,563		
1976	20,752		
Demonstration Project Stage			
1977	20,943	1,280	6.1%
1978	21,136	1,700	8.0
1979	21,330	1,990	9.3
1980	21,530	2,420	11.2
1981	21,480	3,870	18.0
Construction Stage			
1982	21,430	5,420	25.3
1983	21,378	6,930	32.4
1984	21,327	11,440	53.6
1985	21,276	10,770	50.6
1986	21,106	9,020	42.7
1987	20,922	10,850	51.9
Commercial Stage			
1988	20,739	11,270	54.3
1989	20,558	11,580	56.3
1990	20,379	11,880	68.3



more than doubled between 1970 and 1974 from about 18,000 to 37,000. Furthermore, the population of Sweetwater County is conservatively estimated to reach over 50,000 by the early 1980's. The population of Colstrip, Montana, increased from about 100 in the late 1960's to more than 3,000 in 1975, and if additional power plants are built, could swell to 6,000 within two or three years. The population of Page, Arizona, another area impacted by energy resource development, rose from about 2,000 in 1970 to 9,000 in 1974. It appears, therefore, that changes in employment and population in Uintah County are likely to be of a substantially lower magnitude relative to the existing population than the changes that have occurred in other "boom town" areas. The expected increment in Uintah County is approximately 1.5 to 1.6 times current population and employment levels, while the increments in other areas have been on the order of 2 to 10 or more. This is not intended to imply, however, that the many problems associated with rapid regional growth will be absent in Uintah County.

Income

To properly assess the impacts on income in Uintah County resulting from oil shale development, it is necessary to project real income increases over the next ten to twenty years. For the United States as a whole, real income per capita has risen historically at a 2-1/2 to 3 percent rate. However, within specific industries the rate of increase is usually less. The reason for this is that national, aggregative data include the effects on per capita income of technological changes which result in shifts of employment between industries. However, in the case of the single industry this source of productivity



increase is absent. A reasonable estimate of the growth rate of real income for workers within the oil shale industry is estimated for purposes of this study at 2 percent per annum. The rate of increase in real income in local service type industries has historically been less than that for the industrial sector for the United States. Therefore, a 2 percent rate of productivity or real income increase in the local service sector has also been assumed. This assumed rate of real income increase, together with employment and current wage and salary incomes in the various sectors, was used to derive yearly estimates of wage and salary income increases by sector resulting from oil shale development in Uintah County. These are shown in Table 9. A word of caution is in order regarding the interpretation of the high values appearing in the sixth through tenth years. A high percentage of income in these years is due to the construction sector, a sector which is unlikely to have as great an effect on the total economy as the operating and local services sectors. This is due to the fact that construction workers who are employed temporarily in a geographical area typically have a relatively low propensity to consume goods and services within the area. As a result, the impact of income in certain years on the level of local economic activity will be somewhat less than is indicated by the income data alone.

The local service sector income estimates given in Table 9 include income of self-employed proprietors. In addition, oil shale development will result in increased property income and transfer payments in Uintah County. Within Uintah County the latter components of income constitute approximately 23 percent of all personal income.



Table 9. Income and income per worker by sector and year resulting from oil shale development in Uintah County.

Year	Construction Sector		Operating Sector		Local Service Sector		Total (\$1,000)
	Per Capita	Total (\$1,000)	Per Capita	Total (\$1,000)	Per Capita	Total (\$1,000)	
Demonstration Project Stage							
1	27,400	10,960			10,500	1,710	12,670
2	27,900	11,160			10,700	3,530	14,690
3	28,500		15,400	4,620	10,900	5,420	10,040
4	29,000		15,700	4,710	11,100	7,370	12,080
Construction Stage							
5	29,700	14,850	16,000	4,800	11,400	9,240	28,890
6	30,300	30,300	16,300	4,890	11,600	11,580	46,770
7	30,900	46,350	16,700	5,010	11,800	13,750	65,110
8	31,500	63,000	17,000	25,500	12,100	16,120	104,620
9	32,100	48,100	17,300	25,950	12,300	18,440	92,490
10	37,700	16,350	17,700	26,550	12,500	20,830	63,730
Commercial Stage							
11			18,000	45,000	12,800	23,460	68,460
12			18,400	46,000	13,100	26,200	72,200
13			18,800	47,000	13,300	26,600	73,600
14			19,100	47,750	13,600	27,200	74,950
15			19,500	48,700	13,900	27,800	76,500
16			19,900	49,800	14,100	28,200	78,000
17			20,300	50,800	14,400	28,800	79,600
18			20,700	51,800	14,700	29,400	81,300
19			21,100	52,800	15,000	30,000	82,800
20			21,600	54,000	15,300	30,600	84,600
21			22,000	55,000	15,600	31,200	86,200



This implies that the total income of Uintah County will rise by about \$112 million dollars above the level that would exist without oil shale development by about the twentieth year after the beginning of the development project. In the absence of oil shale development, it is estimated that total personal income of Uintah County will be \$116 million by year 1990. With the development of oil shale beginning in year 1977, it is estimated that total oil shale related income in 1990, including property income and transfer payments, will be about \$97 million. Thus, the personal income of Uintah County will be about 85 percent higher with oil shale development than it would be in its absence.

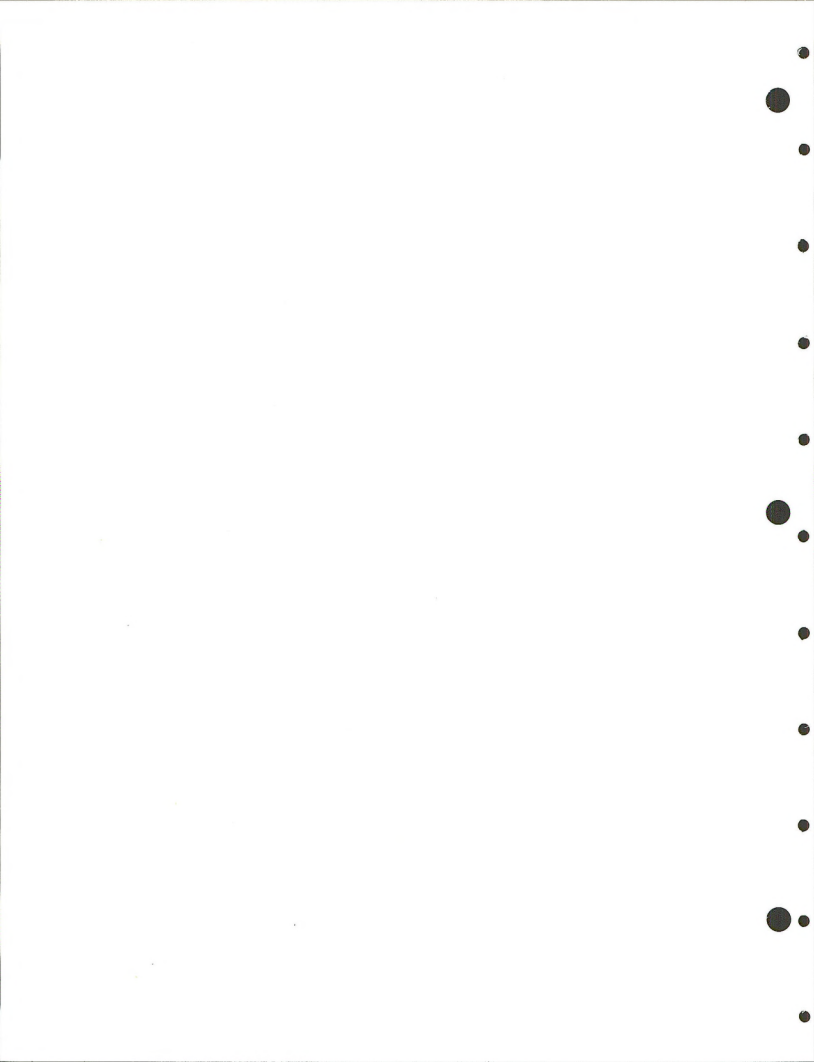


CHAPTER IV
SOCIO-CULTURAL IMPACTS OF OIL SHALE DEVELOPMENT

In this chapter, the socio-cultural impacts associated with the projected oil shale development will be assessed. The chapter will be divided into two sections. First, we will present a historical description of the impact area that will include a discussion of settlement and growth patterns, a description of the unique cultural values associated with rural, largely Mormon communities, and a brief description of important characteristics of the Ute Indian Tribe.

The second section of the chapter will present projected socio-cultural impacts of the proposed oil shale development. This section will include an extended discussion of the impacts of boom growth on areas having somewhat similar historical and cultural patterns to those of the Uintah Basin. Specific impacts on traditional attitudes and values discussed in section one will be assessed. In addition, the effect of boom growth on quality of life and the ability of communities to provide necessary services will be discussed.

Legally required environmental impact statements have tended to emphasize physical and biological impacts of various developments while ignoring or de-emphasizing the social consequences resulting from such actions. Where efforts have been made to assess social impacts, the emphasis has tended to be on short-run benefits and costs as opposed to longer range consequences, and indirect costs have tended to be either ignored or underestimated (Singh and Wilkinson, 1973).



This often leads to a situation in which social impacts are assessed only to the degree that the resultant environmental impact statement will meet the requirements of the law and promote an official go-ahead on the proposed project.

The evaluation of social impacts, then, has frequently been the unwanted step-child of the environmental impact assessment process. The budget for and the assignment of personnel to this phase of the larger process has usually been small in comparison to total budget and personnel commitments. A partial consequence has been the intermittently slow development of a social impact assessment technology. How do we go about measuring social impacts and what exactly should be included in the study? The Environmental Policy Act of 1969 directs all Federal agencies to "identify and develop methods and procedures which will insure that presently unquantified environmental amenities and values are given appropriate consideration in decision-making along with economic and technical considerations." The law provides highly ambiguous instructions, however, for the person seeking to study social impacts that will be associated with a development (Singh and Wilkinson, 1969).

To overcome some of the problems that have been readily evident in many of the earlier efforts, we established goals for the development of the social impact portion of this study. First, we assume comprehensiveness by assessing impacts on individuals, groups, and communities. Impact assessment studies have frequently dealt with one or two of these levels but few have been concerned with all three. Second, we attempt to assess long- as well as short-run social impacts. Many large scale energy development projects have projected



lifespan in the neighborhood of 30 years. Obviously, community and lifestyle patterns can change dramatically in those years. Will such changes impose negative social effects when the resource is gone and the community is faced with the responsibility of adjusting to decline? Third, we attempt to fit our assessment of social impacts into a model that has applicability beyond the particular problem and geographic area that are of prime concern. Toward that end, we use data from a number of other areas in the Rocky Mountain West that have experienced or are experiencing changes similar to those projected for the Uintah Basin. Data from these other areas are not used to suggest that identical problems will emerge in the Uintah Basin but to indicate that many of these problems can be avoided with sufficient advance awareness, concern, and preparation.



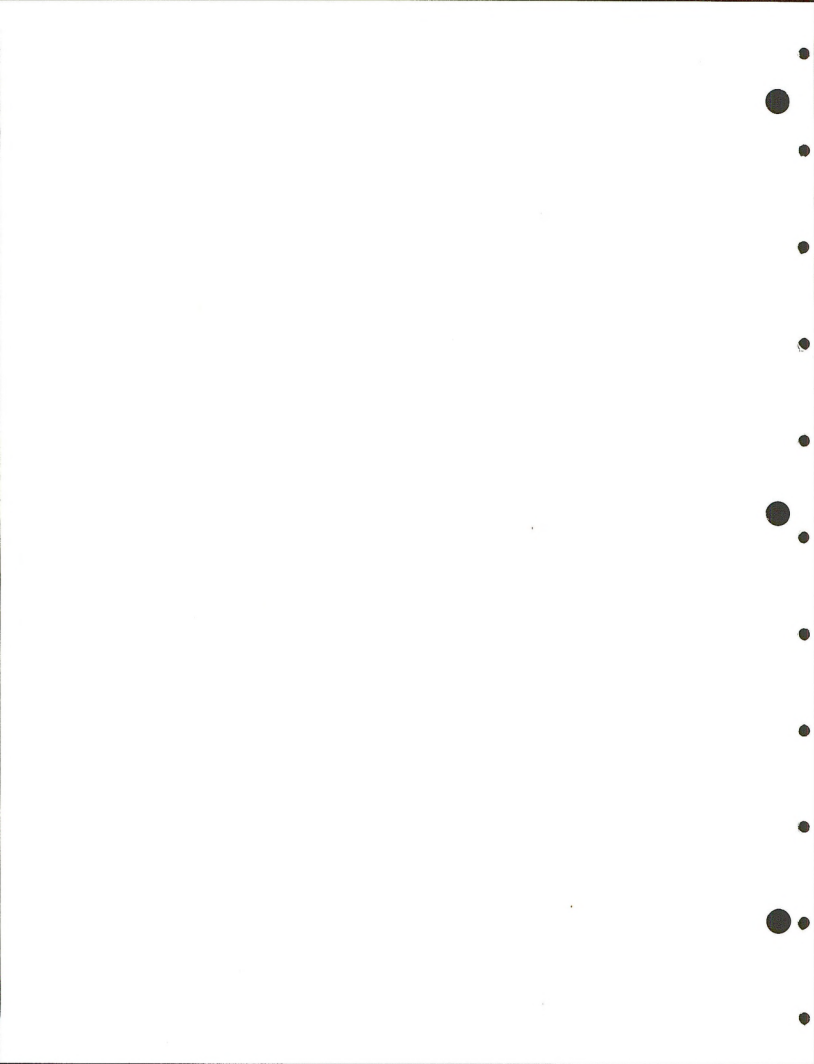
HISTORICAL BACKGROUND

Socio-cultural impacts of energy development in sparsely populated areas will be determined in part by the historical background of those areas. For example, areas that have experienced little social change in the past, that have been largely isolated from the outside world, and that are fairly homogeneous in terms of cultural, ethnic, and social characteristics will be more severely affected by growth and change than will more heterogeneous, dynamic areas.

The Ute Indians

Like other Great Basin groups, the Ute Indians of the Uinta Basin obtained a rather meager living from wild species of plants and animals that were available in their desert and mountain habitats. Divided into three distinct groups (the Uinta, White River, and Uncompahgre Tribes), the Utes wandered over a relatively wide area where they gathered roots and berries and hunted small animals. Their small homes were usually temporary structures made of brush and grass (Dale, 1971). Later, some Utes obtained horses, became more mobile, and began to hunt large game including the buffalo.

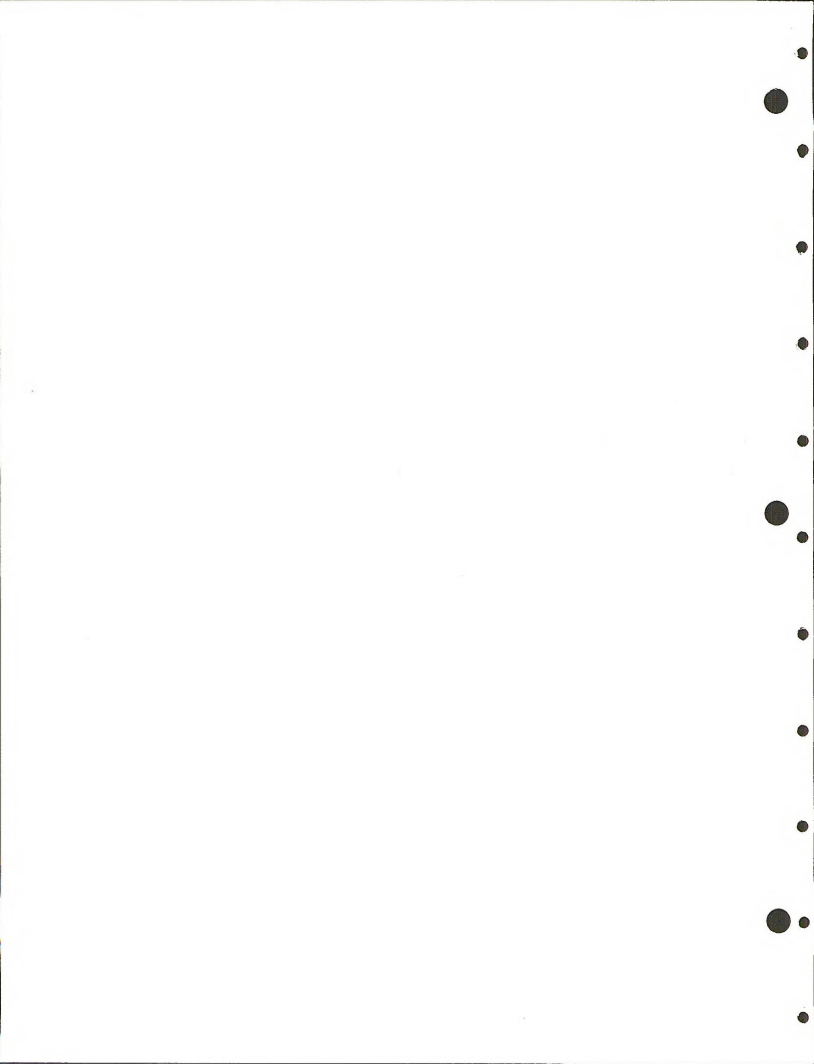
When the Mormon pioneers moved into Utah from Illinois, they won the initial friendship of the Utes by their kindly overtures. Brigham Young was always generous in his dealings with the Indians and urged his people to treat them well at all times (Dale, 1971: 65). Mormon colonization of the Uinta Basin, however, generated conflicts between Mormons and Utes.



John Wilson, appointed Indian agent in 1849, urged that the Utes be taught the white man's ways. However, he also urged that they be located in a spot that was remote from white settlements (which usually meant in an area for which the whites had not yet found any use). It was paradoxical that while declaring that the Indian's future lay in agriculture, the reservations were so arid that farming was virtually impossible. Early white settlers were ready to accept the belief that the Indians preferred to live in the most desolate and unfruitful regions of the country. However, prior to white encroachment, the Indians were usually found in the most productive areas including the fertile river bottoms.

The Uintah and Ouray Reservation was established by Executive Order in 1861. This order set aside 2,487,470 acres for various bands of the Utes in the Uinta Basin. The Uncompaghre Reservations, also set aside by Executive Order, added 1,933,440 acres. Throughout this period of early contact, the Utes had a generally troubled relationship with the federal government. White settlement of portions of the better reservation land exacerbated some of these problems but eventually led to the achievement by the Utes of some rather sizeable land settlement claims from the government.

The Tribe is organized under the Indian Reorganization Act. The Utes have a constitution and charter. Tribal affairs are governed by a tribal business committee made up of six elected members (two each from the Uinta, White River, and Uncompaghres). Terms of office for the Business Committee are four years. The Business Committee has the power to negotiate with Federal, state, and local governments, approve or veto the disposition of tribal lands, regulate all tribal



economic affairs and enterprises, promulgate and enforce tribal ordinances, and levy taxes upon tribal members.

Significant progress and development have been noted in recent years among the Utes. Robert L. Bennett (1961-1962) observed:

The Ute Indian people are living at a standard of living higher than any they have ever enjoyed. Their way of life has been revolutionized by the availability of automobiles, electricity, modern plumbing, household appliances to fit almost every need. The children are going to public schools in good clothing. Their education is being supplemented by a recreational program . . .

Taking everything into consideration, the future development of the Ute appears uncertain and hazardous. Fewer irrigable acres are being used by Indians than before the program started and livestock ownership by Indians of both sheep and cattle is down considerably. Failure to build a firm economic base for future income is the real dilemma facing the tribal members and the tribal leadership.

The Ute Indian people, after the expenditure of over eight million dollars in the past three and one-half years, are still at the crossroads. There are two ways in which economic security can be met. One is through continual distribution of tribal funds per capita, which practice would insure temporary relief and continue the temporary and artificial standard of living presently achieved through unearned income distributed during the past ten years. The outcome of this experience has been that the people dispose of their assets and capital when unearned income in the form of per capita payments ceased to be regularly maintained. Another way to achieve economic security is to build industries and tribal enterprises through the development of reservation resources.

Since that time, several tribal enterprises have been developed or expanded, including the Bottle Hollow Resort complex, the Ute Scientific Laboratory, Ute Fabrication, and the Ute Livestock Enterprise. Thus, Bennett's observation that tribal economic security could be built upon industry and tribal enterprises using reservation resources has moved well along the road of fruition.

Development of the oil shale industry in the Uintah Basin will further this process. Indians are already benefiting economically



from mineral resource royalties, which may be greatly expanded.

Such expansion, however, would also entail some significant costs to the tribe as well. Like the traditional rural Mormon community, the Uintah Utes have a culture and lifestyle that might not survive. The Utes are already experiencing serious alcohol abuse and related social problems. Boom growth resulting from oil shale development could make them even more of a minority in their own land. The associated adjustment problems and erosion of the traditional Ute culture are among the most serious potential hazards of a booming oil industry.

Anglo Settlement of the Basin

Anglo settlement of the Uinta Basin did not begin until 1877, although the area had been explored by the Escalante Expedition in 1776 and by a Mormon scouting party in 1861. Although Mormon leader Brigham Young had heard glowing accounts of the area, the scouting party he sent reported that the area was useful only to "help hold the world together." Mormon colonization efforts were therefore directed toward Southern Utah instead.

After creation of the Uintah-Ouray Indian Reservation, however, Mormons began to settle the arable land surrounding the reservation. Vernal was established as "Ashley Fork Center" in 1878 and was soon joined by a half-dozen other farming and ranching communities in the area. Meanwhile, forts and trading posts cropped up to "aid the Indians and guard the frontier." The community of Roosevelt, named after President Theodore Roosevelt, was established in 1906 and was the only town in the Basin to grow during the depression era.



The new communities of the Uinta Basin grew rapidly at first. For example, the population of Uintah County was 2,762 in 1890 and 6,458 in 1900. The rate of growth then slowed considerably and remained low until recent energy-development related growth. The county population was 7,050 in 1910, 10,035 in 1930, 10,300 in 1950, and 11,582 in 1960.

The more rapid rates of growth in recent years in the Basin have been directly related to oil and related resource development. Though a state report on county resources in 1940 noted that "there appears to be no important mineral production in Duchesne County," it has been development in this and related resources that now accounts for the growth experienced in the area. The 1940 report went on to discuss the potential of gilsonite and coal and only as an after-thought did it mention that, "the U.S. Geological Survey also reports the occurrence of shale (oil) . . . "

The effects of oil and oil shale development on demographic patterns in the Uinta Basin cannot be overemphasized. Without the discovery of oil, it is likely that many persons would have concurred with the report of the early Mormon scouts on the usefulness of the area. The population of Duchesne County was significantly lower than in 1920. The entire area experienced the outmigration of significant proportions of its most able young people until quite recently. Economic stagnation and decline had been the rule rather than the exception until the growth of the oil industry in the area. A Roosevelt City Councilman has noted, "Cattle have gone to pot, so has farming. We would have been in bad shape here financially without the oil companies" (Shale Country, May, 1975: 10-11). Nevertheless,



the projected changes that would be associated with oil shale development have important implications for the area's cultural value systems. It is to an identification of some of these that we now turn.

Unique Socio-Cultural Values in the Impact Area

Any discussion of potential impacts on local social and cultural attitudes and values must be prefaced with an identification of those attitudes and values. As noted, Anglo colonization of the Basin developed under the direction of the Mormon Church. The Mormon settlement pattern deviated in important ways from what prevailed in most other areas of the nation. The usual pattern had settlers in isolated homesteads with towns developing around supply and marketing location. The Mormons created rural villages (Nelson, 1952) that were laid out on the square, with wide streets. Each family was given only one to two acres within the village, thus necessitating daily travel between home and outlying farmlands. Initially, land holdings tended to be relatively small as equal land distribution was the rule. This pattern of settlement permitted collective activity and political organization much sooner than did the isolated homestead pattern.

The high proportion of residents of the Uinta Basin belonging to the Mormon Church and the resultant cultural homogeneity continue to influence the development of the area. We say this in spite of the conclusion of many social scientists that religious affiliation and activity have relatively small demonstrable effect on the lives of believers (Clark, 1958). Contrary to the conclusions of Clark (1958) and others, studies have documented that traditional Mormon values and practices demonstrably affect the believers' adaptation



to their environment (Nelson, 1952).

Family values. The cultural and belief patterns relevant to our discussion of socio-cultural impacts of projected oil shale development include a considerable emphasis upon family life and the sanctity of the home. Premarital chastity and marital fidelity are stressed and children are highly valued, leading to Mormon families that are significantly larger than the national average. Certainly pre- and extra-marital sexual behavior, divorce, and family instability occur among Mormons, but the church philosophy opposes such actions and both preventive and remedial programs have been inaugurated. The influence of these values and programs is perhaps illustrated in the low rate of illegitimacy in Utah (19 per 1,000 live births compared to a national average of 73 per 1,000 live births) (Brinkerhoff and Kunz, 1969).

What this means for any impact analysis is that a projected influx of a large number of workers from different religious and cultural backgrounds can be viewed as threatening by Mormon communities. A large influx of male construction workers, for example, might endanger traditional moral and family values. The local communities seem to have adjusted relatively well to population growth and diversification so far associated with resource development in the Uinta Basin. Nevertheless, some adverse impacts on traditional cultural attitudes and values related to family patterns can be anticipated.

Importance of Education. Educational attainment has been strongly emphasized since the early organization of the Mormon Church. This emphasis is readily demonstrated. In 1922-23 Utah had a rate



of college attendance among its young people twice as high as the national average. Thorndike (1943) documented that prior to 1942 Utah had the highest rate of production of men and women entered in American Men of Science, Who's Who in America, and Leaders in Education. In 1960, Utah ranked first in the nation in median number of years of school completed, first in percentage with at least four years of high school, second in the percentage of population with four or more years of college, and fourth in percent of population classified as literate (Brinkerhoff and Kunz, 1969).

The educational gap between Utah and the rest of the nation has been closed somewhat, with the 1970 census revealing that Utah median education (12.5) barely exceeded the national average (12.1). Over two-thirds of the residents of Utah have completed high school, however, while this is true for just 52 percent of the nation as a whole. Over 30 percent of Utah residents have attended at least one year of college as compared to a national average of just over 20 percent.

Educational patterns of Uinta Basin communities are in some ways more like the national figures than Utah averages. Both median number of school years completed by persons 25 years and older residing in Uintah and Duchesne Counties in 1970 and the percent of high school graduates of this group are almost identical to national averages and somewhat below the Utah figures. With a highly educated population, a significant proportion of the most able young persons are expected to migrate in search of additional education or employment consistent with their training. Industrial growth can reverse such migration patterns. In addition, the traditional emphasis on education means



that a fairly well educated local population will be available for participation in industrial development or may be interested in moving back to the area when employment opportunities become available.

Emphasis on Law and Order. Rural Mormon communities with their systems of informal social control have been noted for their low rates of delinquency and crime. The rapid growth in crime rates in the United States has been slow in coming to these areas. In addition, the ruralness of these communities has contributed to the emphasis on self discipline.

