

Socioeconomic Impact of the Unocal Oil Shale Project—An Analysis

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First, before presenting the socioeconomic analysis of the Unocal Oil Shale Project, it is necessary to provide a brief overview of our Northwest Colorado region.

Because of the magnitude of our region's oil shale resources and the size of oil shale projects, much attention has been given to oil shale impacts. However, our region has several world-class energy resources, not just oil shale, and I believe we have several world-class recreation/-tourism resources as well. It is this regional background one must understand before assessing the overall impact of the Unocal oil shale project.

First, the following list (Table 1) shows some of the population and public land characteristics in the region. This shows that despite having only about 4.5% of the population of the state, our region contains 27.7% of the public lands, 70.4% of mineral royalties generated, 60.0% of energy-related jobs in the state, and about 8.3% of the tourism-related jobs.

As I indicated, we have several world-class energy resources in this region, which include:

- *Oil Shale.* The Piceance Basin, located entirely within this region is the richest oil shale deposit in the world.

From 650 billion to 1 trillion barrels of recoverable oil are estimated for this reserve—roughly equal to the entire world's proven crude oil supply.

- *Coal.* Colorado's coal reserves of 17.1 billion tons ranks us eighth in the nation. Coal production in 1990 was 19.1 million tons, with approximately 85% produced from 11 mines located in the Northwest Region. We produce a low-sulfur, high-Btu coal.

- *Oil and Gas.* In 1989 Colorado oil companies produced 237.4 bcf of clean burning natural gas. The Rangely oil field in Rio Blanco County is rated the sixteenth most productive oil field in the nation.

- *Coalbed Methane.* The Colorado Oil and Gas Conservation Commission estimates that Colorado contains about 183 tcf of coalbed methane resource in place. This is more than the entire United States estimate of 168 tcf of natural gas reserves. The Northwest region contains about 63%, or 115 tcf, of the Colorado total resource. More than 90 wells have been drilled in our region to develop this resource, with two 24-in. pipelines proposed to access California markets. The pipelines would carry either natural gas or methane.

Table 1. Population, land, mineral royalties, and employment statistics for northwestern Colorado counties in 1989.

County	1989 Population	1989 Public Land Acreage	1988	1989	1989
			Mineral Royalties Generated	Energy-Related Jobs	Tourism-Related Jobs
Garfield	28,800	1.2MM	\$ 2.2MM	1,447	2,481
Mesa	90,600	1.5MM	2.9MM	999	2,910
Moffat	10,600	1.6MM	12.9MM	2,542	700
Rio Blanco	5,200	1.5MM	28.3MM	1,921	129
Routt	14,800	0.7MM	2.4MM	656	2,168
NW Region	150,000	6.5MM	48.4MM	7,565	8,388
Colorado	3,316,900	23.5MM	69.3MM	12,606	101,000
%NW Region	4.5	27.7	70.4	60.0	8.3

RECREATION RESOURCES IN NORTHWEST COLORADO

- *Skiing.* The Steamboat Springs, Powderhorn, and Ski Sunlight ski areas account for 11.4% of the Colorado ski business. We also have some of the best snowmobiling and cross-country ski trails in the world. Steamboat Springs is known internationally as "Ski Town USA."

- *Natural Resources.* Our region is blessed with the Colorado, Gunnison, Dolores, White, Yampa, Green, Little Snake, and Roaring Fork rivers. We have the Mt. Zirkel and Flat Tops Wilderness areas and Grand Mesa, the world's highest flat-top mountain.

- *Recreation Areas.* We have Dinosaur and Colorado National Monuments, Vega, Highline, and Island Acres State Recreation Areas, Rifle Gap (where Christo Curtain was hung in 1972), 14 golf courses, three national forests, Kokopeli Bike Trail, JQS Jeep trail, and the world's biggest natural hot springs pool.

- *Wildlife Hunting and Fishing.* We have the world's largest mule deer herd and world famous elk hunting. We have outstanding trout fishing and one of the world's largest fish hatcheries.

- *Cultural/Historical.* We have Pintada Canyon Indian art, the Hole-in-the-Wall hideout of Butch Cassidy and the Sundance Kid, Dinosaur Valley, Rigg's Hill, and Rabbit Valley where fossils of the world's largest and smallest dinosaurs have been found. We have the Western Colorado Center for the Arts, the Museum of Western Colorado, and Grand Junction is home of the Junior College World Series.

We also have good access into our region. Visitors can get to our region by Interstate 70, U.S. Highway 40, U.S. Highway 50, two regional airports, three county airports, and by AMTRAK.

These recreation and transportation access resources provide this region the opportunity to maintain a diversified economy that should moderate future economic cycles.