Crime rates are not available for the individual counties in question but a comparison of the State of Utah with other intermountain states as well as with the nation as a whole is informative. The rate of occurrence in Utah is significantly lower for six of the seven major crimes (murder, rape, robbery, aggravated assault, burglary, and auto theft) as compared to the national average. While not always the lowest of the intermountain states, Utah overall has as low if not lower crime rates than any of its neighbors.

Local culture and values have influenced local and state laws. For example, Utah has very stringent liquor laws including an ordinance prohibiting "liquor by the drink." Population growth and particularly the population diversification likely to be generated by a developing oil shale industry in the Basin promises conflicts between such values and those of some elements of the incoming population.

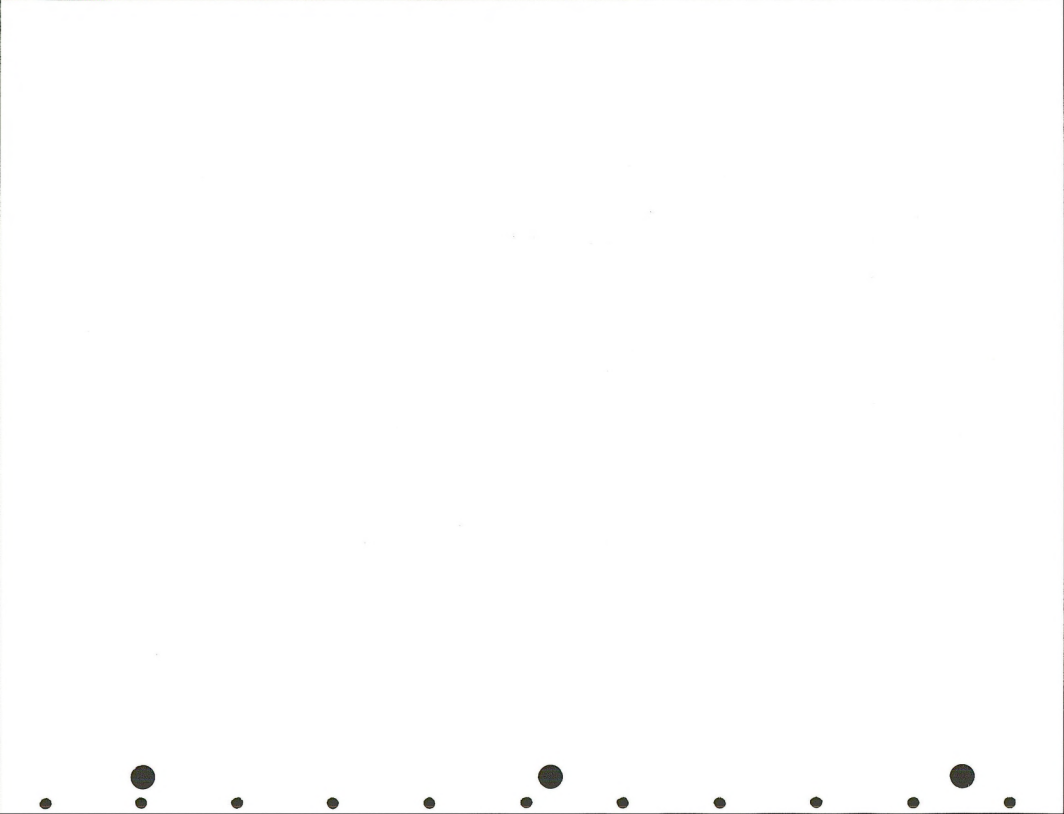
Emphasis on Local Government. The ideology of the Uinta Basin and Utah in general has traditionally stressed loyalty to the



Table 1
 RATES OF SEVEN MAJOR CRIMES FOR 1970
 FOR INTERMOUNTAIN STATES

	<u>Murder and Non-Negligent Man-Slaughter</u>	<u>Forcible Rape</u>	<u>Robbery</u>	<u>Aggravated Assault</u>	<u>Burglary- Breaking Or Entering</u>	<u>Larceny- Theft</u>	<u>Auto Theft</u>
United States	7.8	18.6	171.5	163	1,075	2,059	454
Montana	3.2	10.5	22.3	75	594	1,956	422
Idaho	4.6	12.3	20.5	86	674	2,214	144
Wyoming	5.7	12.3	22.0	73	646	2,049	165
Colorado	6.2	36.0	129.1	185	1,381	2,992	588
New Mexico	9.4	21.7	66.1	196	1,142	2,408	392
Arizona	9.5	27.0	120.2	214	1,493	3,550	501
Utah	3.4	10.9	53.1	70	915	2,883	316
Nevada	3.8	19.6	188.4	182	1,661	3,044	661

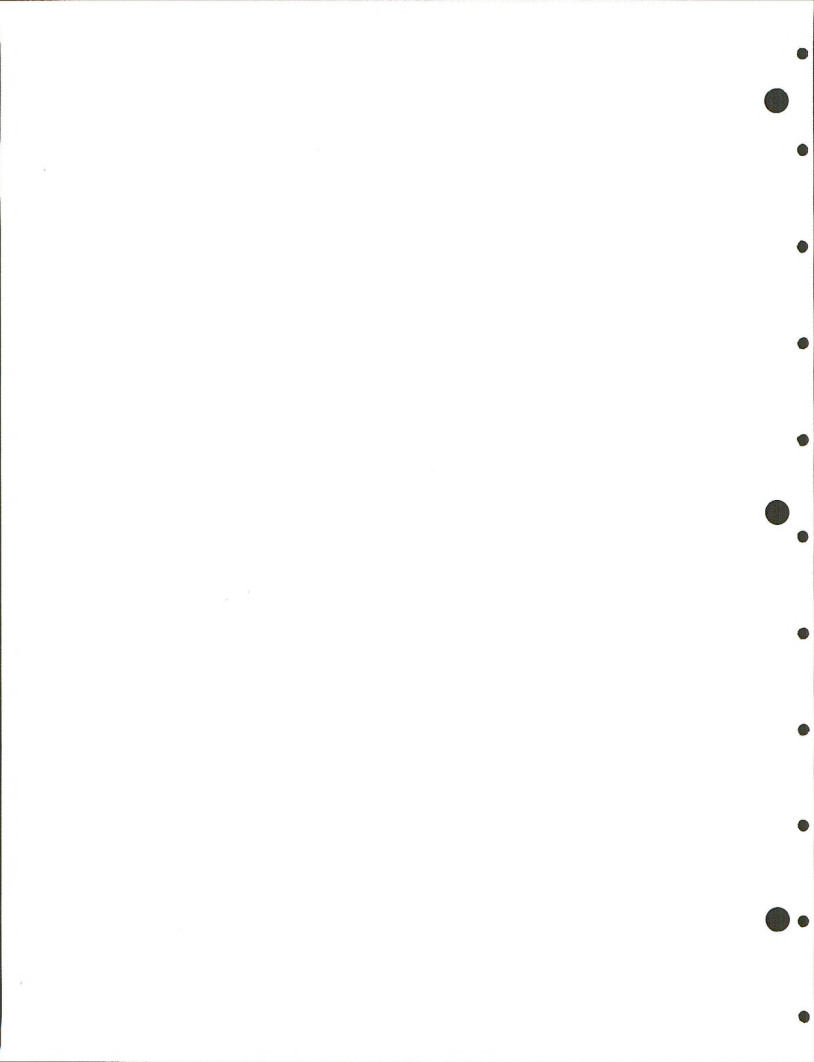
Source: U.S. Bureau of the Census, Statistical Abstract of the United States: 1974 (95th Edition) 1974, Washington, D.C.: U.S. Government Printing Office.



constitutional government. This has been evidenced by a high level of participation in the armed services, of voting in national, state, and local elections, and so on. Utah's voting rate has consistently been well above the national average and significantly higher than those of the other intermountain states (Brinkerhoff and Kunz, 1969). It is important to recognize that Utahns characteristically favor problems and programs being handled on the local level. Political ideology tends to be fairly conservative, which is consistent with the stress on law and order and local government. This conservatism and localism influences individual's perceptions of and feelings about federal agencies and their rules, as well as about extra-local organizations and industries that can exert substantial control over local decision making. The projected oil shale development could strengthen unfamiliar political philosophies; local citizens would probably try to resist this and, in fact, might attempt to keep newcomers disfranchised. Certainly tendencies to shift local control to extra-local businesses and agencies will be resisted.

Emphasis on Progress. While the above four values can be seen in some ways as barriers to local growth and development, the prevailing culture has also characteristically valued progress. The successful Mormon colonization of the intermountain West is partly due to this ideology. The making of the "desert to blossom as a rose" required the utmost of man's ingenuity and technology.

Considerable data have been collected which indicate a strong predevelopment sentiment in the area. Numerous attitude surveys have been conducted in Uinta Basin communities in the last several



years and these have consistently noted that majorities of the sampled local citizens favor continued economic expansion and the development of local resources.

Crawford, Fullerton, and Lewis (1975), for example, report overwhelming support for the development of oil shale in the Basin. In response to the question "Do you approve or disapprove of oil shale development in the Uinta Basin?" a total of 89 percent of their Roosevelt respondents and 82 percent of their Vernal respondents replied in the affirmative. Most of those who did not indicate approval stated that they were undecided rather than opposed. Nevertheless, those polled, especially established residents, perceived a potential for negative impacts associated with rapid population growth. In response to the question "Do you feel large increases in the population would have a positive or negative influence on the community?" 21 percent of the longtime residents indicated that such growth would have positive consequences while 22 percent felt the consequences would be negative. Conversely, 42 percent of the new residents (those living in the Basin for five years or less) felt that large population growth would have positive consequences while only nine percent indicated that the consequences would be negative.

Many of the newcomers surveyed by Crawford, Fullerton, and Lewis felt that the influx of a large non-Mormon population would weaken what they perceived to be Mormon dominance of educational, governmental, and commercial enterprises. Longtime residents, perhaps, simply saw the same change as a negative rather than a positive occurrence.

Earlier surveys indicated that Basin residents often expressed support for what would on the surface appear to be two antithetical



values, rural lifestyle and economic growth. The 1975 survey by Crawford, Fullerton, and Lewis found that new residents were strongest in their support of economic growth while established residents were more favorable toward maintaining traditional rural lifestyles. Significantly, however, neither group was willing to admit that these two values were entirely antithetical. That is, the average Basin resident believed that growth could bring desirable economic stability to the area without necessarily destroying traditional lifestyles and value patterns.

Our own attitudinal survey conducted in Uintah and Duchesne County communities included a random sample of residents of the area using telephone directories and utilities listings as a sampling frame. Questionnaires were personally delivered to the homes of respondents and then picked up a day or two later. If a respondent had difficulty completing the questionnaire, a personal interview was conducted.

Generally, our results were consistent with those of other surveys conducted in the Uinta Basin. Respondents expressed general satisfaction with their communities. However, not all of those sampled felt that recent growth associated with industrial development had made their communities better places to live. In response to the question "Do you feel that past and present growth in this area resulting from resource development has made this community a better or worse place to live?" 65 percent responded positively while 35 percent responded in the negative.

As would be expected, different subsamples in the larger population responded quite differently to this question. Table 2 summarizes responses by length of time in the community, religious

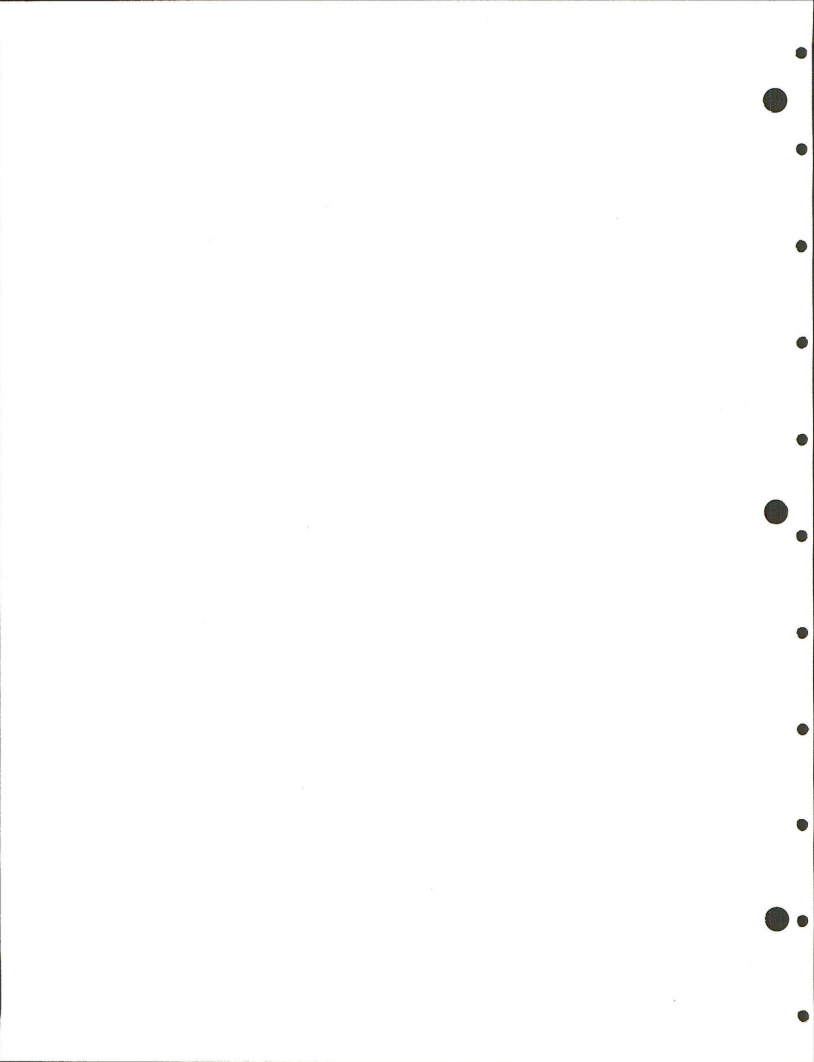


Table 2

THE RELATIONSHIP BETWEEN SELECTED DEMOGRAPHIC VARIABLES
AND PERCEPTIONS OF CHANGE ASSOCIATED WITH ECONOMIC GROWTH

	<u>Growth has made the area a better place to live</u>	<u>Growth has made the area a worse place to live</u>
Years in the Community		
0-5	82	18
6-10	67	33
over 10	57	43
Religion		
Mormon	62	38
Non-Mormon	86	14
Age		
25 and under	78	22
26-35	66	34
36-45	75	25
46-55	63	37
56-65	61	39
65 and over	35	65



affiliation, and age. As can be seen, 82 percent of those persons who had lived in the area five years or less felt the growth resulting from energy resource development had made the area a better place to live. This figure dropped to 67 percent for those who had lived in the area from six to ten years and to 57 percent of those who had been there longer than ten years.

Eighty-six percent of the non-Mormons and 62 percent of the Mormons responded favorably to the growth. Similarly, younger respondents were more likely than older respondents to cite change associated with economic development and population increase as desirable. The most significant differences were between respondents 25 years of age or younger (78 percent) and those 65 and older (35 percent).

In summary, Uinta Basin residents value progress and many of them associate progress with industrial and population growth. They feel generally favorable to past and future changes in their communities. However, there are important differences among different segments of the overall sample. Younger persons, non-Mormons, and those who have lived in the area five years or less are most positively oriented toward future economic and population growth. A majority of most other groups respond favorably though not to the degree of the above mentioned portions of the sample.

SOCIO-CULTURAL IMPACTS ASSOCIATED WITH BOOM GROWTH

Rapid population growth invariably creates significant difficulties for small communities. In recent years data have been accumulated from areas experiencing large-scale energy resource development. A number of other studies dealt with the general



problems associated with rural industrialization and are instructive of possible changes and problems that may be anticipated. We will first review some of the general studies and then turn to research on communities experiencing boom growth from energy resource development.

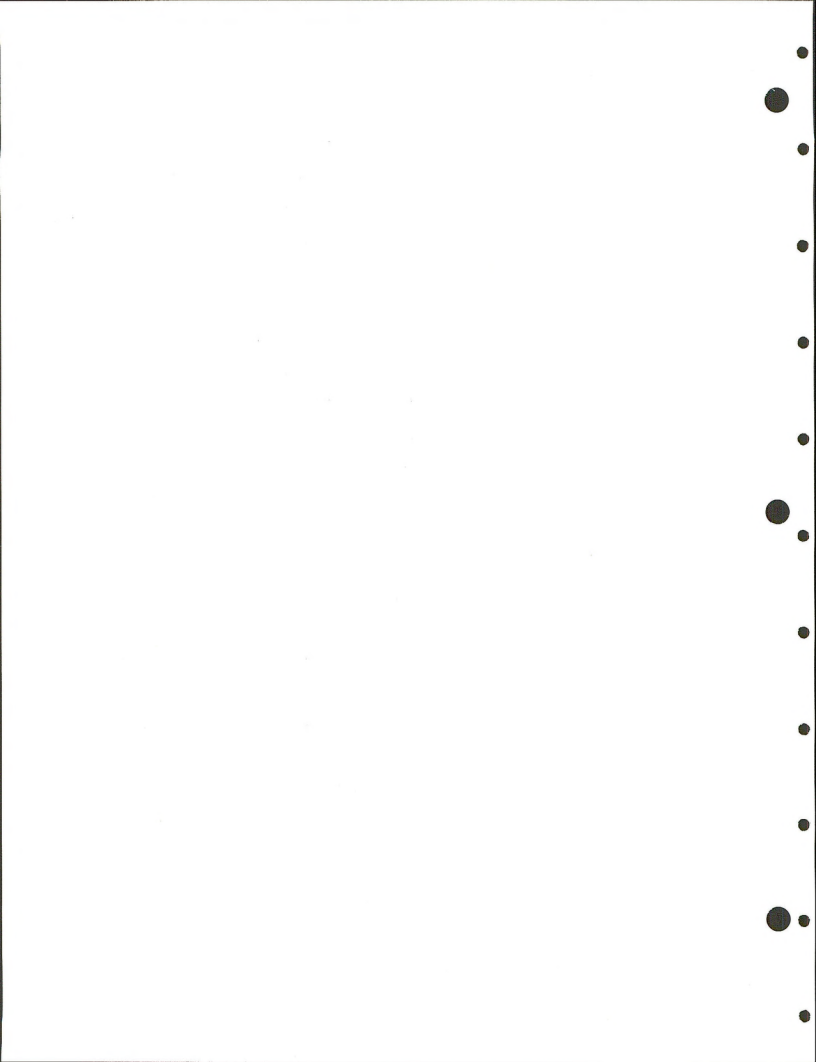
Smith, Hogg, and Reagan (1971) have noted that development projects are often justified in terms of national or regional economies or needs with little attention to specific local impacts. For example, a number of energy resource development projects are being supported in the name of attaining greater national energy self-sufficiency. Thus, the development of oil shale deposits is considered more in terms of meeting national demands for oil than in terms of impacts on the local areas where the shale would be mined and processed.

Given that most of the benefits are exported while the costs are born locally, it is logical to expect the provision of extra-local resources to assist in alleviating negative local impacts of development.

The problems associated with boom growth in areas of the Rocky Mountain West in the past two or three years are currently receiving greatly expanded documentation. Following Gilmore and Duff (1974), these problems can generally be categorized as: (1) associated with a degraded quality of life; and (2) associated with reduced industrial productivity.

Quality of Life Impacts

A degraded quality of life, both for long-term residents and newcomers, has been noted in several studies of boom growth in Western



communities. The degraded quality of life results from housing, health services, recreational and cultural opportunities, and educational facilities all lagging far behind the increased demands and needs for these services. In their study of Sweetwater County, Wyoming, Gilmore and Duff (1974) found approximately 5,000 mobile homes in the county in 1974 with a demand for 1,400 more units of permanent housing. Many of the families residing in mobile homes would have preferred permanent housing but none was available. As additional permanent housing became available, it was usually priced beyond the means of many of the workers. In Gillette, Wyoming, they found that "Massive, unplanned mobile home parks sprung up; sometimes squatter colonies of trailers lacking normal water and sanitation facilities proliferated. The 1973 Housing Inventory . . . indicated 72 percent of the county's nonurban housing stock is mobile homes."

Gray (1974: 4) has noted the incongruity of such conditions; "The greatest irony in these situations is that the workers are not poor, but their living conditions are often worse than those found in urban ghettos . . . These workers often move from one temporary village to another as a way of life; they permanently live in temporary housing. Since so-called temporary housing, such as trailer villages, is usually sub-standard, some of these workers never enjoy the amenities which most Americans with much smaller salaries enjoy."

Gilmore and Duff also found that the ratio of physicians to population declined from one physician per 1,800 people to one per 3,700 people. The mental health clinic caseload expanded ninefold while the population was doubling. Alcoholism rates, broken homes, suicides and suicide attempts increased dramatically. In Rock Springs,



while the population was doubling, the number of annual calls to the police department increased from 8,000 to 36,000. Complaints to one local law enforcement agency increased 60 percent between 1972 and 1973 (High Country News, 1973).

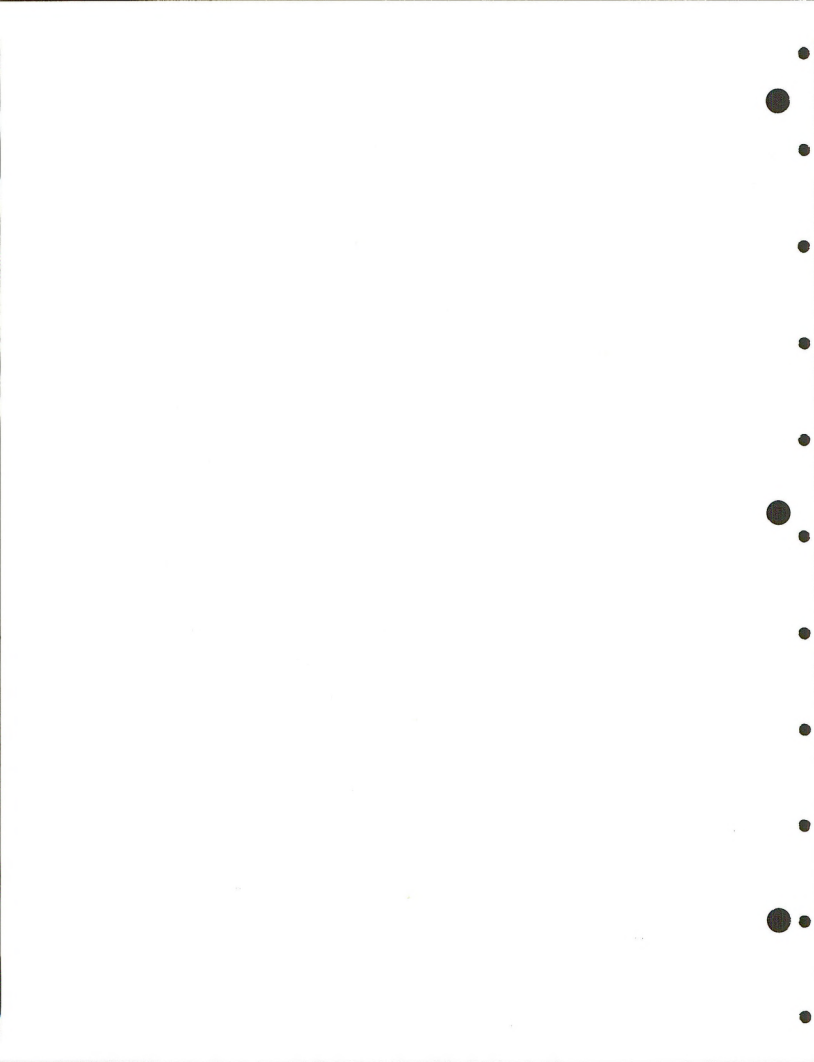
Similar problems indicating a declining quality of life have been noted in other studies of the boom growth in Campbell County, Wyoming. In fact, Dr. ElDean Kohrs, Clinical Director of the Central Wyoming Counseling Center, developed the term "Gillette Syndrome" (named after the boom town of Gillette in Campbell County) to describe the family problems associated with the general breakdown of public service delivery systems and decreased access to a reasonable set of amenities for living. He noted that the wives of the workers often spent their days fighting the wind and mud in crowded mobile homes with no grass, no yard, and no place for the children to play. The frustrated wives snap at their husbands when they return from a 16-hour shift. They, in turn, angrily leave for the local bar where they can drink and trade stories among themselves.

Kohrs (1974) stated that he often had to confront divorce, family tension, emotional damage, and alcoholism as a result of the boom growth in Gillette. Children were forced to attend school in double shifts because of a lack of classrooms, jails became overcrowded, truancy and delinquency increased, drinking problems became more serious, and growing depression led to a rapidly accelerating suicide attempt rate. In fact, Kohrs notes that suicide attempts were rarely successful but seemed to be primarily a means of expressing the feeling that something was seriously wrong and needed to be changed.

As noted, the poor quality of life for newcomers was often



associated with living in fringe settlements because housing and other facilities in existing communities were inadequate. In a survey of families living in Gillette, Doran, Duff, and Gilmore (1974) found that fringe dwellers were less integrated into the community, participated less in community activities, and were less satisfied with their living conditions than were persons dwelling in town. Such a lack of involvement with and integration into the community can have serious implications. Without a sense of belonging or of place, other problems may be compounded and affected individuals may be less able to deal with problems or to join with others in attempting to find their solution. Based on a survey of residents of Sweetwater County, Wyoming, Bickert (1974) states: "There is another problem confronting Sweetwater County--a problem which defies ready solution. That is the general malaise emanating from a number of factors, but principally arising from the lack of real commitment to the welfare of the community. Personal commitment and interest go hand-in-hand with a position of community establishment; e.g., long-time residence, high income, white collar occupation. On the other hand, alienation--the perception of powerlessness in dealing with one's personal environment--is more apparent among newcomers, low income groups, and individuals with a great deal of previous residential mobility. . . . The lack of commitment manifests itself in an unwillingness to become involved in community affairs and a disinterest in local politics. Newcomers perceive themselves as too removed from the power structure to change it. Old-timers may have sought political involvement in the past, but frustration there and with recent community changes has implanted a 'what's the use?'



attitude."

Bickert found that a majority of the newcomers were sufficiently dissatisfied with the community that they were threatening to leave unless some of the major quality of life problems were solved. With boom growth projected for many areas of the West, skilled workers (and probably even many unskilled workers) may be able to "shop around" for areas or communities having the most appealing quality of life. Areas having less attractive living conditions will likely experience high rates of turnover and continuing expressions of dissatisfaction that will be reflected by the problems noted above. That is, workers will stay for awhile and then move on to other areas where the demand for labor is equally high and the living conditions are more appealing.

Perhaps the most difficult quality of life problem, and certainly one of the most prevalent in the rather isolated rapid-growth communities associated with energy resource development in the West, is the problem experienced by the wives of the workers. All of the problems we have identified above are perhaps compounded for the married female population. When decent housing is not available, the wife is the one most affected. She is the one who must spend time in the cramped trailer while her husband is on his job. Inadequate recreational and educational opportunities more seriously affect the wife and mother than the working father. And, too frequently, the wife (especially if the family resides in a fringe trailer settlement) finds it difficult to become integrated into the existing community. The latter problem is compounded when there are significant cultural differences between the long-time community residents and the



in-migrating labor force.

Most of the quality of life problems that we have discussed above apply to the newcomer who comes with the employment boom. However, long-time residents also suffer. For example, many of the traditional cultural and value characteristics of the Uinta Basin communities could be seriously affected. Gilmore and Duff (1974) found that in Sweetwater, Wyoming, many of the old-time residents suffered from the boom financially rather than sharing in its boost effects. Housing and related costs increased rapidly as a function of demand. Long-time residents required to live on the same basic salary they had been receiving found it very difficult to pay the highly inflated prices. In addition, crowding and congestion, increased competition for local services, higher crime rates, community conflicts and disorganization, all contributed to important decreases in quality of life for such persons.

These quality of life problems do not necessarily defy solution. Nor, is it inevitable that because these problems surfaced in Wyoming's Sweetwater and Campbell Counties, that they will occur everywhere. We have emphasized what may be some of the worst examples of declining life quality as a result of boom growth. Nevertheless, reference to these examples should allow citizens and leaders of communities that may someday face similar rates of boom growth in the future to implement solutions before the problems reach major proportions. The important point is that some communities that have experienced rapid growth associated with energy resource development have also experienced some or all of these problems. This fact and its implications should not be ignored.



Reduced Industrial Productivity

A low quality of life in boom towns has been closely associated with serious declines in worker productivity. Between 1972 and 1973, Gilmore and Duff (1974) found that mining productivity dropped by 25 to 40 percent with some construction productivity falling even more. Much of the decline in productivity was directly attributable to employee turnover and absenteeism. Different employers reported 35 to 100+ percent annual rates of turnover.

Given what would generally be considered very attractive wages and salaries, employee turnover is assumed at least in part to be a function of unattractive living conditions. Thus, Gilmore and Duff note that in fairly remote areas where labor must be attracted and retained from elsewhere, quality of life may become a critical factor of production. If lack of acceptable housing and other facilities makes living conditions sufficiently unattractive, then absenteeism and worker turnover become critical production factors that must be considered along with such traditional things as investment capital, land and materials, and labor. They argue that, in isolated rural areas, this implies the whole community must be developed rather than just the industrial sector.

As noted earlier, inadequate living conditions may be especially difficult to accept when the income of the principal wage earner is commensurate with a far more pleasing lifestyle. Thus, for many workers, immediate gratification of certain needs replaces a pattern of deferred gratification. For others, the high wages are accumulated only until the sum can support a move elsewhere. While industrial research has long suggested that productivity is dependent on a large



number of factors that go well beyond the characteristics of the immediate job, it would be difficult to find more supportive data than that noted above.

A Model of Socio-Cultural Impacts

In this section, we attempt to integrate the important socio-cultural and demographic characteristics of the Uinta Basin and impacts associated with boom growth in areas having characteristics that somewhat parallel those of the Basin.

The model used (Albrecht, 1975) depicts both the socio-cultural outcomes of boom growth and similar factors that are likely to affect resource development. As noted earlier, cultural attitudes and values as well as basic demographic characteristics of any impact area are likely to affect its decisions concerning energy resource development. These factors plus national energy needs and the economic potential of the resource itself must be viewed as important in the resource development decision. For example, despite national energy needs, if an economically competitive procedure cannot be developed to process oil shale, then the resource will not be utilized at the present time.

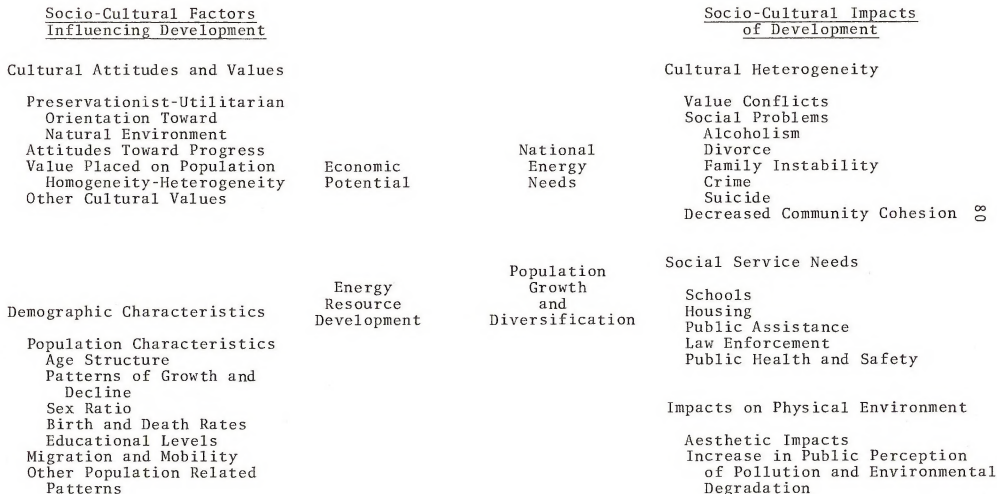
Turning to the outcome side of the picture, the model suggests that the socio-cultural impacts associated with resource development will be a direct function of population change. However, impacts associated with population growth must be viewed somewhat independently of impacts associated with population diversification.

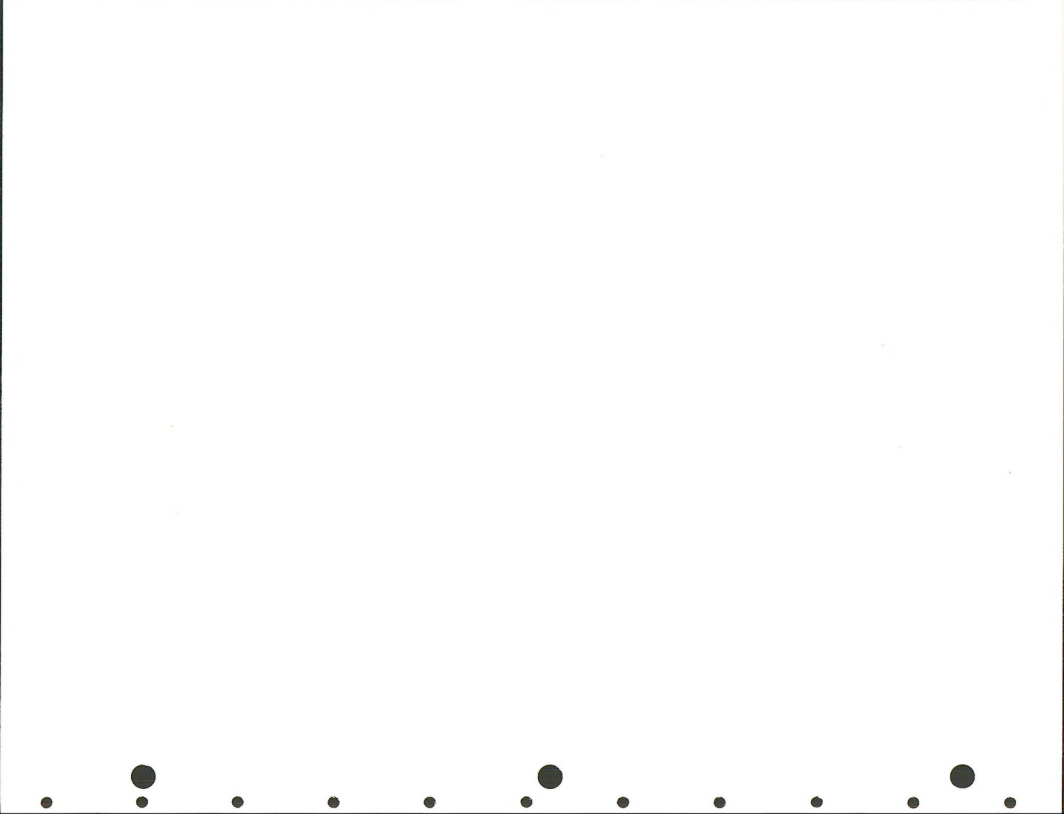
Impacts Associated With Growth. Research conducted in a number of communities in the West has shown that very rapid population



Figure 1

A PRELIMINARY MODEL OF SOCIO-CULTURAL IMPACTS OF GROWTH
ASSOCIATED WITH ENERGY RESOURCE DEVELOPMENT





growth often induces serious strains on community services, and signs of community and personal disorganization such as divorce and family instability, crime, and mental illness are likely to increase precipitously. Thus, if population growth from oil shale development is large, changes summarized in the two bottom rows on the right margin of the model can be anticipated. That is, demands upon basic public services and facilities will significantly strain the communities expected to provide these services. The experiences of other rapid growth areas suggest that the primary pressures will be on schools, housing, public assistance, law enforcement, and public health and safety. Earlier sections of this report have projected specific needs for new facilities and personnel in each of these areas in the Uinta Basin.

As demands for services increase more rapidly than does the tax base, long-term residents are frequently unwilling and/or unable to finance facilities for new residents, especially if these new residents are considered transients. As noted earlier, a lack of adequate housing can lead to the proliferation of trailer court settlements on the fringe of an established town. In addition to problems of sanitation and environmental production, residents of such settlements find it difficult to become integrated into the existing community structure.

Rapid population growth also carries with it the potential of affecting the physical environment in ways that have social well-being and quality of life implications. For example, aesthetic deterioration can lead to greater life dissatisfaction. Surveys have revealed that Basin residents highly value their rural lifestyle



and their ready access to an attractive outdoor environment. Without adequate planning and control, rapid population growth can have a deleterious effect on the attractiveness and quality of that outdoor environment.

Impacts Associated with Population Diversification. The cultural homogeneity of the Uinta Basin communities has already been noted. With the exception of the Ute Indian population, the area is almost totally white in terms of racial extraction. The percentage of foreign born citizens is very low, and the degree of religious homogeneity is high. Such homogeneity has contributed to some clearly identifiable cultural patterns. Not only are most religious activities organized around the dominant church, but so also are many of the social and cultural activities. Immigrants to the area who are not of the dominant faith often find themselves excluded from such activities.

The existing cultural homogeneity (reflected in family and church centered activities), a strong belief in law and order, and a certain degree of suspicion of outsiders will be affected by the in-migration of a work force that is heterogeneous in its traditions, attitudes, and behavior patterns. Cultural heterogeneity has its benefits; however, it does bring a potential for value conflicts and, when combined with a growth rate that exceeds the ability of the community to respond, increases the likelihood of such social problems as alcoholism, divorce, family instability, crime and suicide attempts.

Not enough information is currently available to edict the specific characteristics of potential immigrants who come to the



Basin for employment in the oil shale industry. However, they will almost certainly have more varied ethnic, religious, and cultural backgrounds than the natives.

In summary, Figure 1 depicts socio-cultural impacts that may be anticipated from the proposed oil shale development. Such impacts have been documented in a number of other areas of the intermountain West that have experienced boom growth from the development of energy resources. The key to their occurrence and magnitude often depends upon the rate of population growth and the ability of the community to respond to that growth. However, the model also suggests that even if a growth rate is manageable, some socio-cultural impacts will occur because of population diversification. This is especially likely to be the case when the affected area is characterized by a high degree of population and cultural homogeneity.

Overall Efforts to Improve Quality of Life

To induce workers and their families to move into an area characterized by rapid growth, and to keep them there once they have arrived, several things in addition to attractive wages are necessary. Throughout this chapter we have discussed a number of these. All can probably be included under the general label of "quality of life." For newcomers, satisfactory quality of life would probably include access to various public services and amenities, including health and medical services, public safety and protection, quality educational opportunities for their children, adequate recreation and leisure-time facilities and opportunities, and attractive housing.



A "good" quality of life for newcomers probably also includes an opportunity to become integrated into the community and its affairs. The split between old-time and new residents clearly will negatively offset the life quality of both. Surveys discussed earlier in this chapter have revealed that newcomers to boom communities, especially those living in fringe trailer settlements, are often characterized by high levels of alienation and apathy in regard to active involvement and participation in community affairs. Only by established residents helping the newcomers to become integrated into the community are communication barriers likely to be broken. Individuals who feel involved in community affairs and in actions that significantly affect their lives and opportunities are the least alienated from that society.

Every effort should be extended to improve communication and interaction between established community residents and immigrants. Programs could be established to identify newcomers and make them aware of services and facilities that are available in the community such as shopping, recreation, religious and educational programs, and so on. In very rapid growth areas, the community may even consider providing a telephone referral service newcomers could use when seeking the latest information on housing, community programs, and so on. This concept could even be combined with a HELP-LINE designed to provide assistance in special problem cases such as alcoholism, attempted suicides, and family conflicts.

Day Care Centers of baby sitting referral services could also be established to aid young mothers and to increase their opportunities to participate in community affairs and in leisure time activities.



The booming industry, as well as the communities involved, has an important stake in assuring workers an attractive and appealing quality of life. We have noted above that absenteeism and high rates of worker turnover have characterized the situation in several other boom-growth areas. Attractive wages may keep workers for a while but the probability of absenteeism or turnovers is greatly increased by family discontent. The need to create more attractive communities, then, must be viewed not only as a concern of the communities themselves but also as a responsibility of industry. And, as suggested below, the responsibility may be shared by extra-local levels of government as well.



CHAPTER V

SETTLEMENT PATTERNS AND NEW COMMUNITY DEVELOPMENT

One of the critical issues associated with rapid population and economic growth is where workers and their families are to live. Two alternatives are being discussed and evaluated in connection with the oil shale development contemplated in Northeastern Utah: (1) building a new town near the oil shale lease sites; and (2) permitting already existing communities in the area to absorb the increase in population. We will first define some issues that must be considered in deciding whether or not a new town should be built, and then discuss some legal and governmental questions that building a new town could generate.

Issues in the Economics of Residence Location

Issues to consider relative to building a new town include: (a) a brief description of the geographic and demographic setting in Northeastern Utah, (b) residence preferences of oil shale workers, (c) agglomeration economies in supplying public services, and (d) the private marketplace and community size.

Geographic and Demographic Setting

We estimate that a population increase of about 12,000 people can be expected in the area at the peak of construction activity, and that a stable population increment of 13,680 people will be expected in a fully mature industry producing a total of 100,000 barrels of oil per day from the two Utah lease sites. Where will



this population growth be located geographically? This question is of great importance in the siting and cost of public services and the mix of private goods and services the market will provide. The relationships of existing communities to the Utah oil shale lease sites will be discussed next.

Bonanza, Utah is a village housing a few families associated with the American Gilsonite Company. Bonanza is about 10 miles from the oil shale lease sites; and it is expected that were a new town built in the area, it would be located near Bonanza. Except for a tiny grocery store, Bonanza has no commercial activities and no public services that could be utilized in a large new community.

Rangely, Colorado is the other community near the Utah lease sites. Situated about 22 miles east of Bonanza near the Colorado-Utah state line, its estimated 1975 population is about 2,100 people.

Rangely has a junior college and the public services of typical communities in its size class. A rapid population growth over the past twenty years has been associated primarily with the Rangely oil field. It is a community accustomed to growth and seems to want more. Its location in Colorado, however, is a complicating factor. The mines will be in Utah and so also, it would appear, will be the crushing and retorting plants. Thus, Utah counties and communities will capture the benefits of property and/or severance taxes that may result from shale development. Rangely could therefore have to bear the costs of the population growth without being able to capture the industrial tax revenues.

Surface transportation could constitute a difficult problem. A state highway presently connects Rangely and Bonanza. Coloradoans



might put the Colorado side in excellent shape with the aim of attracting residents to Rangely; but unless Utah cooperates on her side of the state line, the highway to the development site may still be impassable or very costly to utilize. It may be that Utah would cooperate if she wanted the tax revenues but not the people. Given her recent pro-growth stance, however, it seems quite likely that Utah will want both and would take steps to make it attractive for the oil shale people to both work and live in Utah. The following excerpt from the January 15, 1976 issue of the Vernal Express presents the issue sufficiently.

Colorado officials sent out feelers Thursday of last week regarding where oil shale workers in Uintah County will live.

Harris D. Sherman, executive director, Colorado Department of Natural Resources, said he wanted to explore the possibility that Rangely, Colorado be equipped to handle the expected influx of oil shale workers.

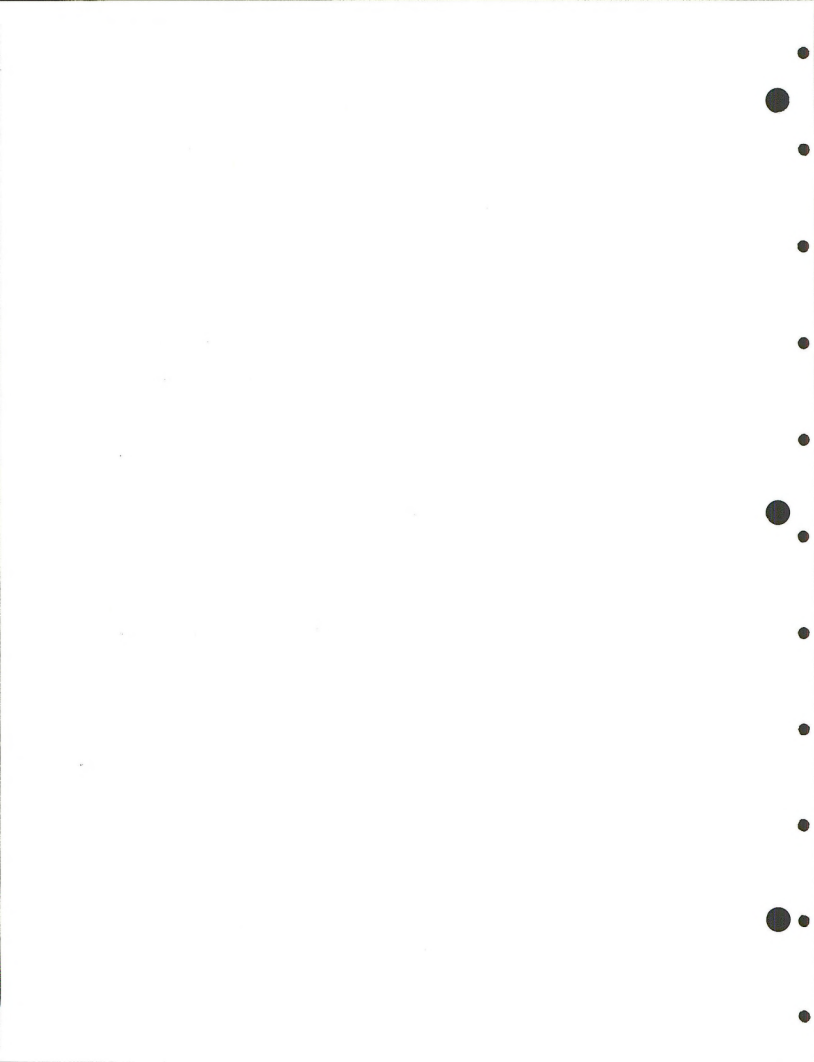
Gov. Calvin L. Rampton said there could be no financial arrangement between the two states whereby Utah would pay money to Rangely for necessary services for the workers, but the two states could plan together.

Rampton said he preferred to see Vernal as the principal hub to handle the oil shale worker influx even though Rangely is closer to the proposed oil shale operation than Vernal.

The Governor told Sherman he didn't think it was right for Rangely to entice the workers of Colorado and then tell Utah officials they caused the problem created by a sudden influx of people.

Sherman told Rampton and the other state officials the state is constructing a road between Rangely and the Utah-Colorado border that could be used by the oil shale workers when they decide where they want to live.

If a new town is not built, much of the population increase would probably be absorbed in and around Vernal. In 1975, Vernal had a population of 6,300 people. Other sections of this report describe the public services offered by Vernal City and Uintah County and the problems associated with increasing these services to meet



the demands of a growing population. Vernal is 45 miles from Bonanza by improved asphalt highways.

Utah is studying ways to reduce this distance and improve the roads so as to reduce travel and time costs for worker commuters. Three alternatives are being studied by the Utah Department of Transportation for linking Vernal and Bonanza, and three others for linking Bonanza to the project site (Vernal Express, 1975). The distance from Vernal to Bonanza is 37 miles under Alternative A. A new highway would be built south from Vernal, with a new bridge spanning the Green River about five miles southwest of the present crossing near Jensen, Utah. This highway would then connect with the present highway, SR-45, five miles north of Bonanza and proceed to Bonanza. The estimated cost of Alternative A is \$8.5 million. Alternative B follows US-40 to the Jensen crossing of the Green River and then proceeds along the southern bank utilizing SR-264 to the spot where Alternative A crosses the river. The route is then the same as Alternative A into Bonanza. Alternative B does not require a new bridge but will require widening the present one at Jensen. Estimated cost is \$8 million. Alternative C simply follows existing highways US-40 and SR-45 and involves upgrading existing roadways and the bridge at Jensen. The length is 45 miles and the estimated cost is \$8.2 million.

At first glance, it may appear that Alternative A is better than the other two, since it involves a shorter distance for only a slightly higher estimated construction cost. This conclusion may not be valid, however, if maintenance costs are added to construction costs, and potential federal-state cost-sharing possibilities are taken into



account.

If other transportation routes were established and improved, Roosevelt with a 1975 population of 4,800 and Duchesne with 3,200 people may also participate in the projected population growth. The distance is only slightly longer from Bonanza to Roosevelt than Bonanza to Vernal. The shortest distance from Roosevelt and Duchesne to Bonanza, however, involves unimproved roads through the Uintah-Ouray Indian Reservation. We know of no plans to improve these roads.

Residence Preferences

Factors affecting residence decisions are complex and vary markedly between individuals and families. Since area population growth associated with oil shale development is now only potential rather than actual, it is impossible to define a sample of people who will ultimately move into the area. Therefore, much of the following discussion is necessarily speculative. The following factors are briefly considered: (a) transportation and commuting times; (b) costs of establishing a residence; and (c) aesthetics and recreational opportunities. The availability and costs of public services will be treated in the next section.

a. Transportation and Journeys to Work

The travel and time costs incurred in getting to work is an important variable affecting choice of residence location. Journeys to work, however, are only a part of the transportation costs borne by a family. People travel to satisfy shopping, recreation, church, education, and a multitude of other needs. The location of goods and services consumed by the family relative to the family residence



partially determine total travel costs. This means that whether a transportation evaluation favors a new town or established communities (such as Vernal and Rangely) will depend critically on the transport services available and on the character and size of the communities being compared.

If the new town can offer a wide range of public and market services, then family trips to other communities will be fewer than if the new town is small. The saving in transportation costs achieved by living in the new town would be great as journeys to work would be relatively short. But, if the new town is small and family services are lacking, savings in short journeys to work could be more than offset by expenditures on family trips to other towns. Bond makes this point in his analysis of residence decisions of farm families in Utah (Bond, 1972). Families living on the farm in rural Utah made more trips to town during an average week than farmers living in town made to operate their farms. Primarily because of this factor, about fifty percent of farm operators in rural Utah counties live in town rather than on their farms.

The transportation cost borne by the typical oil shale family living in Vernal or Roosevelt would depend largely on the conditions extant in journeys to work. Shortened highway distances and good roads can reduce time and dollar costs of living away from the work site. Means of transportation that permit cost-sharing among workers, or among the companies and workers, and allow the workers to read or rest while traveling, would also reduce transport costs and increase the relative advantage of living away from the working site.



b. Residence Establishment Costs

Where a family chooses to establish its residence depends also on the costs of that residence relative to those of alternative locations. Land prices for housing development would probably be much higher in or near existing communities than at a new town. In the latter case, the land is owned by the federal government and a price would have to be negotiated between the government and the developer. One would expect this negotiated price to be much lower than in the Ashley Valley near Vernal for two reasons: (1) the value of most land parcels in its best alternative use (agriculture) is much higher for the irrigated Ashley Valley than for the undeveloped and unproductive desert areas near the oil shale site; and (2) the accessibility of complementary services used in developing lands (e.g., water, sewers, roads, refuse collection, public utilities, etc.) is much greater for areas near already developed locations. This accessibility tends to get capitalized into land values. An acre of undeveloped land near Vernal would therefore have a higher value than an acre near Bonanza, *ceteris paribus*. One cannot conclude from this, however, that it would be less costly to develop the land near Bonanza. The complementary services, already available near Vernal, must be developed and that cost added to the costs of the new land near Bonanza before land parcels can be validly compared. As a matter of fact, if the soil is of better quality and the land basically more productive in the Ashley Valley, then the total costs needed to fully develop land for urban purposes might well be higher for Bonanza than for Vernal.

Over the long run, property taxes also have a bearing on relative

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residence location costs. The tax rate must be related to the services that must be financed from local taxes. In a new town all services must be built from scratch; and unless there is an external subsidy not available to existing communities, it is difficult to see how an equivalent bundle of services could be produced at lower per capita costs in the new town. In fact, the capital costs of establishing the service base would appear to be much higher in the new community. Thus, if anything, it would seem that the per capita property taxes would be higher for the new town.

c. Aesthetics and Recreation

Because personal preferences vary so widely, it is difficult to generalize about the aesthetic value of one residence location relative to another. Some people like to live near the mountains, others prefer the warmth and open space of the desert. Wherever people live, however, they seem to want a variety of recreational opportunities. Some of these are supplied by the private market, with the variety and quality of such services related to the size and affluence of the supporting community. Other recreational opportunities, generally provided by public investment, include public parks, camping and picnicking areas, golf courses and tennis courts, public swimming pools, boating facilities, and hunting and fishing. Some of these public services may be available because a community happens to be located near to federal lands which provide them. Others must be furnished by the community. The ability of a community to finance these services depends on its size and its affluence and its willingness to tax itself to provide capital and operation costs.



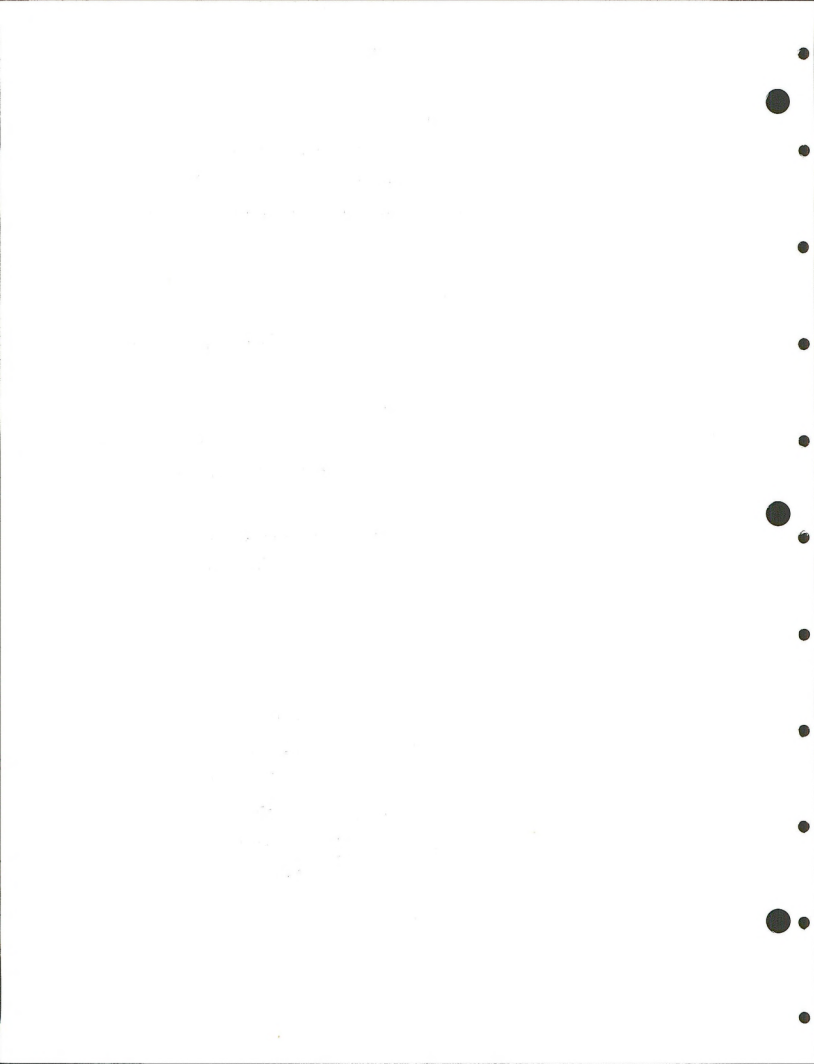
The Vernal area is richly endowed with outdoor recreation opportunities. It has a municipal golf course and a community swimming pool and tennis courts. It is near a National Forest and Flaming Gorge Reservoir, one of the best hunting, fishing, and boating areas in the entire country.