ECONOMIC ANALYSIS OF UNOCAL'S PARACHUTE CREEK SHALE OIL PROJECT

Unocal began construction in January 1981 on its property at Parachute Creek, Colorado. The project includes a mine, shale retorting plant, raw shale-oil upgrading facility, provisions for disposal of retorted shale, and necessary support facilities. It was designed to process 12,800 tons of shale and produce 10,000 bbl/day of shale oil. The facility was completed in 1983 at a cost of \$650 million.

Actual production was not achieved until mid-1986. During this period, Unocal spent more than \$350 million trying to achieve startup. In 1987, production was about 500,000 bbl of synthetic crude oil; in 1988 about 1 million barrels; in 1989, 1.1 million bbl; and 1.5 million bbl in 1990.

During this operation period, Unocal expended another \$200 million, for a total investment over \$1.2 billion in the Parachute Creek Shale Oil project. In 1981 Unocal secured a contract under the Defense Production Act, which guaranteed a product price of \$42.50/bbl (the actual market price at the time) adjusted for inflation. Nevertheless, according to Unocal, the project, not even considering capital recovery, lost approximately \$103 million in 1987, \$50 million in 1988, \$36 million in 1989, and \$10 million in 1990. Because of startup and operational difficulties, the sharp drop, instead of the predicted increase, in oil prices; and limited production; Unocal announced in March 1991 that it would cease operations by June 1 of 1991.

In 1989, at the request of Mesa County Commissioner Dick Pond, AGNC Synfuels Chairman, AGNC undertook an analysis of the economic impact of the Unocal Oil Shale Project. Commissioner Pond was concerned that closure of the Unocal project would have a severe economic impact on both Mesa and Garfield Counties. He wanted both counties to take steps to help avoid the closure or to get ready for the impact. The 1988 analysis of the economic impact of the Unocal Oil Shale Project is shown in Table 2. It demonstrates that this pioneer oil shale project contributed up to \$70.1 million annually to this region's economy.

According to the AGNC analysis, in 1988 a total of 1,568 jobs (771 direct and 797 indirect) were at stake, with a potential population impact of 4,160 people. The analysis showed that up to 1,568 jobs then were dependent on the Unocal project, including 506 direct Unocal employees and 265 contract employees at the project. A conservative economic multiplier effect means that a minimum of another 979 employees were supported. The project also paid a utility bill within the region of \$20.0 million, and local purchases exceeded \$7.5 million annually.

The economic impact of the project decreased somewhat in 1990 because of Unocal's cost-cutting measures to turn the project into a profitable venture. At the end of 1990 (and currently) the project employed 480 Unocal employees plus 250 contract workers, for a total of 730 direct jobs. With the indirect estimate of 752 jobs, an overall total of approximately 1,482 jobs depended on or were supported by the project. The overall annual economic impact in Western Colorado currently is estimated at \$62.3 million.

The loss of these jobs and the economic impact will be felt in both Mesa and Garfield Counties. Although the project is located in western Garfield County, approximately 52% of the employees reside and commute daily from Mesa County. The remainder live in Garfield County. This pattern of an approximately 50-50 split between the two counties has existed since the start of the project.

Using population estimates of the Colorado Department of Local Affairs, the estimated population impact in the two counties will be 1,983 people in Mesa County and 1,831 in Garfield County.

Table 2. AGNC analysis of economic impacts of the Unocal oil shale project.

Annual Economic Estimates	1988		1990	
	Number	Annual Costs (\$ million)	Number	Annual Costs (\$ million)
Jobs and wages				
Unocal project employees*	506	\$18.0	480	\$18.4
Unocal contract employees*	256	7.4	250	7.9
Subtotal, Unocal project	771	\$25.4	730	\$26.3
Indirect jobs (1.03 multiplier)**	797	13.7	752	14.2
Total jobs and wages	1,568	\$39	1,482	\$40.5
Local utility consumption* (Gas: Northwest Pipeline, Barrett Energy Electric: Public Service Company of Colorado)		20.0		11.8
Local Unocal corporate purchases (Western Colorado)*		7.5		7.0
Local sales tax (Western Colorado)**		0.5		0.4
Local property taxes (Garfield County)*		3.0		2.6
Total economic contribution		\$ 70.1		\$ 62.3
Potential Population Impact Total Population				
480 Unocal employees @3.25†	1,560			
250 Contract employees @2.25†	562			
752 Indirect employees @2.25†	1,692			
Total	3,814			
Mesa County (52%)	1,983			
Garfield County (48%)	1,831			

* Unocal.

** AGNC estimates.

† Colorado Dept. of Local Affairs.