If a proposed dam is built on the White River near the oil shale development site, a fishing and boating resource of high quality would become available to residents of a new town. Deer and antelope hunting is unexcelled near the development site and in the Book Cliff Mountains to the south. People who value these activities could be very happy living in the new community, but the area would initially lack the variety of outdoor recreation activities available in the Vernal area.

In the next section of this report we discuss whether large cities have an advantage over small cities in producing public services efficiently.

Agglomeration Economics

If the approximately 13,680 people expected to increase the population base of the area at the peak of oil shale development choose to locate in a new town, what are the implications for producing public services vis-a-vis the implications if they locate at Vernal or Rangely? Two separate issues emerge: (a) the front-end, capital-cost, tax-revenue relationships of the two situations; and (b) the long-run costs of producing services in a "large" community as compared to several "small" communities.

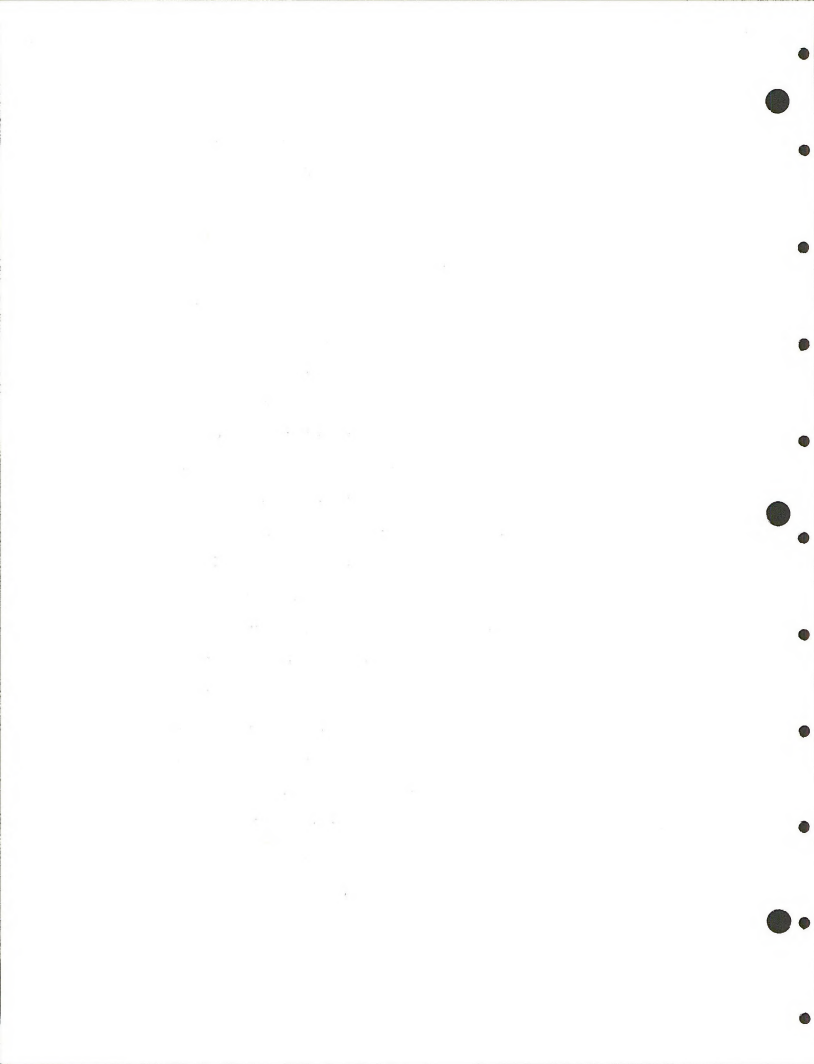


a. Front-End Cash Flow Problems

Nancy Robertson's work (Robertson, 1976) indicates that Vernal City and Uintah County can manage the growth in public services required by a rapid population increase without a serious cash-flow problem in the early stages of development. The reason appears to be two-fold: (1) the institutional framework for assessing and collecting taxes is already established and the tax base is expected to expand rapidly enough to furnish adequate revenues for expansion of services; and (2) public services can grow from an already substantial capital base rather than having to be built from scratch.

It is not possible to be so sanguine about whether or not a new community can escape a cash-flow problem. There is literally no capital stock to be expanded. The stock to provide the flow of public services must be created, and the front-end capital requirements will be very substantial. In addition, there is no existing economic base to help on the revenue side. Worst of all, the tax base in the form of the mine and the plant, the business establishments in the new town, and the residences in which people live, can only be built if some public services (utilities, water, sewer, streets, etc.) already exist. This almost guarantees a cash-flow problem, a need for resources to build the capital stock before tax revenues come on line as the community grows. Of course, these resources can be obtained by borrowing or by grants, but the problem would seem to be much more severe for a new community than for an existing one unless the terms of acquiring external resources are much more favorable.

b. Long-Run Economies of Scale



Can large communities produce public services more cheaply in the long run than can smaller communities, ignoring the initial capital problems? Economists have studied this problem intensively. They distinguish three types of services: (a) horizontally integrated; (b) vertically integrated; and (c) circularly integrated (Hirsch, 1973, p. 327).

Horizontally integrated services refer to a number of similar functions producing the related services under a unified set of policies. Included are police protection, fire protection, education, hospitals, and refuse collection. These account for about 80 to 85 percent of the value of urban public services.

Vertically integrated services require a number of successive steps in production and delivery. Examples are electricity generation and distribution, water production and distribution, and sewage treatment. These services may account for 10 to 15 percent of urban public services.

Circularly integrated services involve a package of complementary services. The administrative activities of city hall or county government are cases in point and these circularly integrated services generally compose 3 to 6 percent of the total (Hirsch, 1973, p. 327).

"If services of equal quality are rendered regardless of the scale of operation, if plants are of about equal size, have about equal service functions, tend to be operated at about optimum capacity, and can be readily added or closed; and if factor prices are fixed, then long-run average unit cost function tends to be horizontal" (Hirsch, 1973, p. 333). Dr. Hirsch believes that a priori, there is little reason to expect economies of scale for horizontally integrated

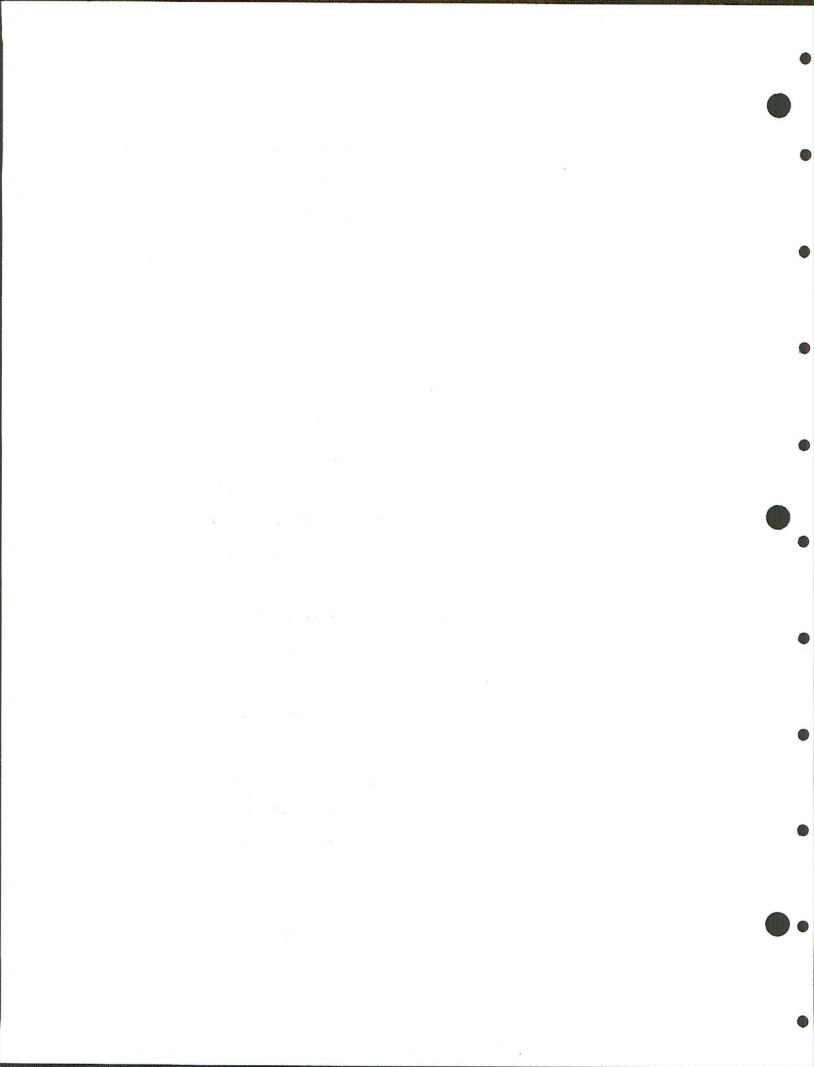


services. The opposite is true for vertically integrated services, however, where economies of scale may be expected to be substantial. Circularly integrated services are expected to be U-shaped, a priori; that is, as city size increases, costs decline for a while, reach a minimum and eventually rise for very large cities (Hirsch, 1973, pp. 333-334). The empirical evidence tends to support these a priori expectations for the first two categories, but the evidence for circularly integrated services is difficult to find.

a. Horizontally Integrated Services

Dr. Elinor Ostrom studied police services in neighborhoods in Minneapolis, Grand Rapids, Nashville, and St. Louis (Ostrom, 1974). "The general pattern across the series of studies was that the citizens living in matched neighborhoods served by small to medium-sized police departments were (1) less likely to be victimized; (2) most likely to call upon the police when victimized; (3) more likely to call upon police for assistance; (4) more likely to receive assistance in less than five minutes; (5) more likely to rate the job of police as outstanding; (6) more likely to rate police-community relations as good; (7) more likely to indicate that crime is about the same or less; and (8) more likely to agree that police treat all equally" (Ostrom, 1974, p. 17). While there is nothing here that proves that police services are less expensive in small towns than large ones, there is some evidence that police services are qualitatively superior.

The evidence on cost comes from a study of nineteen cities and villages of Milwaukee County, Wisconsin (Schmandt and Stevens, 1960, p. 374). They correlated per capita police protection expenditures



with service level and population. They found no cost economies as city size increased. Hirsch also came to similar conclusions (Hirsch, 1959, p. 237).

A study by Will revealed significant economies of scale in fire protection up to a city size of 300,000 population, but none thereafter (Will, 1965). In the case of refuse collection, Hirsch studied a number of cities and municipalities in the St. Louis area (Hirsch, 1965). He found that cost per pickup did not vary significantly with number of pickup units (a good proxy of amount of refuse collected and, therefore, of scale).

The costs of education have been studied more extensively. John Riew looked at 109 high schools in Wisconsin in the early 1960's (Riew, 1966). Per pupil operating costs were correlated with the number of pupils in average daily attendance. Costs declined and then rose with the low-point at 1,675 students. Riew attributed the economies of scale to the belief that high schools require a high degree of specialization in teaching staff and facilities. He does not believe that the same economies exist for primary schools.

A New York study (Kiesling, 1969) found no economies of scale in primary and secondary schools. This study also found no economies of scale in school district performance.

Thomas Williams (Williams, 1973) investigated the costs of supplying public services in Utah. He found economies of scale with only two horizontally integrated services, education and highways and streets, and these were not highly significant. His city sizes ranged from 2,000 to 175,800 people. There were more opportunities for economies of scale for the individual schools than for the district



as a whole. The low-cost per pupil school was 560 students and the low-cost district was 35,680 students (equivalent to a community population of about 130,000 residents). The city size which minimized street and highway costs was approximately 75,000 people.

As to hospital services, Kong Ro (Ro, 1968) developed data from 68 hospitals in western Pennsylvania. The explained variable was in-patient cost per patient day. He tried several explanatory variables: number of admissions, occupancy rate, patient care expenses for in-patient operating expenditures, and patient days per unit of hospital personnel. No significant scale economies were discovered, but Ro noted that had the dependent variable been in-patient expenditures per admission instead of per day, that he would have found scale economies. Cohen (Cohen, 1970) studied hospitals of different sizes in New York City, and found that those with 560 to 575 beds were able to operate at lower unit costs than larger or smaller ones.

In sum, economies of scale do not appear to be extremely important for horizontally integrated services, corroborating the a priori expectations of Hirsch discussed earlier.

Two questions might be raised about the applicability of these data and results to the new town versus existing town situation in northeastern Utah. In the first place, the ranges of community size studied in these empirical analyses have generally far exceeded Utah's likely alternatives, which could run from a few hundred people to perhaps fifty thousand. Although the data from the large cities may not apply well to this situation, they may yield some useful insights if used with caution. In the second place, if the new growth

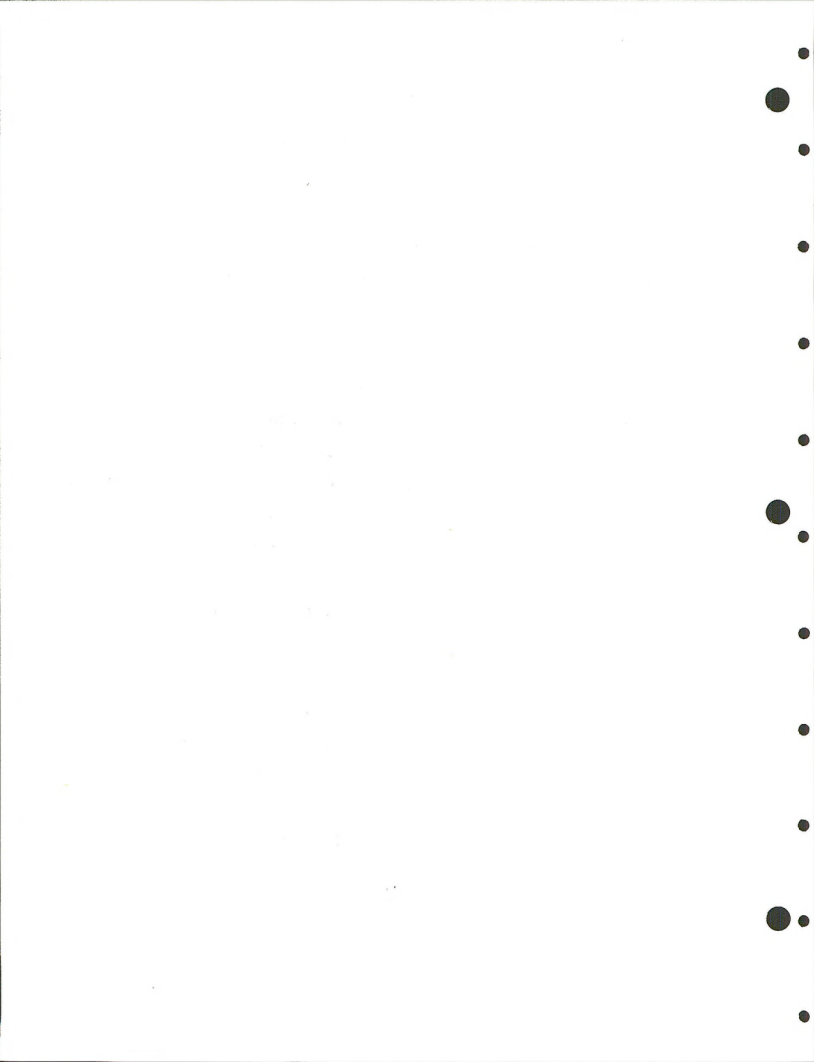


occurred in the existing communities of Rangely or Vernal, they would more than double in population. Thus, they would resemble a new community almost more than an old one. The economies of scale data described here were for existing communities, not new ones. This problem may not be significant, however, since even new communities eventually become old, and this section is concerned with long-run costs of service production and distribution.

b. Vertically Integrated Services

As discussed previously, these services are municipal water production and delivery, electricity, and sewage disposal. Long-run water delivery cost functions have been estimated for Wisconsin communities (Hines, 1969). The approach was to ascertain the average total costs (excluding power and pumping operating expenditures) for surface sources of water supply for municipal systems of different sizes. Significant economies of scale were found. Larger facilities and equipment were more efficient than smaller ones because of technological superiority.

Marc Nerlove (Nerlove, 1961) examined returns to scale in producing and distributing electricity by studying 145 privately owned utilities. He correlated production costs with various measures of output size. The increasing returns to scale were significant. Although the evidence came from private producers of electricity, rather than governmental suppliers, the probability is high that the results also apply to the public sector since the two sectors have common technology and factor markets. A number of gas and electricity cost studies (Loman, 1951 and Johnston, 1960) from the United Kingdom



also show declining cost functions.

A 1953 study (Isard and Coughlin, 1953) in Massachusetts estimated operating costs for secondary treatment sewage plants. Correlation methods yielded a negatively-sloped unit cost function, implying increasing returns to scale.

This sample of cost studies suggests significant economies of scale in producing vertically integrated services. The caveat stated earlier, however, may well be appropriate here also. When comparing an expansion of Vernal with the building of a new town, economies of scale may not be as relevant (since population comparisons may not be all that different in the two cases) as the fact that substantial water, gas, electricity, and sewage investments have been made in Vernal, whereas all such investment will have to be new and unavoidable in a new town.

c. Circularly Integrated Services

Little direct empirical evidence exists as to economies of scale in supplying administrative services, such as those administered by city officials, county government, local school boards, or local planning and zoning boards. A couple of points, however, strongly suggest economies of scale.

In 1942, 155,000 units of local government in the United States (Hirsch, 1968, p. 508) included special districts to provide a wide gamut of services in addition to the counties and municipalities that administer local government. Primarily through consolidation, this number was reduced to 116,000 by 1952, and to 91,000 by 1962. Even fewer exist today. Apparently the public has believed that cost

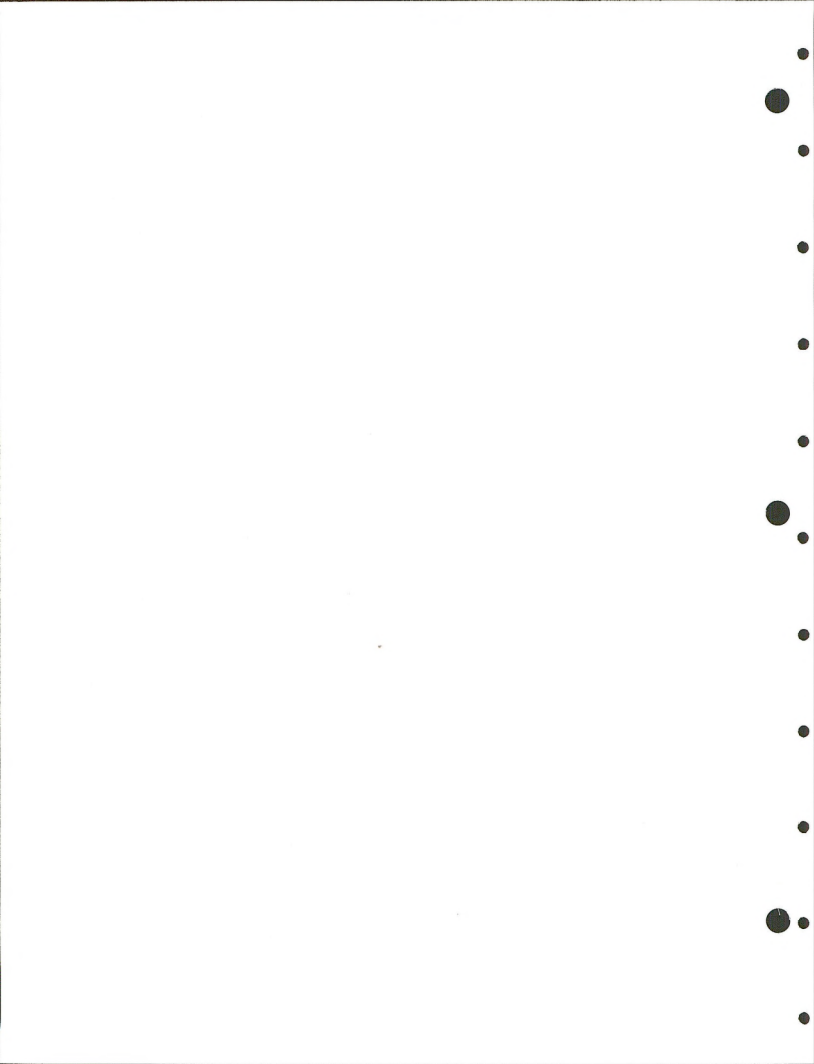


savings could be effectuated by having fewer but larger units of local government.

The other point is related. The number of elected officials serving in administrative positions tends to be approximately the same regardless of the size of the population serviced by that unit. Each city has a mayor, and each county a given number of elected officials. They may not be paid as much if the city is small and their duties are limited as they would be if the city is large. Even the number of appointed officials in local government would not increase proportionately with the population over the range of city sizes being compared in this analysis. Thus, if the population of Uintah County were split among existing communities and a new community, more resources would apparently be tied up in local government to get the same services than would be required if the new community were not built. The other side of the coin is that if the burden on the taxpayers for local government is taken as a constant, larger cities could offer more specialized and higher-quality services than could smaller cities.

The Private Marketplace and Community Size

It is not only the public services offered by the community and their cost that makes a community a desirable place to live vis-a-vis other communities. Well-being is perhaps even more directly related to the goods and services available in the private marketplace and the terms of their acquisition. Americans spend more of their gross incomes in the private sector than in the public sector although the difference is narrowing over time. The value of income is related to



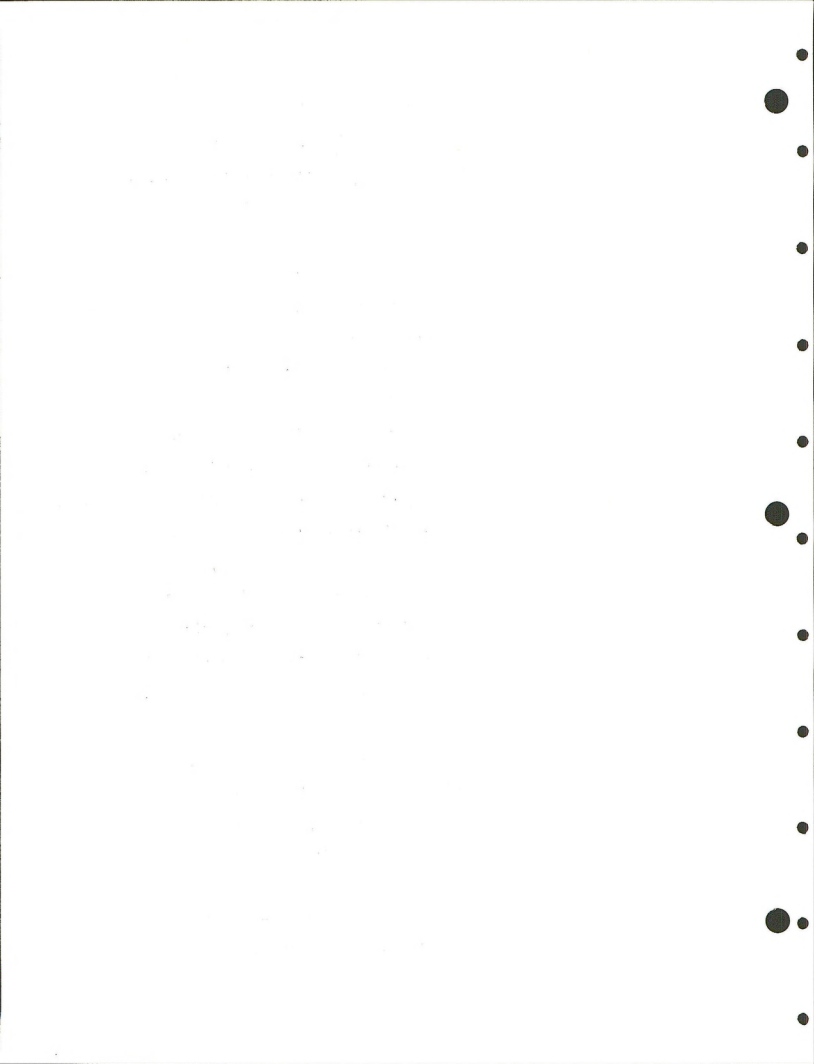
what it can purchase and at what cost. The question of fundamental interest here is whether or not a market area of about 30,000 people, closely surrounding Vernal, might be expected to offer a more attractive set of private goods and services than could a new community of half that number as a separate market area.

Obviously the private and public sectors are not independent from each other. The more prosperous the private sector, the easier it is to raise revenues for public purposes. In addition, the scope of private sector activity will be partially determined by the feasibility of public activity. For example, if the community is not large enough or rich enough to have a public waste disposal program, each family must have its own if it is to have one at all. By the same token, if the private sector is large and diversified, it will supply goods and services that may need to be publicly supplied in a less robust private economy.

Central place theory postulates that communities serve different functions, and the range of goods and services available in the private sector is determined by size and function. Nearly all communities have a service station but not all have a department store, a mortuary, or a psychiatrist.

Berry (Berry, 1967, p. 16) has defined a hierarchy of central places from smallest to largest: hamlet, village, town, small city, regional city, regional metropolis, and national metropolis. The hamlet contains a cluster of only a few houses and may or may not have any businesses.

The villages generally have between 500 and 1,500 people in the market area. They may have from 20 to 30 different kinds of



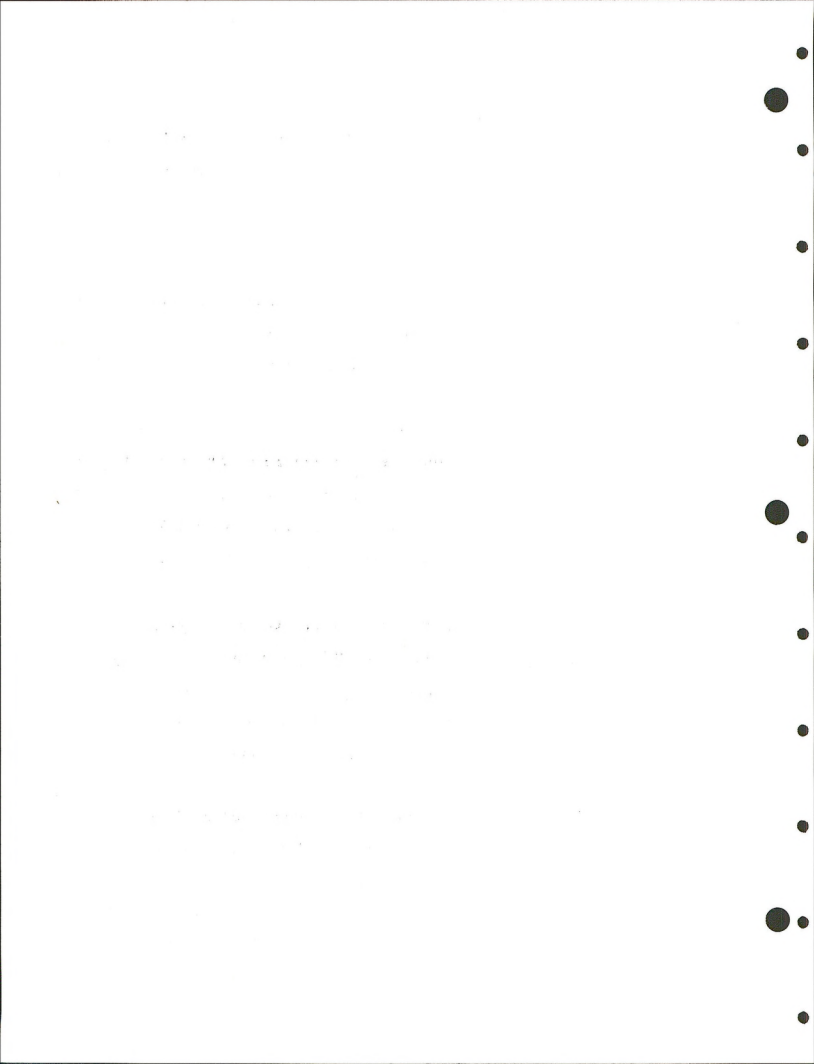
retail and service businesses and from 30 to 40 different establishments (Berry, 1967, p. 15). Examples of activities found in each village would be: grocery, gas station, bar, restaurant, post office, and church.

Towns generally serve 4,000 to 4,200 people in their market area (Berry, 1967, p. 15). In addition to the activities found in the villages, they provide others such as: hardware store, furniture and appliance store, complete drug store, doctor, dentist, dry cleaners, bank, insurance agent, and funeral parlor. The towns would have about 100 establishments.

The small cities are characterized by populations in the market area of about 30,000 (Berry, 1967, p. 15) and from 300 to 400 business establishments. In addition to the activities provided by the towns, they offer: jewelry stores, shoe stores, clothing of all kinds, department stores, florists, liquor store, movies, newspaper, sales of new and used autos, etc.

The regional city may reach out for hundreds of miles to include a market area population of around 100,000 and have over 1,000 retail and service establishments (Berry, 1967, p. 16) including an array of department stores, specialty shops, professional services, and cultural facilities. The two categories of metropolis are simply larger and even more diversified.

Economists (Borchert and Adams, 1963) have used different and perhaps more useful names to describe city function: local convenience center, full convenience center, shopping goods center, speciality goods center, secondary wholesale center, and primary wholesale center. Functions and market area populations correspond closely



to Berry's data cited above.

In another work, Berry (Berry, 1973) has studied urban hierarchies in the Great Lakes region, in the Memphis, Tennessee region, and in the Salina, Kansas region. In these three areas, most of the communities which are classified as complete shopping centers (almost equivalent to small cities described above) had populations from 7,000 to 20,000 people (Berry, 1973, pp. 62, 133, 141). It should be kept in mind, however, that the area population served by these cities may have been considerably larger depending on their location relative to other cities. Twenty-five to 30,000 people in the market area may be fairly typical.

Of course, community size is not the only relevant factor to the efficient functioning of the private retail service sector. It is important that businesses compete with each other, both in terms of price and commodity quality. In this connection: (1) other things equal, competition is fostered by an increase in community size as more businesses are established and collusion becomes more difficult; and (2) businesses may deem it risky to locate in a one-commodity town (e.g., a new community based on oil shale) since the industry supporting the town will therefore face vicissitudes not ordinarily faced by a more diversified economy. If the economy is more risky, and business firms are risk averters, then profits must be higher to attract them; and other things equal, firms will be fewer and less competitive.

These data and conclusions may have great significance to the new community issue. A new community near Bonanza would not appear to have the same advantages as a "central place" as would Vernal which



has Roosevelt, Duchesne, and other Uinta Basin communities in proximity. If the oil shale industry adds approximately 15,000 people to the Basin economy, it is easy to visualize Vernal as a viable full shopping center, especially if the new residents locate there or nearby. It is more difficult to visualize either Vernal or a new town reaching this status if the new community gets the bulk of the population or even if it is divided between Vernal and the new town.

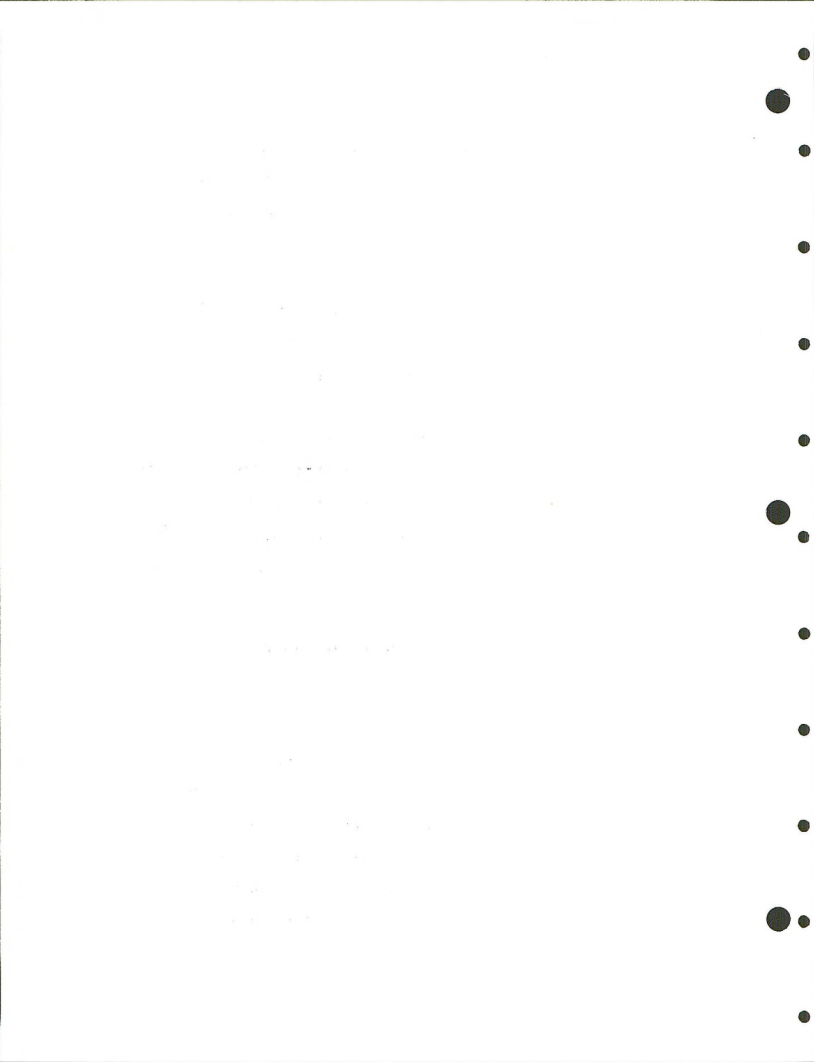
If the decision is made to build a new town near the lease sites, the oil companies and the new town developers must consider many factors. These will be discussed in the following section.

At the conference on Financing of Infrastructure for Energy Development in the West held at Snowbird, Utah, August 21 and 22, 1975, both Robert Richards of Kaiser Corporation and Dr. Camilla Auger of TOSCO stated that a developer would lose at least \$10 million dollars constructing a new town for an energy project of size similar to oil shale.

LEGAL AND POLITICAL FACTORS IN BUILDING A NEW TOWN

The discussion will present the essential elements of new towns, an analysis of the factors that would influence a successful new town venture in Uintah County, an examination of the financing needed, a suggested land use plan to aid the orderly development of the new town, and suggestions for a suitable form of local government.

Obviously every city, town, or village was new at some point in time. The western expansion of the United States saw the rapid rise and fall of towns. Communities arose where there was a gold



strike, a fertile valley, a navigable river, a railroad line, or a wagon trail. Many prospered to become the cities of today; others are the ghost towns that dot the western states. As used currently, however, the terms "new town" or "new community" refer to preplanned towns, not to the spontaneous rise of settlements that has typified the history of this country. Although many attempts have been made to define the new town, no consensus has been reached due to disagreements about land area, population density, economic independence, and other factors.

The purpose of the new town being considered for Uintah County is to facilitate development of the oil shale deposits. Therefore, it should be close to the mines and retorts if at all practicable; its population will consist of the shale workers and the necessary service people; its housing will be determined by the workers' incomes. Thus, a factor such as climate is predetermined by the location of the shale, while transportation and recreational facilities may be constructed.

A common feature of today's new towns is that development takes place under some form of single ownership or control. This factor is closely tied to the planning process since new towns are designed in advance of land development and construction (Clapp, 1971, p. 5). To insure that the plan is successfully implemented, unified land use control, through either public or private means, is essential; otherwise environmental, financial, and aesthetic advantages that are planned may be lost as individual owners develop land in a patchwork fashion.

The need for single ownership of the land requires a large-scale



developer possessing sufficient expertise and financial strength to satisfy the needs of a successful new community. It should have:

1. A commercial center.
2. A reasonable range of cultural activities.
3. A reasonable range of recreational facilities.
4. Sufficient medical and health facilities.
5. All necessary public facilities such as schools, water, complete sewage treatment, roads, etc.
6. A range of residential facilities to accommodate all economic classes.
7. A range of residential types from the free-standing home to the apartment building.
8. Employment opportunities for its population (Clapp, 1971, p. 56).

Due to the scale of a new town, as previously discussed, large sums of money must be spent on front-end costs. These include land acquisition, planning, land subdivision, placement of roads, utilities, and other infrastructure; all these must be funded before there is any return of investment. These front-end costs are the biggest problem that must be faced in making the decision to begin a new town.

Recent Governmental Involvement in New Town Construction

Public involvement in new town ventures has not been followed to a great extent in this century. In 1935 the Resettlement Administration during the Roosevelt presidency began the "green-belt" towns project in an attempt to stimulate employment and to provide low income housing. Three communities were designed and built: Greendale,



Wisconsin; Greenhills, Ohio; and Greenbelt, Maryland.

Indispensable elements in these projects were the public acquisition of large tracts of land to avoid the difficulties and handicaps of diverse ownership and to provide sufficient lands for the provision of great buffer zones; the control of dwellings and land by a local management agency to assure that development's conformity with the area's master plan; and the integration of aesthetics and amenities of rural-type living with the economic viability of an urban community. The desire to create a complete community, or new town character led to efforts to provide employment, recreation and shopping facilities nearby; to the use of cooperative ventures to enhance a sense of civic entity and identity, and to utilization of neighborhood superblocks as a design tool to provide internal traffic safety, and recognition of neighborhood as a valuable socio-physical concept (Adams, 1974, p. 28).

These lofty design goals were not met since the federal government's withdrawal in 1950 made no provisions for development to continue in accord with the master plan. Traditional suburban development took over. The desire to provide low income housing, which has been a goal of the new town movement, was not successful in the green-belt towns, as the rapid increase of land costs led to more expensive, larger homes (Adams, 1974, p. 28).

The most recent federal involvement in the new town area is Title VII of the Housing and Urban Development Act of 1970 (HUD, 1970). The purpose of Title VII was to provide private developers and state and local public bodies and agencies with financial and other assistance necessary to encourage an orderly development of well-planned, diversified, and economically sound new communities. Such development on a significant national scale had been previously prevented by difficulties in: (1) obtaining adequate financing at moderate cost for enterprises that involved large initial capital investment, extensive periods before the investment can be returned, and irregular patterns of return; (2) acquiring sufficiently large sites in economically



favorable locations at reasonable cost; and (3) making necessary arrangements among the private and public organizations involved, for providing site and related improvements (including streets, sewer and water facilities, and other public and community facilities) in a timely and coordinated manner (HUD, 1970, Sec. 7-3).

Seventeen new communities have gained HUD approval; fifteen have taken loan guarantees that total more than \$220 million (Housing and Development Reports, 1975, p. 688). However, effective January 14, 1975, HUD suspended all processing of applications for federal assistance for new community development under Title VII. This suspension was prompted by the deteriorating economic situation and the need to focus all of HUD's attention on keeping the seventeen HUD-approved new communities from going under.

The future status of federally supported new towns is unknown in light of the present moratorium and a HUD study that recommended no more federal guarantees for additional new communities (Housing and Development Reports, 1975).

However, the problems of urban growth are just as real today as when Congress expressed the purpose of Title VII.

It is the policy of the Congress and the purpose of this title to provide for the development of a national urban growth policy and to encourage the rational, orderly, efficient, and economic growth, development, and redevelopment of our states, metropolitan areas, cities, counties, towns, and communities in predominantly rural areas which demonstrate a special potential for accelerated growth. To encourage the prudent use and conservation of our natural resources; and to encourage and support development which will assure our communities of adequate tax bases, community services, job opportunities and well-balanced neighborhoods in socially, economically, and physically attractive living environments (HUD, 1970, Sec. 701 (b)).

The new town concept was supported as a way to pursue these goals,



but the present financial problems have jeopardized their future in the United States.

U.S. New Towns in the Private Sector

Subsequent to World War II, a variety of factors led to the rise of large developers who became instrumental in promoting the modern U.S. new town construction. The large operators could take advantage of the cost savings inherent in merging the processes of land acquisition, site improvement, construction, promotion, and sales (Eichler and Kaplan, 1970). The rapid expansion of both highway systems and automobile ownership made previously impractical areas potential home sites. Federal Housing Agency and Veteran Administration policies made long-term mortgage money with low down payments and small monthly installments available to many families.

Columbia, Maryland, is a product of an alliance between a large developer, the Rouse Corporation, and a financial enterprise, the Connecticut General Life Insurance Corporation. Its projected population of 110,000 is far larger than the new town being considered in Uintah County, but Columbia can illustrate many of the problems facing any new town.

It is estimated that the total development investment in Columbia will be approximately \$2 billion, with more than \$500 million already invested (Cook, 1974, p. 446). The 12,000 acres of rural land purchased in Howard County cost about \$24 million with an average price of \$1,485 per acre.

The population of Howard County in 1963 was under 40,000 and the proposed population of Columbia will be 110,000. Uintah County's



present population of 16,000 is similarly expected to about double if the oil shale is developed.

The impetus for Columbia was a combination of the ideals of its creator, James W. Rouse, and the profit motive. The developer sold the plan to the county by pointing out that, because it lay in the path of the suburban expansion of Baltimore and Washington, D.C., growth was inevitable and advanced planning was essential to avoid the problems of urban sprawl. The anticipated Uintah County growth hinges upon development of natural resources and the resultant new jobs. However, the basic problems are essentially the same: how to provide shelter and services to new residents without disrupting the local environment and unjustly burdening the present residents with increased costs. Rouse's solution was a new town--which is also a possibility for Uintah County.

New Towns: The Result of Public-Private Cooperation

The federal government has been involved in new community development on the financial level in the form of loan guarantees under Title VII as previously discussed. HUD's application requirements insured compliance with certain standards, thereby trying to insure the success of the project.

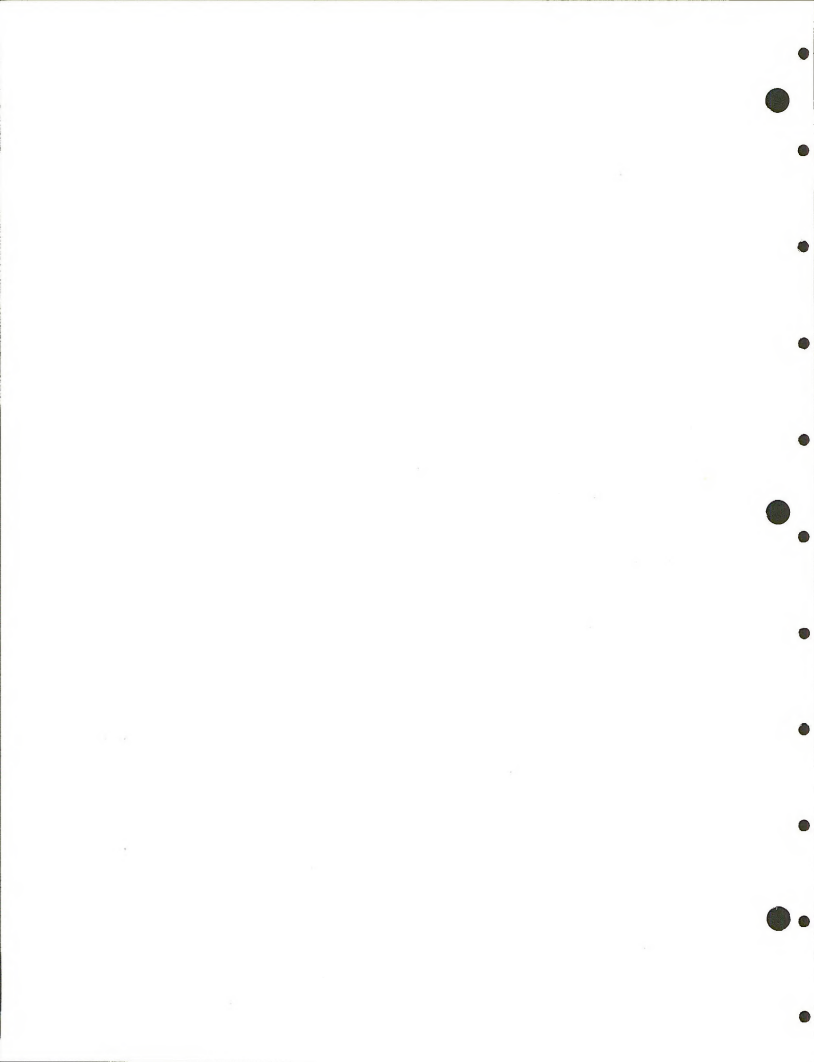
Since the moratorium on Title VII funds, some states have approached new town idea through development corporations. The New York State Urban Development Corporation, for example, was created by state legislation to undertake large-scale projects (Hagman, 1971, p. 446). It has extensive powers so that the state can take an active role in the creation of new communities, which require



planning and financial resources beyond the capacity of local governmental units.

Utah established the Provo-Jordan River Parkway Authority (Utah Annotated Statutes, 1953, 65-10-1) to regulate and control development along the flood plains of the Provo and Jordan rivers. The authority has the power of eminent domain (Utah Annotated Statutes, 1953, 65-10-4) and can impose requirements in excess of those in local zoning ordinances (Utah Annotated Statutes, 1953, 65-10-6). Just as this authority was created to protect a critical environmental area, a development corporation could be established on the state level to aid in the creation of new towns. In Ohio (Ohio Rev. Code, 349.01) enabling legislation facilitates private new town development at the local level by providing for the establishment of a new community authority. The Ohio developer can approach a county for the organization of an authority by presenting a petition containing:

1. The name of the proposed new community authority.
2. The address where the principal office will be located.
3. A map and a full and accurate perimeter description of the boundaries of the new community district . . . the total acreage . . . shall not be less than one thousand acres if the developer is a private entity.
4. A statement setting forth the zoning regulation proposed for zoning the area within the boundaries of the new community district for comprehensive development of a new community.
5. A current plan indicating the proposed development program for the new community district, the land acquisition and land development activities, community facilities and services which it is proposed the new community authority will undertake under such program and the proposed method of financing such activities and services and the projected total population of the new community.
6. A suggested number of members for the board of trustees.



7. A preliminary economic feasibility analysis, including the area development pattern and demand, location and proposed new community district size, present and future socio-economic conditions, public service provision, financial plan and the developer's management capability.
8. A preliminary statement of the impact of the development on the environment of the area.

After public hearings, if the county board is satisfied that the proposed new community is conducive to the public health, safety, convenience, and welfare, approval will be given to incorporate the authority. It will be governed by a board of six to twelve trustees, half appointed by the developer and half appointed by the county. Each new community authority is granted specific powers, including the right to issue bonds and notes, but not the power of eminent domain.

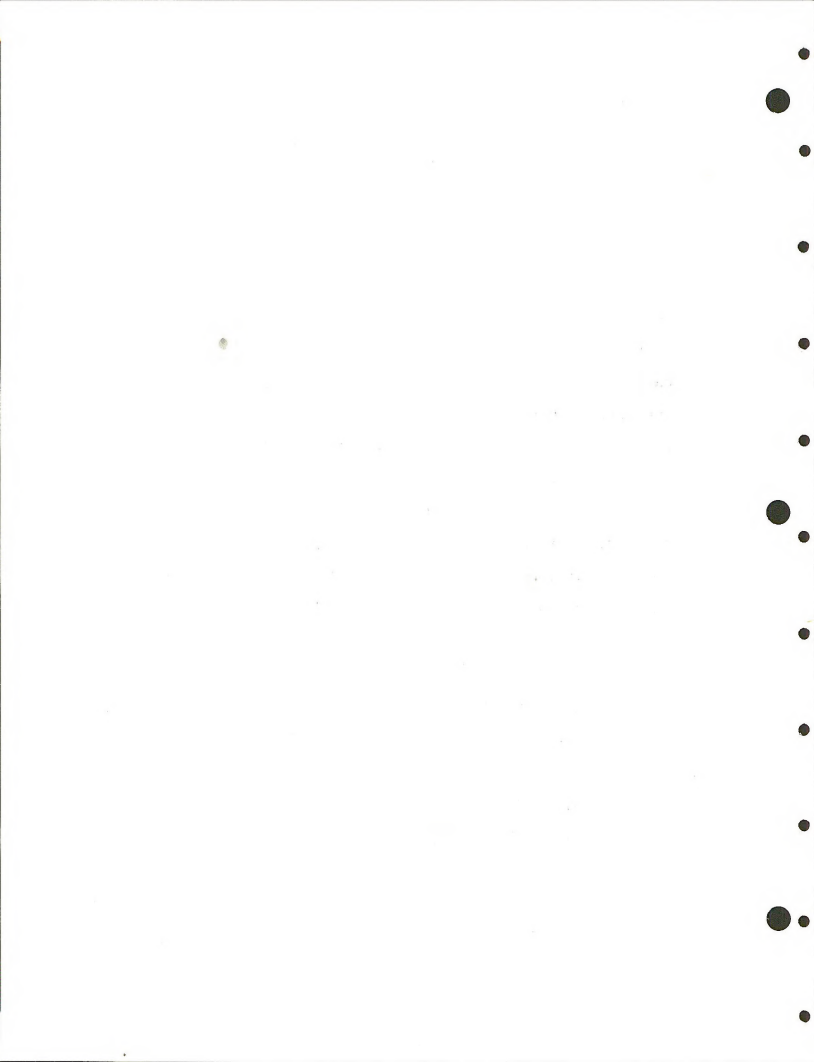
The Ohio method stipulates standards to be met and encourages private developers to start new towns by working with the local counties. New York has taken a more active role with its Urban Development Corporation which is a public entity that initiates and builds large-scale projects such as new towns.

A New Town in Uintah County

If the decision is made to develop the oil shale, it could be necessary to determine the practicability of a new town in Uintah County.

Several characteristics of this area will minimize the problems usually encountered in establishing a new town:

1. The cost of land in the oil shale region is far lower than it would be near a large city. This factor was discussed earlier in this section of the report.
2. The town will not have to attract residents as they will be drawn by the jobs provided by the shale industry.



3. The unpopulated nature of the region means people will not be displaced as land is acquired for the new town.

The problems to be faced in Uintah County involve implementation of the legal and financial structure to insure success. In the following sections we suggest ways to meet these problems.

Form of Government

The creation of a viable community of 15,000 in the isolated oil shale region will require the structuring of a governmental framework that will provide:

1. Adequate public authority for planning, guiding, and regulating the development.
2. A system of financing.
3. A high level of urban services including fire, police, recreation, education, sanitation, and others.
4. Safeguards against environmental damages.
5. Channels through which the future residents and the present county population can participate.
6. Assurance to a private developer that his investment will be profitable.
7. A comprehensive land use policy to insure adherence to the development plan.
8. Confidence by the new residents that the new community will maintain its initial high level of planning.

Various governmental alternatives that have been utilized by existing new towns should be considered relative to present Utah law.

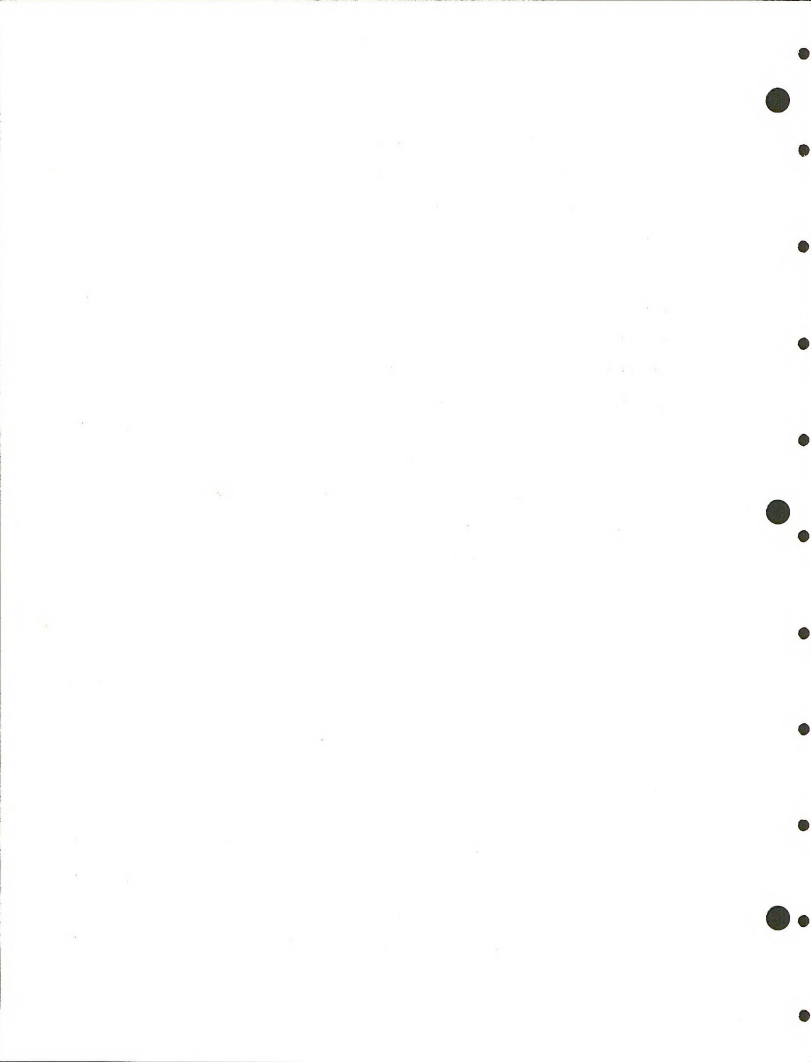
The corporate government (Hanson, 1971, p. 36) is characterized by complete developer control and reflects the developer's desire to protect his large initial investment through the final stages of the project. He fears citizen control, which could endanger his investment.