WILL THE UNOCAL SHUTDOWN INDUCE A BUST?

We do not really like to use the word "bust" in this region. But it is a question that must be examined.

The "raw" statistics for the potential impact will cause some economic problems. The loss of a \$62 to \$70 million annual economic benefit obviously will be felt.

The probable impact in Mesa County will not be as severe as in Garfield County. Mesa County has a 43,500-job employment base, with direct Unocal employees residing in Mesa County representing only about 0.9% of this base. However, the potential impact in Garfield County is complicated by the recent closure of Mid-Continent Resources'

Redstone coal mine. That closure, announced in January 1991, will be for an indefinite period. It appears unlikely to reopen soon unless Mid-Continent is able to sell the mine.

The Mid-Continent layoff affected 477 mine and contract employees, of whom 243 (51%) live in Garfield County. While the direct Unocal jobs represents only about 2.3% of the 14,900-job employment base in Garfield County, the combined Unocal/Mid-Continent layoffs will represent about 4.0% of the total Garfield employment base. If one adds the potential loss of indirect jobs, the impact could be as high as 8% of the Garfield County employment base.

As indicated in Table 3, the Mesa County impact also will be moderated by the fact that only about 6.6% of the county's employment base is in the mining and construction

Table 3. Comparison of 1987 employment statistics for Mesa and Garfield Counties, Colorado.

Employment Sector	Mesa County		Garfield County	
	Number	%	Number	%
Farming/Agriculture	2.3	5.3	0.9	6.0
Mining	0.4	0.9	0.7	4.7
Construction	2.5	5.7	1.3	8.7
Mining/Constr. Subtotal	2.9	6.6	2.0	13.4
Manufacturing	3.1	7.1	0.5	3.4
Transp./Public Utilities	2.1	4.8	0.5	3.4
Wholesale/Retail	9.8	22.6	3.3	22.1
Finance/Real Estate	4.4	10.1	1.2	8.1
Services	12.6	29.0	4.3	28.8
Government	6.3	14.5	2.2	14.8
Total	43.5	100	14.9	100

Source: Bureau of Economic Analysis (REIS)

industries. In Garfield County, on the other hand, approximately 13.4% of the employment base is in the mining and construction industries. Mesa County also has a more healthy 7.1% of its employment in the manufacturing industry, compared to only 3.4% in manufacturing in Garfield County. Otherwise the economic profile of the two counties is remarkably similar.

The potential population impact in the two counties also indicates a potentially more severe impact in Garfield County. The "induced" population of the Unocal project represents about 2.1% of the 93,100 Mesa County population. However, in Garfield County the "induced" population of Unocal employees (direct and indirect) could be as much as 6.1% of the 29,900 population. The population directly and indirectly affected by the combined Unocal/Mid-Continent closures could be as high as 10% of the Garfield County population.

MITIGATING CIRCUMSTANCES

However, I do not believe there will be a "bust" this time around. As some of these "potential" impact figures sound, there should be no "bust" even in Garfield County. A series of mitigating measures should help avoid a worse-case scenario, especially in comparison to the 1982 closure of the Exxon Colony oil shale project. The suddenness and surprise of the Exxon pullout is still remembered annually on the May 2 anniversary in this region. That closure was the cancellation of a large-scale construction project, with far more mobile workers. The mass "exodus" of workers and the "ghost town" image of Battlement Mesa made national news. The closure also occurred at a time when housing prices were inflated, interests rates were at a peak, and the nation's energy industry was beginning a prolonged slump.

For example, coal production in this region dropped 22%, and coal mining jobs dropped 50% from 1981 to 1987.

Mitigating measures this time include the following efforts by Unocal Corporation:

- Repeated warnings that the project was not achieving a "profit," which prepared the region for the probability of closure.
- Lead time of two months for the announced June 1, 1991, shutdown.
- An orderly "mothballing" of the project is planned.
- Six months continued health benefits for laid-off workers.
- Twelve weeks severance and completion bonus for workers.
- Unocal job placement service.
- \$100,000 socioeconomic grant each to Mesa and Garfield Counties.

This is a far cry from Exxon closing its gates.

Federal and state government programs are available to help deal with potential socioeconomic impacts. The State of Colorado has one of the nation's best Local Government Energy Impact Programs. The program is funded by 15% of all mineral royalties paid by energy development on federal lands, plus 50% of all state severance taxes. The Associated Governments of Northwest Colorado also is actively exploring the eligibility of our region for the U.S. Economic Development Administration's SSED program (Sudden and Severe Economic Dislocation).