He is supported by the local government, because it has its own financial interest in having the original plan completed due to commitments made by the developer to provide streets, sewers, and other costly services. The new residents have few chances for active involvement in such government.

A second form utilizes a homeowner's or community association, which is established by the developer to shift the burden of maintaining the provided amenities to the residents (Hanson, 1971, p. 38). The association becomes responsible for operating swimming pools, playgrounds, tennis courts, and other facilities. Membership is usually required for all landowners; since the developer is the major landowner he maintains control until at least 40 percent of the project is completed. In this way he protects his investment while relieving himself of the high cost of maintaining common areas. Unlike the corporate form the residents have a forum, but they lack majority control.

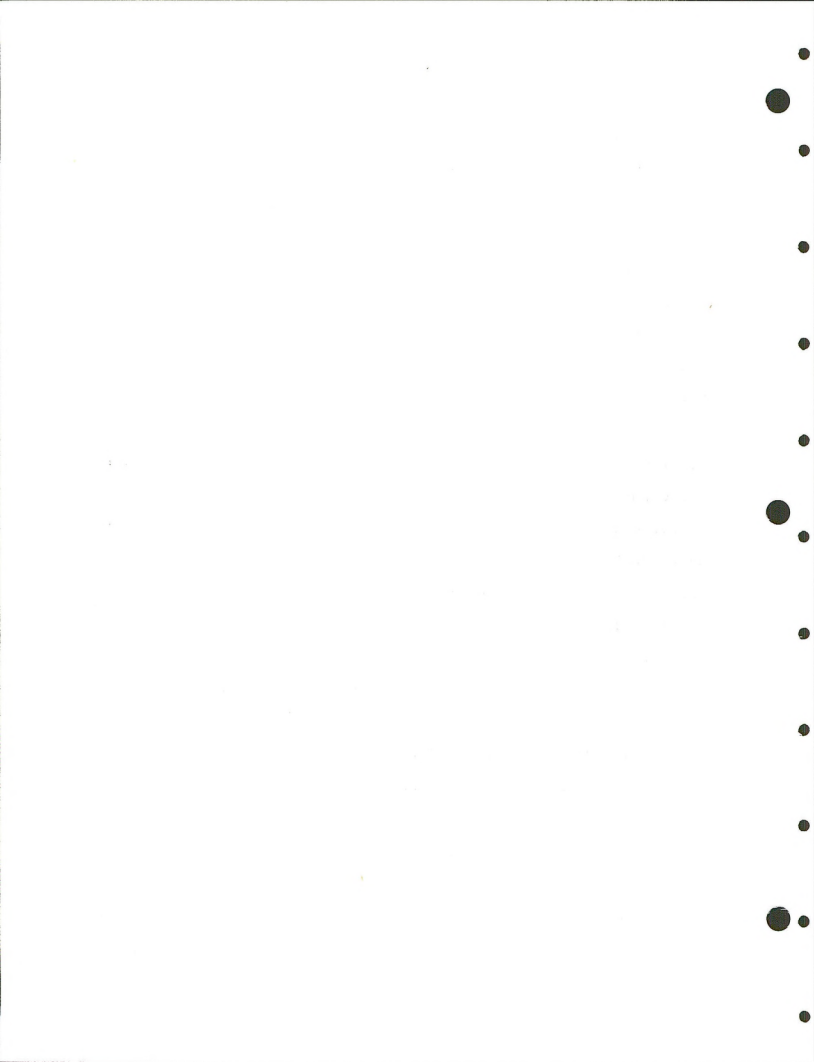
Both of these alternatives operate within a framework of public government. Any new town comes within the jurisdiction of several governments--any state, county or city, and any special purpose districts in the area of development--and must meet the laws and regulations of each. Of particular concern to the private developer are existing zoning, subdivision, and other land use regulations that may have an impact on his planning and construction processes. In most instances the developer will be faced with a county rather than city government since the large land areas required for new towns exist only in unincorporated areas. Therefore, many developers examine the possibility of incorporation to avoid having to deal with



government officials who lack urban expertise and to take advantage of incorporated municipal powers such as zoning and bonding, that cannot be provided by a homeowner's association. On the other hand, despite these advantages new towns such as Reston, Virginia, and Columbia, Maryland, have remained unincorporated, depending upon the developer and the county to provide the necessary services. A decision against incorporation can be based in the developer's fears that a newly incorporated government might enact an unfavorable zoning ordinance. Utah requires a petition signed by one hundred residents before incorporation is possible.

In any dealings with the county, a new town must compete with other demands upon county resources. As long as political power in the county remains with the government that negotiated with the developer, few problems will arise; but as changes occur in county board membership, the new town may lose any promised preferential treatment. Reston, Virginia, for example, has been thwarted in attempts to obtain zoning approval from its county for areas around the town.

Special districts have been utilized as a governmental device for new towns. Perhaps the best known of these is the Estera Improvement District created in 1960 to provide municipal services for Foster City, California. The developer was permitted to appoint the entire board of the Estera District, and it was not subject to public control by either county or state officials. The developer, a private corporation, was thus able to finance capital improvement in its own development by using public power to issue bonds (Hanson, 1971, p. 51). The scandal that arose over this diversion of public funds



to a private use generated a change in California law.

When governmental control is maintained, however, the special district approach can aid new town development.

Utah's County Service Area Act

Under present Utah law the county commissioners can determine when an unincorporated section of the county needs assistance and establish a county service area (Utah Code Annotated, 17-29-1) to provide such services as police protection, fire protection, water service, water conservation, local park recreation or parkway facilities, public libraries, sewers, sewage and storm water treatment and disposal, flood control, garbage and refuse collection, street lighting, airports, planning zoning, local streets and roads, health department services and hospital facilities. The service area is authorized to issue bonds and levy a property tax in order to finance its operations (Utah Code Annotated, 17-29-13). This financial capability was greatly extended by article XIV, section 8 of the Utah constitution, which became effective January 1, 1975. The constitutional amendment lifted the maximum debt limitation of 4 percent of the value of taxable property for special districts formed to provide water, sewage, drainage, flood control, garbage, hospital transportation, recreation, and fire protection services.

The County Service Area Act provides that the governing body shall be a board of trustees of three or more members, which can be the county commissioners themselves or an appointed board. The act also provided for the election of trustees after the initial appointment for six year terms. Once established a service area has:



1. The power of eminent domain.
2. The power to impose and collect charges or fees for any commodities, services, or facilities afforded by the service area.
3. The power to sell, lease, mortgage, encumber, or otherwise dispose of any properties, including water and water rights, owned by the service area.
4. The power to own any and all property or interests in property, including water and water rights, deemed necessary or appropriate by the board of trustees in carrying out the purpose of the service area and the power to acquire the same by purchase, lease, gift, device, or bequest (Utah Code Annotated, 17-29-10.2).

A county service area obviously could provide a governmental framework for a new town in Uintah County. The county could use the service area as an incentive for a private developer, whether the oil company of some other large entity, to meet the county's standards for planning and land use controls. The extensive powers of a service area can be offered as a way to assist the developer in plan implementation. The developer's representatives could be appointed to the board of trustees as a further incentive without fear of abuse because the act allows ten percent of the persons eligible to vote in the service area to petition for an election of trustees before a bond election is held. The county also has the power to discontinue any services for which a county service area has been created, or it may dissolve any county service area if such area has no bonds or other indebtedness outstanding (Utah Code Annotated, 17-29-1).

The county service area can greatly facilitate mainly because the legislation already exists. However, because a new town can have tremendous impact on an entire region, and its success or failure depends on an effective government, that provides for plan



implementation and citizen satisfaction. Therefore, it may be advantageous for Utah to adopt specific enabling legislation relative to new towns. The future could see a need for new towns in many Utah areas other than Uintah County.

The Financial Situation

A major problem faced by new towns has been the front-end costs of such a large-scale venture. "The unique circumstances associated with the financial needs of new town development place extreme limitations on the available financial resources. Unlike the financing of the normal urban development wherein the sources are widely dispersed, the new town concept requires a large commitment for a concentrated area during a relatively short period of time. New town development also requires a disproportionate investment during the early phases of development" (Omaha-Council Bluffs . . . 1973, p. 43).

As indicated, acquisition costs in Uintah County may be low due to the isolated character of the oil shale region. If the site is on federal lands, these costs could be much less than average. The front-end costs of developing this land for urban use, however, would be tremendous.

The chief partners with the county in any decision to construct a new town would be the involved oil companies. Due to the current lack of federal funds for new community development and the inability of the state or local governments to generate sufficient revenue, the oil companies would probably have to finance the new town for the benefit of their employees.



To quote from Clapp:

Because of their advantageous tax position and continual relationship with land, oil companies have become the dominant new investors in the new town idea both as principal and financial backer. Gulf Oil has invested heavily in Reston and has since assumed management of the project, and is also active in new towns in San Francisco and Sacramento regions. Sunset International Petroleum (now SUNASCO) having acquired a number of building companies has progressed to the point where the vast majority of its earnings are derived from real estate. It is the developer of San Marin in Marin County, San Carlos in San Diego County, and Sunset City in Sacramento County. The California based McCulloch Oil Company is the developer of Havasu City, Arizona, and Humble Oil, a subsidiary of Standard Oil of New Jersey, is the primary developer of Clearlake City, outside of Houston (Clapp, 1971, pp. 113-114).

Uintah County can cooperate with the companies by providing new town zoning and creating a county service area to facilitate urban services, but the main financial burden will have to be met by the oil companies. The county will have to act in a supervisory capacity to insure that a well-rounded new community is developed.



CHAPTER VI
THE PROBLEM AND THE NEED FOR PLANNING¹

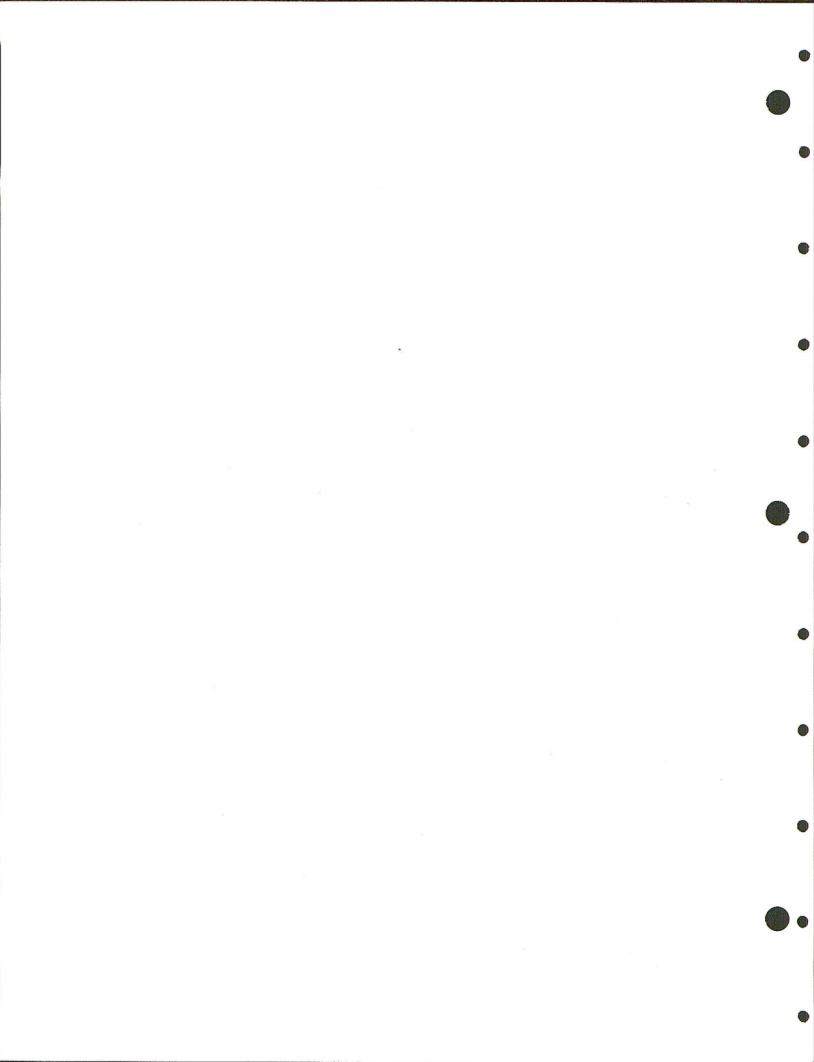
Uintah County will experience substantial growth if an oil shale facility is built and operated there. Similar growth has overwhelmed unprepared communities. The local governments were often hampered by inadequate state legislation as well as by a lack of foresight.

Proper management of the federal lands involved in any efficient attainment of the nation's energy production goals requires federal attention to the welfare of communities which receive the impact from energy development. The private companies developing energy facilities in the western United States have been made aware of the boom town problem through a reduction in worker efficiency.

Officials of state and federal governments and of the respective companies now agree that something must be done to alleviate the local community problem. But no one wants to bear the costs. Unfortunately, that means the local community must attempt to meet the front-end costs. In this chapter we suggest ways that the local communities can involve state and federal governments and the private companies in efforts to achieve a balanced and orderly growth pattern.

One consequence of the usual boom town syndrome is substantial social problems, which lead to a significant reduction in productivity in the construction and operation of the facilities. At the Jim

¹The recommendations and suggestions contained in this chapter originated at USU and are not necessarily representative of the BLM.



Bridger Electric Generating Power Plant, constructed outside Rock Springs, Wyoming, cost overruns attributable to labor problems amounted to \$55 million. Idaho Power Company, one of the partners in the construction of the plant, has testified before the Idaho Public Utilities Commission that a rate increase should be granted because the cost overrun was acceptable due to the unexpected nature of the labor productivity problem.

Commenting on cost overruns due to boom town conditions at the National Conference on Financing Energy Development in the West held in Albuquerque, New Mexico, on October 30, 1975, Dr. Camilla Auger stated, "A major benefit to the industry of cooperating in providing front-end monies to communities, is that by assuring orderly development, the companies can avoid both the costly construction delays and high worker turnover that occur when adequate housing and municipal services are not available in time."

The White River Oil Shale Corporation is well aware of the productivity problem. At a meeting of the Uinta Basin Energy Planning Council, Merrill Littlewood, a company representative, cited an example of the problems that can plague a natural resource extraction firm. Quoting from the minutes of the Socio-Economic Technical Committee Meeting held September 16, 1975, "Littlewood cited an example of a town in Canada that was a boom town because of nickel development. Twenty-three thousand people live in it now. The company has tremendous turnover in their employees. The best turnover rate they had since the mid-fifties was 70 percent per year. The town had acute social problems." Littlewood further stated that the White River Corporation would try to make their employees happy so they would stay,



because it cost the company a lot of money to keep training new employees.

Due to the nature of the oil shale prototype leasing program, the need for adequate community facilities is accentuated. Hollis M. Dole, General Manager of Colony Development Corporation, states on page 113 of the January 27, 1975 Business Week, "We are going to be in competition with Rock Springs, with Gillette, with New Mexico. If we can build a better community, we hope to catch the better workers." While Mr. Dole does not cite Vernal, Rangely, Meaker, Craig, and Hayden, students of community development associated with oil shale realize that development of the four prototype lease sites might coincide with the development of the Colony oil shale site, the Superior Oil oil shale site, and the several coal sites in northwest Colorado. If this occurs within a period of a few years, companies that have not assured that the community serving their project is attractive, run the risk of substantial cost overruns.

The problem is not just that the local community is expected to provide services, and the company wants to make a profit. In Uintah County, because public agencies own 80.7 percent of the land, the efficient use of that land as well as the health, safety, and general welfare of the residents are of concern to Utah and the nation.

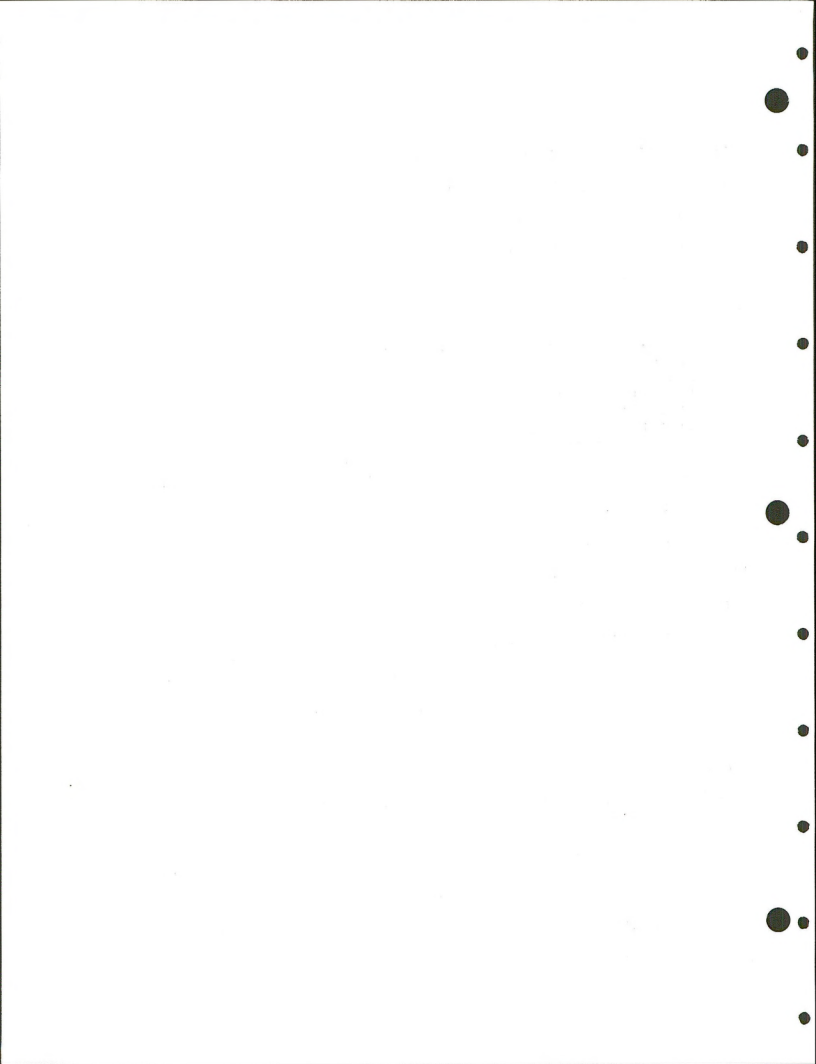
Citizens of Uintah County wish to preserve the rural character of their community life while the area undergoes population and economic growth. However, the most careful planning and preparation to accommodate industrial development will have no effect if Congress decides oil shale development is essential and exempts the region from local control to facilitate development. For example, Section 2



of the Oil Shale Lease grants the lessee "the exclusive right and privilege to . . . construct on the leased lands all such works, buidings, plants, structures, roads, powerlines, and additional facilities as may be necessary, or reasonably convenient for . . . the housing and welfare of the lessee's employees, agents, and contractors." Section 1, Subsection G, of the Oil Shale Lease Environmental Stipulations, deals with housing and welfare of employees.

In the exercise of his right under section 2 of the Lease to construct buildings and other facilities for the housing and welfare of his employees, the lessee shall at all times make certain that the facilities are situated, constructed, operated and maintained in an orderly manner, satisfactory to the Mining Supervisor. While no general restriction is imposed upon the construction of facilities necessary to the employee's health and well-being, such construction shall be subject to the Mining Supervisor's approval and shall not unreasonably damage the environment of the leased lands.

On public land under the exclusive legislative jurisdiction of the federal government, or if Congress exempted the lessee from complying with state and local regulations, the White River Shale Oil Corporation could house their employees on the federal land in facilities subject only to the approval of the mining supervisor. The anticipated lack of attention to zoning or land use control, might not necessarily mean poor housing for the company's employees. State and local governments, however, would be of important regulatory power to influence the shape of development in the best interests of their citizens. Since the federal government has emphasized cooperation with local governmental units, the potential extreme difficulty will probably not occur. Nevertheless, the oil companies could be legally freed of any growth management system if Congress did exempt the oil shale region from state regulations.



Fortunately, the recent trend in federal legislation referred to as the "New Federalism" has given states, cities, counties, and other units of local government more powers within federal limitations. The Intergovernmental Cooperation Act of 1968 sets forth a policy of development assistance directly applicable to the oil shale region.

The economic and social development of the nation and the achievement of satisfactory levels of living depend upon the sound and orderly development of all areas, both urban and rural. Moreover, in a time of rapid urbanization, the sound and orderly development of urban communities depends to a large degree upon the social and economic health and the sound development of smaller communities and rural areas.

The major objectives set out for consideration were:

1. Appropriate land uses for housing, commercial, industrial, governmental, institutional, and other purposes.
2. Wise development and conservation of natural resources, including land, water, minerals, wildlife, and others.
3. Balanced transportation systems, including highway, air, water, pedestrian mass transit, and other modes for the movement of people and goods.
4. Adequate outdoor recreation and open space.
5. Protection of areas of unique natural beauty, historical and scientific interest.
6. Properly planned community facilities, including utilities for the supply of power, water, and communications, for the safe disposal of wastes, and for other purposes.
7. Concern for high standards of design.

All of these closely parallel the objectives of a growth management system with or without a new town. The requirements for local input are enumerated:

All viewpoints--national, regional, state and local--shall, to the extent possible, be fully considered and taken into account in planning federal or federally assisted development programs and projects; state and local government objectives of regional organizations shall be considered and evaluated



within a framework of national public objectives as expressed in federal law; and available projections of future national conditions and needs of regions, states, and localities shall be considered in plan formulation, evaluation, and review.

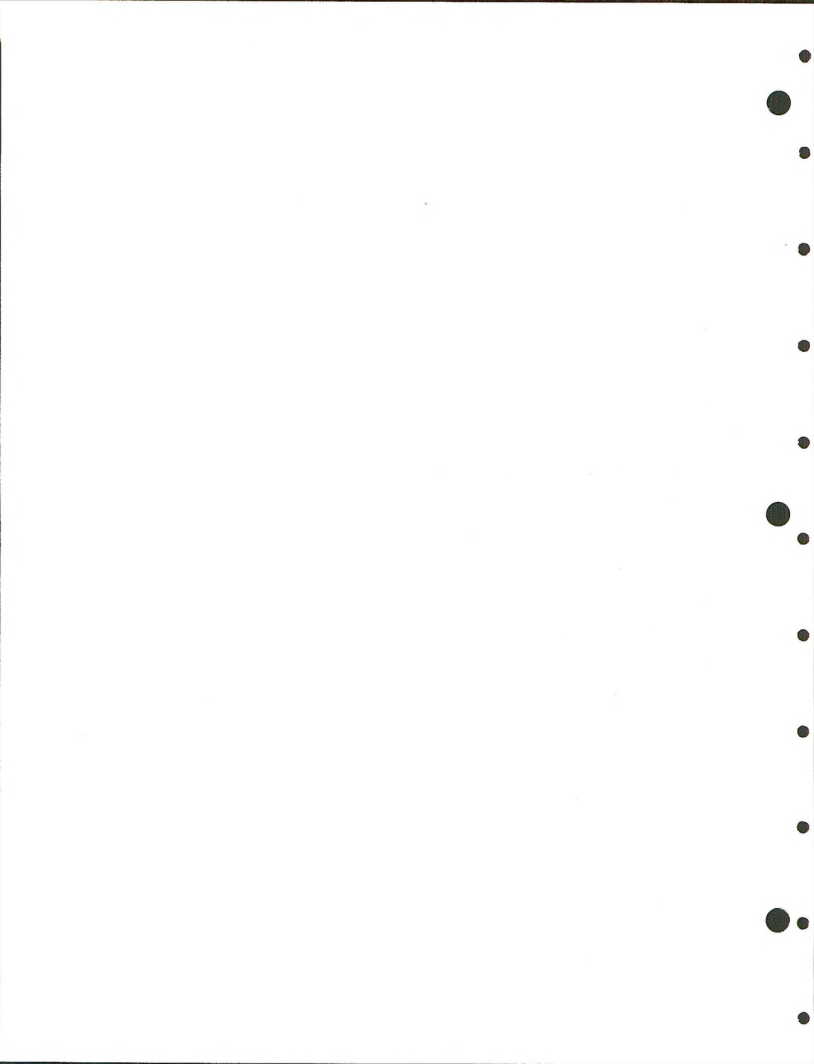
To the maximum extent possible, consistent with national objectives, all federal aid for development purposes shall be consistent with and further the objectives of state, regional, and local comprehensive planning . . .

Insofar as possible, systematic planning required by individual federal programs (such as highway construction, urban renewal, and open space) shall be coordinated with and, to the extent authorized by law, made part of comprehensive local and area-wide development planning.

Pursuant to an authorization in the Intergovernmental Cooperation Act of 1968, the Office of Management and Budget issued Circular A-95. Although no local or regional plan could be successfully implemented in Uintah County without federal and state cooperation due to the high percentage of public land ownership, Circular A-95 requires that federal agencies responsible for federal lands consult with local officials and assure that any federal plan is consistent with state, area-wide, and local development plans. County zoning designates the oil shale lease area as a mining and grazing district, which means no conflicts regarding the mining activity. However, the sections of the lease authorizing the oil companies to construct housing on public lands opposes the county's policy of encouraging growth in the Vernal city area.

Another federal policy provides detailed guidelines regarding urban land utilization where a change of use of public land is involved.