These programs are particularly important for affected local governments. Currently Unocal contributes approximately 68% of the property taxes for Garfield School District No. 16, 35% of the local hospital district, and 54% of the recreation district property taxes. These local governments and the towns of Parachute and Rifle will need assistance.

The potential economic and population downturn also will be mitigated by other offsetting resources in our region. Some of these economic, natural, and social resources include the following:

- *Tourism and recreation resources.* Both Mesa and Garfield Counties have active tourism industries. Garfield County tourism includes Glenwood Springs facilities, skiing, two new 18-hole golf courses, and efforts to increase tourism related to the I-70 corridor and AMTRAK. A new Northwest Colorado Tourism Board is promoting tourism throughout the region.

- *Senior citizen/retirement resources.* Active real estate promotion campaigns have targeted this growing sector of our economy. The Battlement Mesa development is prospering—a real contrast to the 1982 "ghost town" situation.

- *UMTRAP.* The federal Uranium Mill Tailings Remedial Action Program targets sites in both Mesa and Garfield Counties. Unfortunately a 1- to 2-year delay has been announced by DOE for the beginning of the Rifle project.

- *Glenwood Canyon Project.* The I-70 widening project will continue for several more years.

- *Coalbed methane and natural gas development.* Throughout this region drilling activity has increased. The U.S. Forest Service is planning for large-scale drilling and production activities in Garfield County.

- *Natural gas pipelines.* Two major pipelines are planned to connect this region with transmission pipelines heading toward the California market.

- *Economic development efforts.* Both Mesa and Garfield Counties are served by new state Enterprise Zones to encourage small business investment and development. An economic development program has been successful in helping to diversify the Mesa County economy. The availability of a trained work force should help in the recruitment of new industry to the region.

WAS THE UNOCAL EXPERIENCE WORTH IT?

Yes! Everyone remembers the negative impacts when Exxon closed down the Colony Oil Shale Project in May 1982. What most people don't realize is that the layoff of 2,200 Colony employees was cushioned for at least two years by the Unocal project's construction. In fact, during the 12 months following Exxon's closure, Unocal reached its peak construction work force of 3,000, up from 1,000 at the time of Exxon's announcement. Unocal also spent \$65 million on socioeconomic impact mitigation plus tens of millions of dollars on local purchases during this period.

This cushioning effect is best demonstrated by the population figures compiled by the State Demographer's Office. Population actually continued to increase from 1982 to 1983 in Mesa County. Only slight decreases occurred in Garfield County. The population then declined into 1985 and 1986. Both counties since then have experienced modest population increases, as shown in Table 4.

Table 4. Population estimates in Mesa and Garfield Counties, Colorado, 1981 through 1987.

Area	Population Estimate (thousands)						
	1981	1982	1983	1984	1985	1986	1987
Mesa Co.	87.2	94.0	97.1	94.0	88.7	86.3	86.6
Garfield Co.	24.8	28.8	28.5	25.2	25.2	25.5	25.7
Combined	112.0	122.8	125.6	119.2	113.9	111.8	112.3

In addition to delaying the 1982 bust, the Unocal project cushioned the decrease in population by as much as 3,000 to 4,000 each year since. This was especially important from 1984 to 1986, when population continued to decrease. From 1987 until now, population in both counties has steadily increased.

The social contributions of Unocal also were appreciated. Unocal employees and families have become an integral part of our region. They participate in our communities, in our schools, and as our friends.

CONCLUSION—CAN WE LEARN FROM THIS EXPERIENCE?

Yes! We need to continue efforts to diversify our economy, and we need to organize a better way to develop oil shale technology.

Andrew Gulliford, author of *Boomtown Blues*, at a Club 20 meeting in 1990 advocated an oil shale research center. This would provide a smaller scale development program that would not have the inherent boom/bust cycles of commercial-scale development. I agree with Gulliford. Others who have advocated an oil shale test center to focus R&D efforts in a more organized manner include the following:

- Oil Shale Committee of the Rocky Mountain Oil and Gas Association
- Western Oil Shale Action Committee, Club 20
- Colorado Governor Roy Romer, Senator Tim Wirth, Representative Ben Campbell
- Associated Governments of Northwest Colorado
- Garfield Citizen Alliance.

Others have advocated alternative energy research without specifically referencing a test center. These include the Rebuild America Foundation, The Alternate Energy Research Institute, and the Rocky Mountain Institute.

In announcing the Unocal decision to cease operations, Unocal President and CEO Richard Stegemeier, indicated that Unocal's experience clearly demonstrates that more oil shale research is necessary. Mr. Stegemeier indicated that the Unocal site and facilities would make an ideal oil shale research center. The Western Oil Shale Action Committee and Associated Governments of Northwest Colorado are actively exploring such an opportunity.