In the acquisition or change of use of any real property situated in an urban area as a site for public building the administrator shall to the extent he determines practical (1) consider all objections made to any such acquisition or change of use by such unit of government upon the ground that the proposed acquisition or change of use conflicts or would conflict with the zoning regulations or planning objectives

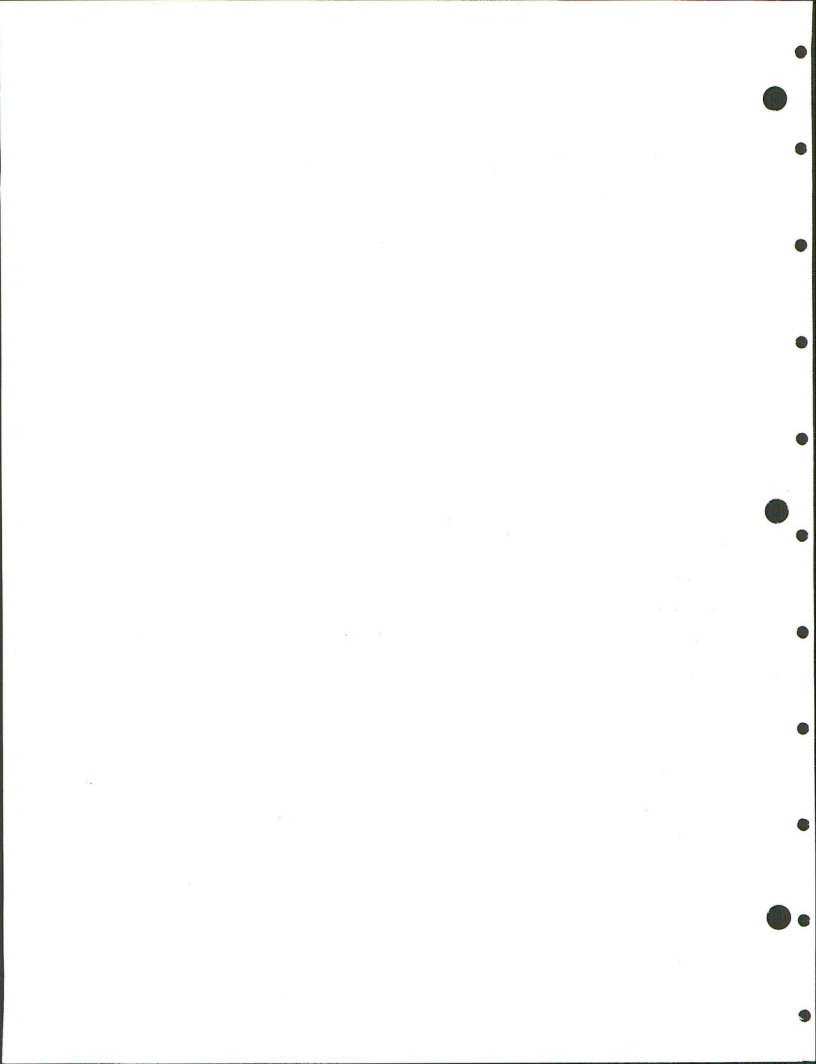


of such unit, and (2) comply with and conform to such regulation of the unit of general local government having jurisdiction with respect to the area within which such property situated and the planning and development objective of such local government.

It is recommended that the Bureau of Land Management suspend any permanent residential development on the public land by the White River Oil Shale Corporation pursuant to Section 2 of the Oil Shale Lease. This recommendation is grounded in the Intergovernmental Cooperation Act of 1968 and Circular A-95 of the Bureau of Management and Budget, Part II, adopted pursuant to that act; the latter directs federal agencies responsible for the use of federal lands to assure the project is consistent with state, area-wide, and local development plans.

The burden of effectively planning for and developing systems to provide the high level of urban service demanded, while maintaining the existing quality of life will have to be met by the local governmental units with federal and state assistance. The adoption of a growth management system can assist the county to avoid the "sprawl" syndrome, which has been identified as one major factor in failures to successfully cope with population growth. The term "sprawl" is used to describe the congestion, unsightliness, blight, and unending ribbons of traffic that result from haphazard development on the periphery of expanding urban areas. "This pattern is characterized by substantial bypassed tracts of raw land between developing areas and a scattering of urban developments over the rural landscape."

Many rural communities have been unable to develop adequate municipal facilities, particularly for residential development, as developers prefer building on inexpensive land, which is normally

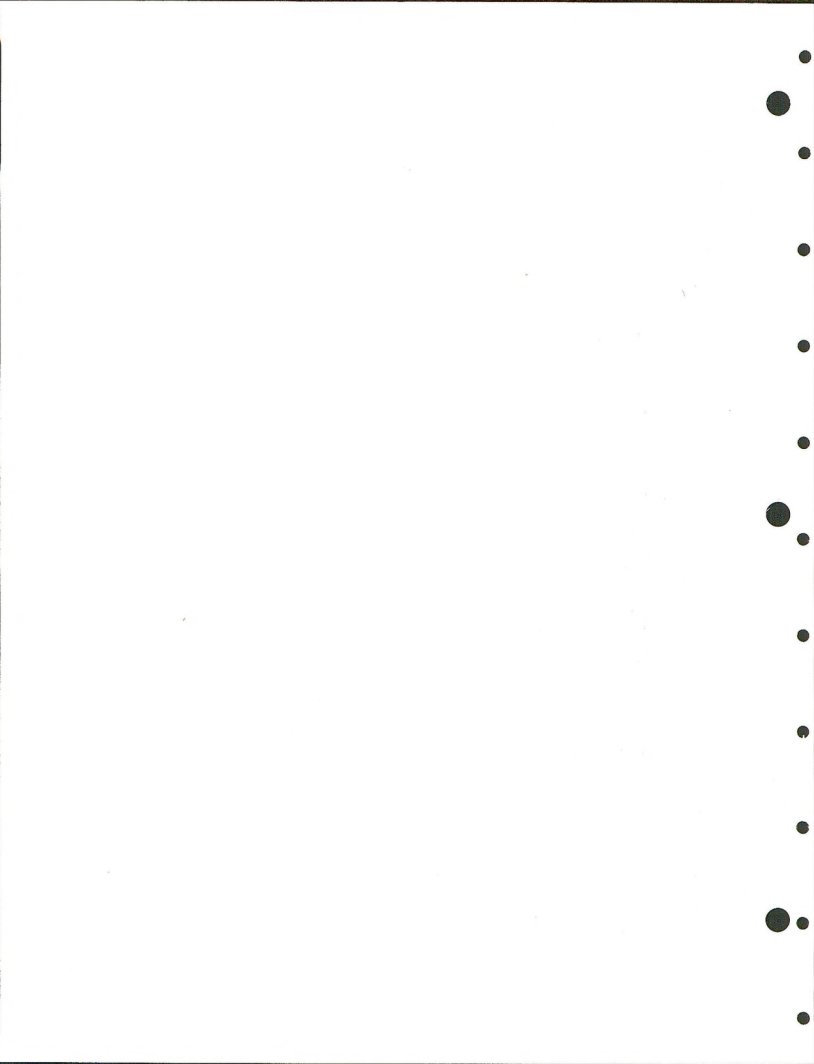


outside of areas with adequate sewerage, drainage, improved roads, firehouses and police stations, schools and libraries, park and recreation facilities, and other urban functions. The resultant transfer of the true cost of development from the developer to the public sector has led to a series of unfortunate effects:

1. Imbalance of growth between types of uses.
2. Inability to provide public services to match private development.
3. Soaring tax rates on property due to inefficient provisions of public services.
4. Waste of energy and inefficient use of energy resources due to sprawling roads and utility lines.
5. Poor quality of services provided due to rapid growth.
6. Inability to implement the planning process, lack of time to develop solutions, inadequate legal and administrative mechanisms.
7. Development of negative policies concerning social, racial and metropolitan solutions, formation of defensive incorporations and annexations, unwillingness to provide proper housing and facilities for diverse economic, racial, and ethnic groups and irrational tax policies.

A detailed cost analysis prepared for the Council on Environmental Quality confirmed the cost inefficiencies of sprawl development.

The Real Estate Research Corporation sponsored a study "to carry out a comprehensive assessment of the environmental and economic effects of alternative housing types and patterns of land development on the urban fringe. It provides a basis for effectively guiding the rapid pace of development taking place on the periphery of our cities and it establishes a useful framework for ensuring greater rationality within both public and private decision making regarding growth and development policies, programs and practices." The major conclusion



of the Real Estate Research Corporation study was:

for a fixed number of household "sprawl" is the most expensive form of residential development in terms of economic costs, environmental costs, natural resource consumption and many types of personal costs. This cost difference is particularly significant for that proportion of total costs which is likely to be borne by local governments. In terms of alternative development patterns for a given site, the study indicates that better planning will reduce all types of costs and their incidence on government.

Before proceeding further with the details of this study and its applicability to Uintah County, it is helpful to describe the present growth pattern, urban service demand and means to fulfill them that exist in the county. For some time, the unavailability of safe drinking water concentrated population growth in the town of Vernal where a public water supply was available. More recently, dwellings have been constructed in the outlying farm areas of Ashley Valley. This urban sprawl pattern has been stimulated by an extension of the public water system, desire for larger lots, and the county's relatively lower property tax levy.

Uintah County development policies for Ashley Valley area therefore encourage new non-farm development within or immediately adjacent to Vernal City, where the necessary services can be provided most economically. However, the county has been unwilling to utilize restrictive land use controls to achieve the desired location and concentration of growth relying instead on persuasion and suggestion. This reluctance, along with factors such as the sewage disposal situation in Ashley Valley could encourage rather than discourage sprawl.

The current pattern of individual septic tank systems, which must be approved by the Health Department before a building permit



may be issued, will eventually become unsuitable due to adverse soil and water table conditions in Ashley Valley. Most pollutants which are discharged into or onto the ground are removed in the soil above the ground water table. Consequently, areas such as Ashley Valley, which have high water tables can use septic tank systems effectively only while population density is low. Such circumstances can stimulate sprawl as developers seek areas where the water table level is not as critical, and favor large lots to maintain the low densities required for an approved septic system. A substantial portion of Ashley Valley, however, has a water table at less than the four-foot depth required for septic tank filter fields. There are already areas where "significant unsafe health conditions" exist. Consequently, as population increases, a public sewer system will become essential.

Financing will be a severe problem as the scattered development in the valley has placed the costs of constructing a sewer system beyond the fiscal ability of the local residents. The county has recommended that new non-farm developments take place where similar non-farm development is already concentrated. The fiscal capacity of the area might thus be increased to a level where the per-connection cost for constructing a sewage system and treatment facility would be more economically feasible. Unfortunately, such concentrations would also mean health problems. If the necessary population density were reached, a special district could be formed to provide the facilities as "Uintah County has consistently adhered to a policy of refusing to become involved in providing public utility services."

In any event, assistance from an outside source will be required



to meet the fiscal problems all local units have to contend with. The federal government under the Water Pollution Control Act and Title F of the Housing and Community Development Act of 1974 has substantial funds available for the construction of waste treatment facilities and sewage collection systems. But the extensive planning required before funds are given to local units of government will require changes in Uintah County's land use policies. The effect of the planning required will be seen when the Uinta Basin Association of Governments in cooperation with the Water Quality Section VI of the Bureau of Environmental Health finishes developing an area-wide waste treatment plan in compliance with Section 208 of the Federal Water Pollution Control Act amendment of 1972. This 208 plan requires the identification of treatment works necessary to meet the anticipated municipal and waste treatment needs of the area over a twenty-year period, the establishment of construction priorities for such treatment works, and the establishment of a regulatory program to implement the control or treatment of all point and non-point sources of pollution to the fullest extent practicable.

These far-reaching requirements will stimulate local governments throughout the county to reevaluate their present land use control policies because once a 208 plan is approved, no federal grants for the construction of publicly owned treatment works will be granted except for works in conformity with the 208 plan. Therefore, development should be directed into those areas where treatment facilities will become available according to the priorities established in the 208 plan unless the local unit is willing to build these expensive facilities without federal aid.



The Housing and Community Development Act of 1974 which established the Community Development Block Grants also ties funding to planning. Applicants must submit a community development plan which identifies community development needs, demonstrates a comprehensive strategy for meeting those needs, and specifies both short and long-term objectives which have been developed in accordance with area-wide development planning and national urban growth policies.

Besides fulfilling requirements for federal funds, a comprehensive planning approach is essential in alleviating overcrowded schools, rising crime rates, tax increases, air and water pollution, urban blight, and traffic congestion which can accompany rapid growth. Proper planning could help the oil shale region benefit from the positive attributes of growth, which can include a stronger local economy, higher personal income, lower taxes, greater upward mobility for the poor and a greater range of choices of lifestyles.

Ashley Valley has been and will continue to be the prime area for development within Uintah County due to natural environmental factors such as climate, topography, soil conditions, and water availability. A rapid increase in population stimulated by natural resource development would burden the valley's local governmental units with a need to service the new residents.

If Uintah County and the city of Vernal cooperated in the development of a growth management plan, they could effectively direct growth in Ashley Valley and:

1. Preserve significant portions of the valley's agricultural land.
2. Limit the problems of sprawl development with its increased environmental, economic, personal, and energy costs.



3. Maintain adequate public facilities for present and new residents.
4. Limit environmental degradation to a level complying with federal and state environmental standards.
5. Insure access to open space and recreational areas by new and established residents.
6. Avoid the problems experienced in other rapid growth situations.

The plan described in this report is merely intended to illustrate one possible approach to the Uintah County situation. The plan that is ultimately activated must be creatively structured to fit specific needs, which can only be identified through extensive study. The planning process should include:

1. An inventory and analysis of the natural characteristics of the land that is about to be planned and ultimately developed, including identification of critical areas which need preservation.
2. Studies to determine the current growth potential of the community so that development demands will not overload a particular area. In this regard the following should be identified:
 - a. On site natural resource capacity such as well-water supply, sewer capacity, erosion potential, and flood potential.
 - b. Existing infrastructure providing natural resource related capacity to a site such as water supply, sewer capacity, solid waste disposal, and energy.
 - c. Existing infrastructure providing non-natural resource related capacity to a site such as roads, schools, etc.

ILLUSTRATIVE PLAN

The county should formulate a general development plan which presents a system for growth management to be implemented by timing and sequential controls which provide the link between planning and zoning. The county should be divided into planning areas each

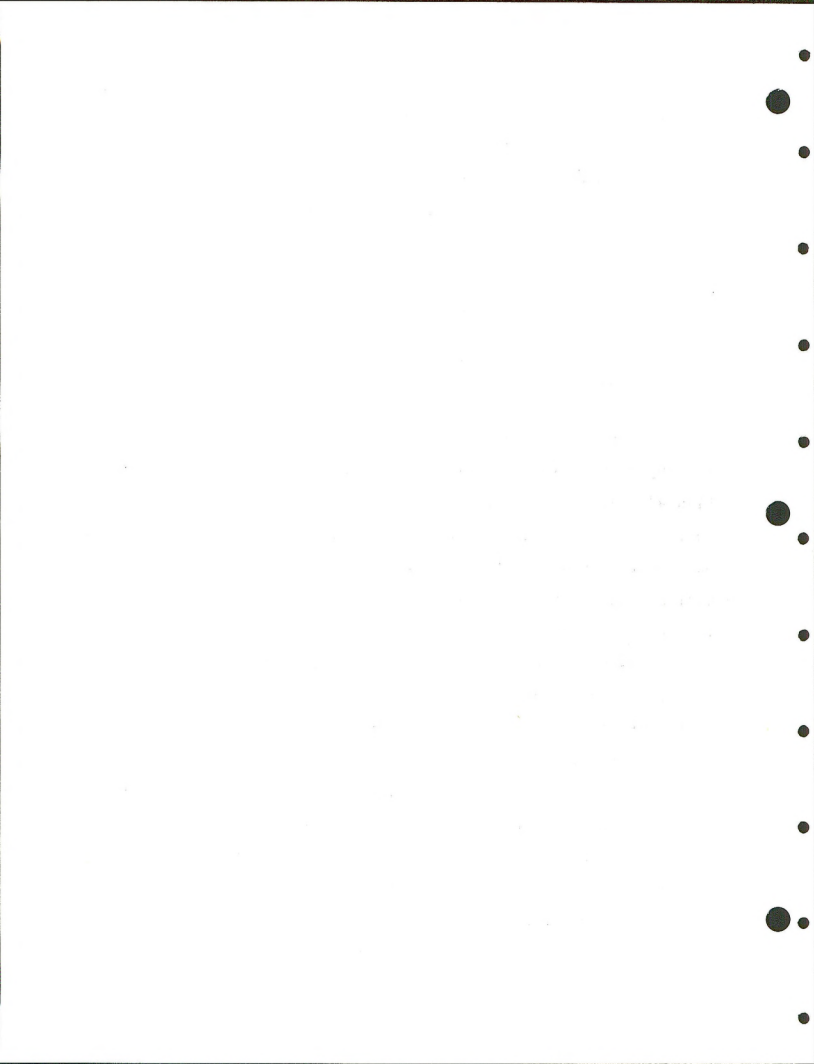


utilizing objectives consistent with area goals as expressed in a comprehensive plan.

Five Planning Areas would be established:

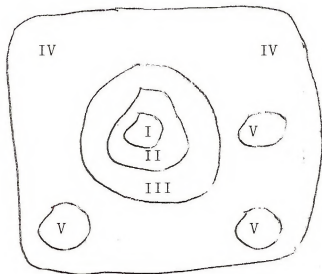
- I The downtown business and commercial districts of existing towns and developed areas.
- II The older residential neighborhoods surrounding the business districts.
- III The area where new development is taking place in the perimeters of developed areas.
- IV The rural land throughout the rest of the county.
- V Any new towns or industrial districts developed in the rural area.

If Vernal City and the county adopted the planning area approach, the objectives can be readily identified from the Vernal Comprehensive Plan adopted in 1970. In the planning area one of the objectives would be to maintain a strong central business area. Efforts must be directed towards attracting new retail, cultural, financial, and professional institutions while redevelopment programs rehabilitate the central core buildings that have been allowed to deteriorate. The emphasis in the second planning area is twofold--the development of vacant lots to utilize the necessary services and utilities presently available and the rehabilitation of delapidated housing. In planning area three the goals will be the complete development of skipped-over land already provided with capital facilities and the opening up of new land for development by the timed extension of public services in accord with a capital improvement program and budget. The goals of planning area four are the preservation of land for agriculture, grazing, forestry, mining, and other open-space uses throughout the county. The purpose being to avoid sprawl



development and to stimulate investment in the core areas, planning area five allows for the development of planned industrial districts and new towns on land encompassed by area four. Any new town constructed would be surrounded by planning area three, and all industrial uses would have to comply with strict environmental standards.

A simple diagram has been used to illustrate the planning areas.



LEGAL IMPLEMENTATION PROCESS

The reason for identifying planning areas is to allow the county to direct new growth into the area best suited for the proposed use. The two most critical areas on which the success of the growth management program hinges are the areas three and four. New growth will not utilize the vacant land areas in areas one and two if cheaper land in area four is available for development. Such development leads to the "leap frog pattern" which has placed such strain on cities and counties throughout the country as this report

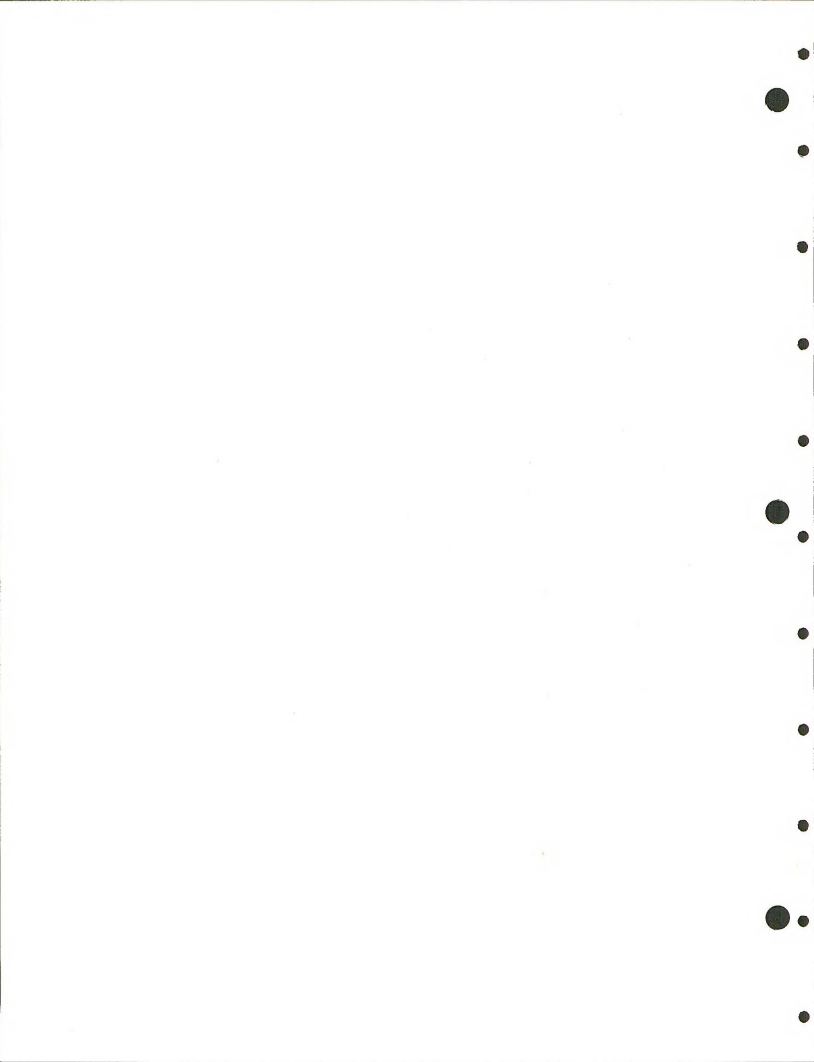


has indicated in the section which discusses "sprawl" development. Therefore, the legal implementation which directs growth into area three as public facilities are provided and restricts development in area four is the key on which this plan concentrates.

The control of development in planning area three will be accomplished through an ordinance requiring a Residential Development Permit. Any new development will be required to obtain such a permit before it can be built. Permits will be granted in those areas where the necessary criteria are met, e.g., where sewers, water, schools, parks, drainage roads, etc. are available. When a development acquires the necessary points as determined by the Zoning Administration, the Board of County Commissioners will consider the application and issue a permit if the standards are met. Permits will also be granted for future use in those areas where the services will be made available in accord with the county's and town's capital improvement program.

The adoption of a long-range Capital Improvement Program is essential for the implementation of the proposed ordinance and the success of the growth management system. The Residential Development Permit Ordinance can withstand constitutional attacks which will allege that the ordinance deprives a person of the reasonable use of his or her land only if the county and city can show that every effort is being made to provide the facilities without which the necessary point total for development cannot be acquired. The comprehensive plan of Uintah County identifies a Capital Improvement Program as:

A device to facilitate the orderly development of



necessary public facilities. It is a long-range financial plan for the acquisition and development of public property and facilities, parks and public buildings. In addition to outlining needed improvements, the Capital Improvement Program also designates a priority of need and source of funds for the facilities. Normally, the program looks about six years into the future. It should be revised each year concurrent with the preparation of the annual budget to reflect completion of projects and anticipated new projects.

The purpose of tying the development permit to the Capital Improvement Program is to reverse the normal pattern where facilities are provided after development occurs. Under the proposed plan growth can be directed into those areas where facilities are to be provided as set forth in the Capital Improvement Program of the 208 plan presently being drawn up.

It is recommended that the "community council" form of county government be considered by the county. This form unites in a single consolidated city and county government the power, duties, and functions which are vested in the county, the largest city in the county, such other cities and towns as elect to merge in it, and all special taxing districts, public authorities, county service areas and other local public entities functioning within the boundaries of the county except school districts. The consolidated government will have power to extend on a county-wide basis any governmental service or function which is authorized by law. In addition, the "county council" will have all of the legislative and policy-making powers which are not expressly denied by the constitution, by a general law applicable to all cities or counties or by a specific restriction in the plan itself.

The State of Utah has recently enacted legislation which compliments the suggested growth management system. The Building



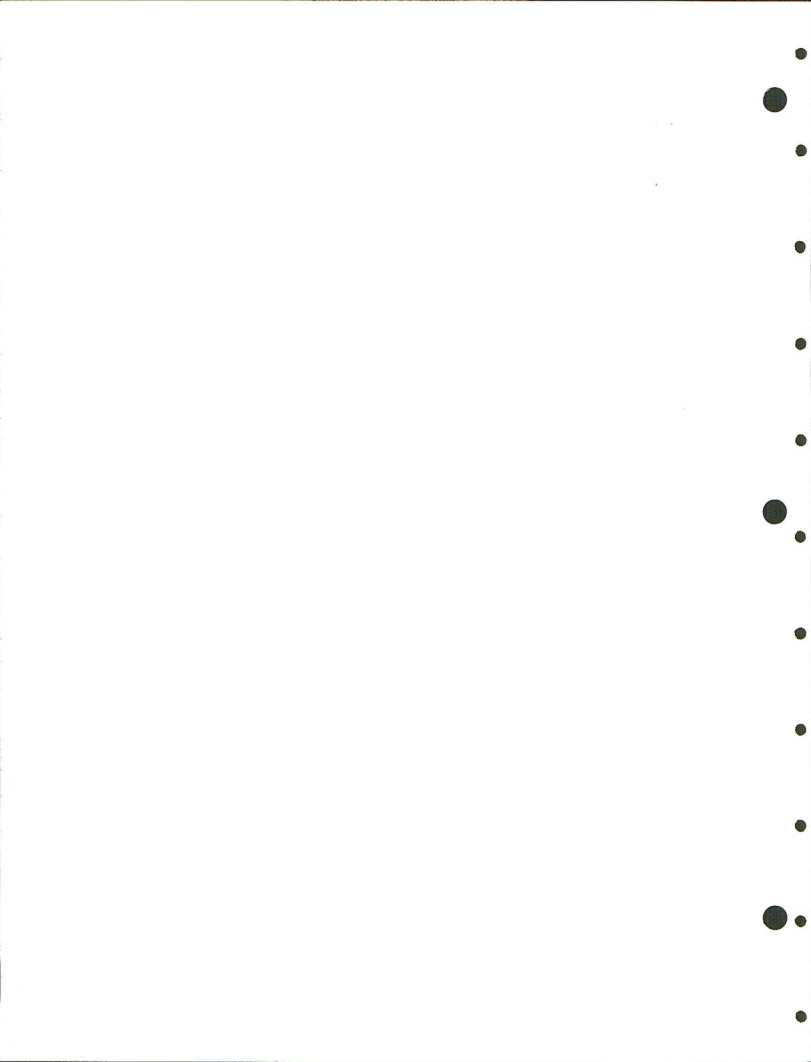
School Houses Act enables school districts to contract with energy developers for facilities in areas where projects are located. The Resources Development Act provides for prepayment of sales and use taxes by energy firms. The Special District Services Act permits cities to share in the tax base for out-of-city developments that affect cities. The act also allows exceptions to current bonding limits for cities and counties. In addition, a lending program for the upgrading of municipal water systems has been inaugurated. The Uinta Basin received particular attention from Governor Calvin L. Rampton, when he appointed the Uinta Basin Energy Planning Council. The role of the state in the suggested growth management system is discussed in succeeding chapters. At this point, one comment is in order. The legislation passed by the State of Utah clearly outlines the policy of the state as regards front-end money. Namely, the state expects the energy development company to provide the needed cash flow through prepayment of taxes.



CHAPTER VII
TAX REVENUES GENERATED BY
OIL SHALE DEVELOPMENT

The construction and operation of an oil shale facility in Utah will generate significant tax revenues. An understanding of the sources of revenue for the respective jurisdictions enables one to evaluate the impact of oil shale development on local government. The revenues to the federal government are not considered in this report as they are inconsequential when compared to the federal budget. Revenues to the State of Utah are examined, and these revenues are evaluated in relation to the demands which will be placed on the state. The three local jurisdictions which will experience the greatest change--the county, the school district, and the City of Vernal--are examined in detail.

The State of Utah will benefit from the bonus payments made on the two leases, and from increases in income taxes, sales and use taxes, and from property taxes through the uniform school fund. Even if construction on the facility is never initiated, the State of Utah under current federal law will receive 37.5 percent of the \$72,422,400 bonus payments, or \$27,158,400. Uintah County would receive 10 percent of this money, or \$2,715,840. The State of Utah has clouded the issue through a court suit in which Utah claims the entire \$72 million plus. The claim is based on a swap of land made with the federal government, for which the state has yet to receive clear title. The federal government argues that the oil shale lands



exceed in value the lands given up by Utah. Ironically, the state may benefit from the collapse of oil shale. Failure to develop Ua and Ub would weaken the federal argument of unequal value. In any event, the payments made to date are held in escrow collecting interest while awaiting the decision of the court. The outcome is of extreme interest to Uintah County which stands to gain or lose close to \$3 million.

The State of Utah as a whole will benefit from the taxes paid by the oil shale complex to the state. A profitable oil shale industry would pay state income tax. The extent and probability of future profits are an unknown. Therefore, the magnitude of potential state income tax is indeterminate at this time.

The uniform school fund will be a significant benefactor of the oil shale complex. The State of Utah has historically displayed a deep interest in education. Utah has been in the forefront of those states which have attempted to insure a quality education for all students in spite of a dependence on the property tax. School districts which are below average in assessed valuation are hard pressed to provide educational services comparable to wealthier school districts. Utah has instituted the uniform school fund to balance the educational advantages of school districts of disparate property values.

The uniform school fund requires payments from school districts in proportion to property valuation, and a payment to school districts based on average daily attendance. This is a simplified explanation of a complex formula which is calculated annually and includes such factors as percentage of handicapped students in the district. The construction of the oil shale complex in Uintah County will cause the



per student assessed valuation of the school district to increase. While it is not possible to forecast accurately the benefit to the rest of the state, it is clear that Uintah School District will either be less dependent on or a net contributor to the uniform school fund. The difficulty in assessing the exact outcome of oil shale vis-a-vis the school fund is that one would need to know the future of property values of all school districts in the state.

The complex will pay a significant amount of sales and use tax to the State of Utah. The general sales tax is an excise tax on retail sales of tangible property, as defined in section 59-15-5 of the Utah Code, made inside the taxing jurisdiction. The use tax is a tax on the privilege of storing, distributing, using, or consuming articles of tangible property in the taxing jurisdiction on which no sales tax has been paid. With regards to the oil shale complex, the use tax is more relevant. The nature of the use tax assures that Utah will receive 4 percent of the value of all materials used to construct the facility. Table 1 displays the sales and use tax that might be paid the state and county.

The calculations presented in Table 1 are based on the construction schedule, an estimated \$1.5 billion cost of construction and an assumption that 60 percent of the cost of construction is materials.

The use tax is a one time tax paid concurrently with the use of the property. While the assumptions used to derive Table 1 may understate the sales and use tax by a wide margin, the results are helpful in assessing the magnitude of the tax. Although, the amount paid Uintah County may be diminished by purchases of materials



Table 1. Projection of sales and use tax to be paid by oil shale complex.

Year	Value of Materials	State Tax	County Tax
Demonstration			
Project Stage			
1	\$ 46,800,000	\$ 1,872,000	\$ 351,000
2	46,800,000	1,872,000	351,000
3			
4			
Construction			
Stage			
5	57,600,000	2,304,000	432,000
6	115,200,000	4,608,000	864,000
7	172,800,000	6,912,000	1,296,000
8	230,400,000	9,216,000	1,728,000
9	172,800,000	6,912,000	1,296,000
10	57,600,000	2,304,000	432,000
Total	\$900,000,000	\$36,000,000	\$6,750,000



elsewhere within the state. The State of Utah can afford to provide the oil shale industry with support services and infrastructure such as highways. The willingness to do so in a timely manner becomes the important issue. The Resources Development Act which provides for prepayment of sales and use tax indicates that Utah is prepared to act when the need arises.

As already noted, the entire state of Utah will benefit from the property tax paid to the school district through the mechanism of the uniform school fund. Property taxes are a function of the assessed valuation and the mill levy. Although the Utah Code specifies that property should be assessed at 30 percent of fair market value, in practice, the assessments average 20 percent. Therefore, 20 percent of the estimated cost of construction has been used in projecting property taxes to be paid by the oil shale complex. This estimate of assessed valuation was then multiplied by approximate current mill levies made.

Table 2 displays the estimated cost of construction in place, the assessed valuation, the total tax paid to the county, the total tax paid to the school district, and the yearly changes in the respective taxes. In 1974, the total assessed valuation of Uintah County was \$42,819,537. In the fourth and final year of the demonstration project stage phase, the assessed valuation of the county will have more than doubled. At the same time, the entire population impact due to oil shale, both direct and indirect, will amount to less than 20 percent of the alternative future zero forecast. Obviously placing both the county and the school district in a position to service the major population impact of years seven through ten.



Table 2. Projection of property taxes to be paid by oil shale complex.

Year	Cost Of Construction In Place (000's)	Assessed Valuation (000's)	County Property Tax Mill Levy of .0118	Change On County Tax	School District Tax Mill Levy of .045	Change On School Tax
Demonstration Project Stage						
1	-0-	-0-	-0-	-0-	-0-	-0-
2	75,000	15,000	177,000	177,000	675,000	675,000
3	150,000	30,000	354,000	177,000	1,350,000	675,000
4	225,000	45,000	531,000	177,000	2,025,000	675,000
Construction Stage						
5	300,000	60,000	708,000	177,000	2,700,000	675,000
6	390,000	78,000	920,400	212,400	3,510,000	810,000
7	585,000	117,000	1,380,600	460,200	5,265,000	1,755,000
8	870,000	174,000	2,053,200	672,600	7,830,000	2,565,000
9	1,275,000	255,000	3,009,000	955,800	11,475,000	3,645,000
10	1,560,000	312,000	3,681,600	672,600	14,040,000	2,565,000
11	1,650,000	330,000	3,894,000	212,400	14,850,000	810,000



In addition to the property tax revenues which will be realized from the oil shale installation, property taxes from new housing and new and expanded commercial and industrial properties are to be anticipated. These revenues will accrue to the county and school district, regardless of location within the county. The City of Vernal will benefit from construction activity that is located within the city limits, as Vernal has a property tax.

Assessed valuation of property is directly related to the ability of a jurisdiction to sell bonds. The use of bonds is a device whereby future revenues can be used to pay for the construction of public facilities such as schools. Therefore, in examining property tax revenues to be collected by the county and school district, the proper analysis is to calculate if future revenues would be sufficient to pay off bonds. A thesis dealing with the impacts on education due to oil shale concluded that the school district could pay 40 percent interest on bonds and be able to repay them if the payments to the uniform school fund were equal to payments received.

The details associated with bonding are as follows. The Utah Municipal Bond Act is designed to assist municipalities on expenditures for improvements, facilities, or property. Municipality is defined, in this act, as any city, town, county, school district, public transit district, improvement district, metropolitan water district, or water conservancy district as designated by the code. It does not include the State of Utah and its institutions. Any municipality, subject to limitations of the Municipal Bond Act, may issue bonds for the purpose of "paying all or part of the cost of acquiring, improving, or extending any one or more improvements,



facilities, or property" it is authorized to acquire. Such authorization includes:

1. Public buildings of every nature, i.e., offices, jails, police and fire stations;
2. Waterworks, water treatment plants, water systems, and any other improvement;
3. Sewer systems and sewage treatment plants;
4. Drainage and flood control systems;
5. Recreational facilities of every nature, i.e., playgrounds, athletic fields;
6. Convention centers, sports arenas;
7. Roads, bridges, parking lots;
8. Airports;
9. Educational facilities, i.e., schools, museums, theaters;
10. Hospitals.

Costs may include the cost of equipment and furnishings, engineering, legal and fiscal advisor's fees. The interest to accrue to the bonds during the construction period, up to six months, is also included. "Where bonds are payable solely from the revenues derived from the operation of the revenue-producing facilities, the governing body may provide for the use of bond proceeds to establish a reserve fund sufficient to pay the maximum amount of principal and interest estimated to fall due on the bonds in any future twelve-month period" (Municipal Bond Act, Section 11-14-1, p. 332).

A municipality, i.e., Vernal, desiring to issue bonds under the requirements of the Utah Code, must provide for an election on the question of the bonds. Bonds may only be issued if a majority of the qualified voters indicate their approval. Initially, a voter



qualified only if that person had paid property taxes in the year preceding the election. This provision restricting voting was rendered inoperable by the U.S. Supreme Court in 1970. The election notice must state the purpose for which the bonds are to be issued, the maximum amount of the bonds to be issued, the maximum number of years from their respective dates, and the maximum rate of interest. The purpose need not outline particular projects and specific amounts, but must only be stated in general terms (Municipal Bond Act, Section 11-14-2, p. 332).

Bonds approved may not be an amount that would cause the municipality to exceed the constitutional limit on indebtedness. Bonds, however, do not necessarily need to be issued all at once; but they must be issued within ten years of the election in which they were approved. The constitutional percentage is calculated as 100 percent of the reasonable fair cash value of the taxable property in the municipality as computed from the last equalized assessment rolls for the state and county. No bond election is void because amounts of bonds authorized by an election exceeded the limitation at the time of the election, but the bonds may be issued from time to time in an amount within the applicable limitation at the time the bonds are issued.

The critical point of the above discussion is the limitation on indebtedness. The county and school district will not be hindered by the limit of 100 percent of the reasonable fair cash value of the taxable property as reference to Table 2 will verify. The City of Vernal may or may not be as well situated. The question of the fiscal future of Vernal City revolves on the site chosen



either by or for the workers as to their housing needs. If Vernal City is chosen, then there will be an increase in both revenues and expenditures for Vernal.

In Chapter V, an analysis of choice of residence location was presented. Rangely, Colorado is the community closest to Ua and Ub. However, Rangely does not have the community infrastructure of Vernal City and Uintah County. In fact, residents of Rangely travel to Vernal to shop. Rangely is located in a flood plain and is not certified for federally guaranteed mortgages. Moreover, the town will find difficulty in expanding sufficiently to handle the population influx due to Ca, a nearby Colorado prototype oil shale site. The difficulties will not be limited to expansion of community infrastructure, but to the acquisition of raw land. The town of Rangely is hemmed in by federal lands, and it is not clear whether sufficient land is available. This is compounded by the present land speculation in Rangely.

To add to the detriments of Rangely as a potential housing site for the oil shale workers is the political reality of taxation. The substantial assessed valuation and concomitant property taxes are available only to Uintah County and the State of Utah. As Governor Calvin L. Rampton has stated, Colorado cannot expect to build a road connecting Rangely to Utah and then blame Utah for the ensuing problems.

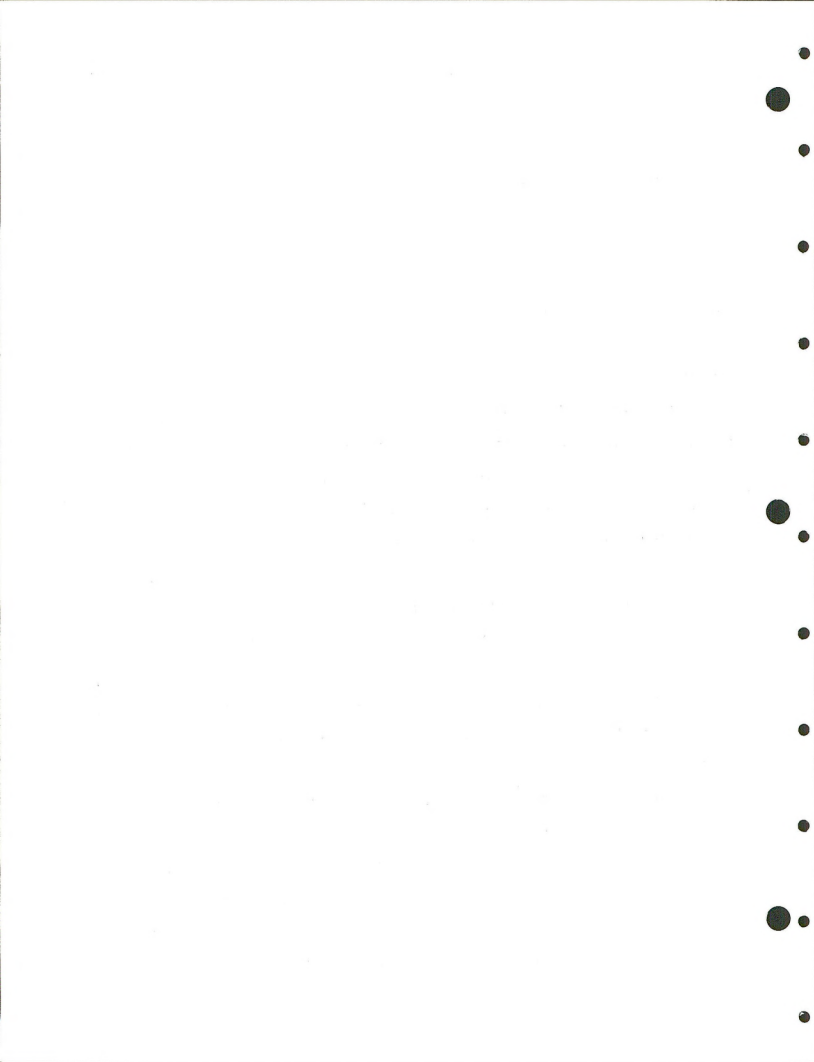
On the positive side, are the advantages which Vernal City, Uintah County, and the State of Utah have to offer the potential residents. All three express a pro-growth attitude and a willingness to plan for and facilitate development. The State of Utah has



passed the Resource Development Act which allows energy development companies to prepay sales and use tax. The monies would then be available to construct roads to service the project. In effect, the State of Utah foregoes revenues that would have gone into the general fund. Instead, these monies are used to build a road which will facilitate the construction of the energy project. Thus, the profitability of the project is enhanced.

Governor Calvin L. Rampton has used the power of his office to create the Uintah Basin Energy Planning Council, and to appoint technical advisors to assist the Council. The Council is composed of elected officials from the Uinta Basin. The technicians are men of expertise locally and from federal and state agencies and the state's universities. The Council and various subcommittees have met periodically, and are an example of coordinated planning among local, state, federal, and private parties. This report is part of this process. Funded partially from federal and partially from state funds, the researchers have worked as part of the planning process.

At this point, a recapitulation of Chapter VI would be helpful. In that chapter, the need for planning was stressed. Of particular importance, planning and control at the local level should be increased and supported by the state and federal governments. The actions of both these parties to date indicates that they encourage local initiative. This report, in particular, urges that Uintah County and Vernal City cooperate through a growth management system to control and direct the population growth so as to protect the public health, safety, and general welfare, and to insure sound and



fiscally responsible local government. The thrust of the plan is to channel growth where it is economic for the city and county to provide services.

If the city and county either adopt the suggested growth management system, or a similar policy of their own, the residence location of the new residents of Uintah County will in large part be determined. Not only the location will be determined, but also the timing of the development. A growth management system provides the local governments with an environment in which their special problems are given greater attention. Unlike boom towns in which development overloaded public facilities, Vernal City and Uintah County can grow in a manner determined by the local people.

Table 3 displays the estimated total demand for housing units by employment group due to oil shale development. Construction workers will almost uniformly purchase mobile homes or rent. This is based on research presented in a thesis by Roberts which showed housing patterns in rapid development situations. Operating employees due to their relatively high incomes prefer to purchase permanent dwelling units. The local service employees will purchase permanent units if their incomes are sufficient; however, roughly a third will purchase mobile homes or rent. If growth management becomes an enforced policy in the county, then the vast majority of the construction will be channeled into Vernal.

On the assumption that Vernal becomes the growth center, an analysis of the city fiscal situation is possible. The housing will increase the property tax base of the city. Expansion of commercial and industrial activity will also increase the property tax base.



Table 3. Estimated total demand for housing units by employment group due to oil shale development.

Year	Construc- tion	Opera- ting	Local Service	Total Demand	Annual Change In Total Demand	Average Household Size
1	400		70	470	470	2.72
2	400		200	600	130	2.83
3		300	340	640	40	3.10
4		300	470	770	130	3.14
5	500	300	510	1,310	540	2.95
6	1,000	300	590	1,890	580	2.86
7	1,500	300	650	2,450	560	2.82
8	2,000	1,500	660	4,160	1,710	2.75
9	1,500	1,500	680	3,680	-480	2.92
10	500	1,500	970	2,970	-710	3.03
11		2,500	990	3,490	520	3.10
12		2,500	1,120	3,620	130	3.11



Retail sales will increase within the city limits, causing the sales tax revenues to increase. The population influx will cause the various fees and miscellaneous revenue sources to rise. Whether revenue rises sufficiently to offset needed expenditures is the relevant concern. Vernal City has responsibility for garbage collection, fire protection, law enforcement, water and sewer, and general administration. With regards to all but water and sewer, the city should be able to maintain present standards of service. This conclusion is based on the following logic. The incoming population will on average earn higher wages than the present residents. Unless they have significantly larger families than predicted in Chapter III, the per capita revenues will rise. Since as was discussed in Chapter V, the cost of providing these services is fairly constant for increases in demand, the rising revenues should adequately cover these expenditures. Capital outlays for these items will be relatively modest and within the means of the city.

Water and sewer, however, present a challenge to the City of Vernal. At the time this report is written, the water and sewer system needs expansion and improvement. Attempts are underway to obtain funds from the Environmental Protection Agency. It is the recommendation of this report that the federal government coordinate the activities of its agencies. If BLM causes oil shale to go forward, EPA should provide funds to the city which houses the workers. This is necessary due to the previously discussed limit on indebtedness. The tax base of the city will not expand either in time or sufficiently to fund water and sewage systems as needed.

At the county level of responsibility, the immediate doubling



of the tax base followed by an eventual 1,000 percent increase is more than sufficient. Health service delivery is the major budget item of the county and can be adequately provided for through the increased revenues. The school district will be in a position to finance the necessary expansion. This is based on the predicted doubling of the tax base prior to the arrival of over 80 percent of the newcomers.



APPENDIX A
REGIONAL BASE METHODOLOGY

General

The simplest method of calculating regional multipliers is to estimate the ratio of total employment (or income), T, to basic employment, B. If the ratio is, say 3, it is then assumed that total employment will increase by 3 for every unit increase in base employment. In other words, non-base employment, N, rises by 2 for every unit increase in base employment. This procedure, which assumes a linear and proportional relation between T and B, is used to project future changes in T associated with changes in B. Reluctance to assume proportionality over the range of projected values leads to a second approach. Where observations on T and estimates of B at two different times are available, the values themselves may be replaced by their differences in calculating the multiplier, which can be expressed as $\Delta T/\Delta B$, where " Δ 's" indicate changes. A logical extension of this approach, used when several estimates of historical values of T and B are available, is to fit a linear regression line through the points and use the slope coefficient as the estimate of the multiplier. This third approach is conceptually the same as the second, the latter being a statistical "special case" of the former.

Weaknesses of the regional base approach have received ample attention in the literature, and will not be listed here. However, of particular relevance to areas like Uintah County are three problems associated with the use of regional multipliers to project future



regional economic change. The first of these results from the possibility that at a given point in time, the estimated multiplier may be "distorted" due to the existence of disequilibrium conditions. If a region is undergoing rapid economic growth or decline, either overall or in important sectors, the calculated total/base employment ratio may reflect recent changes to which there has been only partial and incomplete adjustment. This problem is not solved by estimating changes in employment between two periods, since disequilibrium conditions may affect either or both the point estimates of T/B.

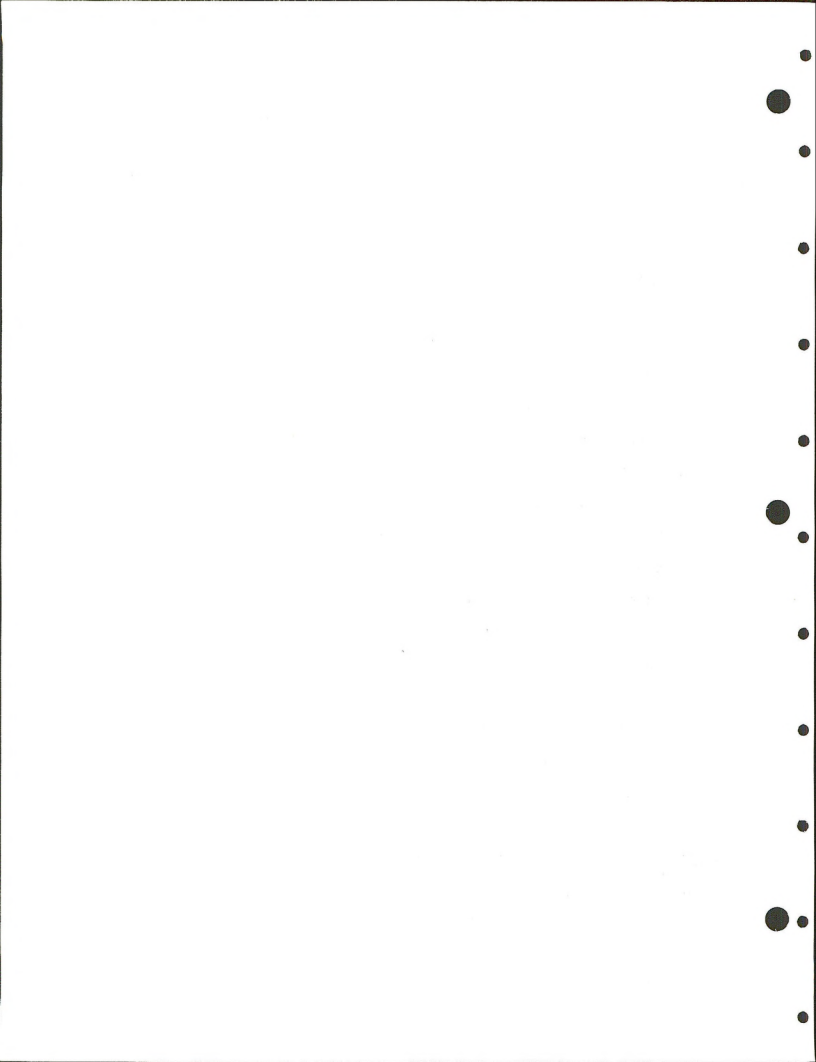
The second problem is that as the county grows the T/B ratio is likely to change due to scale effects, location theoretic considerations, and other factors. Economies and diseconomies of scale imply that growth in industrial output will not be proportional to input (including labor) growth. In addition, high fixed cost industries having economies of scale may not be viable in small areas with limited markets. As a result, changes in the size of the county's economy will be associated with changes in the composition and relative size of the non-base sector. Use of past changes, rather than a single point estimate of T/B, may reduce this problem somewhat, but does not eliminate it. In effect, whereas the T/B method says, "the future will be like the present" in terms of the county's economic structure, the $\Delta T/\Delta B$ method says, "changes in the future will be like changes in the past." In view of the possibility of different types of structural changes occurring in the non-base sector over different ranges of population and/or income size, the latter assertion is questionable.

Closely related to this second problem is a third one involving



the method of allocating projected employment changes in the non-base sector to industries within the sector. Regional base analysis projects estimated changes in employment among non-base industries on the basis of industry employment, so that equal percentage increases are assumed in all industries. An inconsistency is evident, even though past changes are used to calculate the regional multiplier. Although scale and other effects leading to non-proportional changes in both the base and non-base sectors as a whole are taken into account (and assumed to persist in the future in a linear approximation), effects leading to non-proportional changes within the non-base sector are ignored. This may considerably lessen the reliability of estimates of future non-base industrial composition estimated by the conventional regional base approach.

The first two problems just discussed may lead multiplier estimates that are questionable for predictive purposes. The third problem may lead to poor predictions of industrial composition, even assuming accurate projections of total, base, and non-base employment. When a regional base analysis is applied to an area like Uintah County which, when compared with large (perhaps multi-state) regions of the United States, has a large base sector relative to its local service sector, the problems of regional base analysis discussed above are magnified. An extreme example would be one where a large industry employing thousands of workers is expected to enter a region containing a population of only several hundred. In such circumstances heavy or total reliance upon current and historical regional data to project total employment (much less its composition) is clearly inappropriate.



Multiplier Estimation

The method used in this study to estimate an employment multiplier for Uintah County preserves the advantages of a regional base analysis and at the same time avoids excessive reliance upon historical and current data from the region under study. The method will be described in general terms as a series of steps.

Step 1: Industries were classified as base, non-base, and "mixed" on a priori grounds. Data on employment by 27 industrial classifications was gathered for the non-base and "mixed" industries from a sample of 197 other counties in the western United States. The population size range of the sample was 10 to 40 thousand, which spans the anticipated change in size of Uintah County resulting from oil shale development. The predicted change in county population was, of course, not known in advance, its estimation being a goal of the study, but only a very rough estimate was necessary at this point.

Step 2: Utilizing the cross-sectional data obtained in Step 1, an ordinary least squares estimate of the relation between employment and population was obtained for each of the non-base industries.

Step 3: Non-base employment was estimated for each of the "mixed" industries for various county size groups. The "minimum requirements" method was applied to the data at hand in the following way: sample observations were grouped into several size classes. For each size class a decision rule was applied to determine the "minimum requirement" level of employment (i.e., estimated non-base employment) for each industry. There were 20 size classes and 20 minimum requirement levels for each mixed industry.

Step 4: For each mixed industry an ordinary least squares



estimate was obtained of the relation between population size and estimated non-base employment using the 20 observations for each industry obtained in Step 3.

Step 5: Let n^i denote non-base employment in industry i , where the i includes both non-base and mixed industries, and let P denote population. The sum of the \hat{b}_1^i estimated from the reduced form equations $n^i = b_0^i + b_1^i P$ in Steps 2 and 4 is a cross-sectionally derived estimate of $\Delta N/\Delta P$ from which a regional employment or population multiplier may be calculated:

$$\begin{aligned}\Delta T &= \Delta B + \Delta N \\ &= \Delta B + \frac{\Delta N}{\Delta P} \cdot \frac{\Delta P}{\Delta T} \cdot \Delta T \\ &= \Delta B + \sum_i \hat{b}_1^i (\Delta P/\Delta T) \Delta T \\ \Delta T/\Delta B &= \frac{1}{1 - (\Delta P/\Delta T) \sum_i \hat{b}_1^i} \\ \Delta P/\Delta B &= \frac{\Delta P/\Delta T}{1 - (\Delta P/\Delta T) \sum_i \hat{b}_1^i}\end{aligned}$$

As may be seen, the regional employment and population multipliers require the estimation of $\Delta P/\Delta T$ for the region. This was done on the basis of the demographic characteristics discussed in Chapter III and verified on the basis of experiences of a sub-sample of 10 rapid-growth counties.

Step 6: The product of estimated change in P from Step 5 and the coefficients \hat{b}_1^i are estimates of changes in local service employment by industry.



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