

CHAPTER 1

DESCRIPTION OF REGIONAL DEVELOPMENT ACTIVITY

BACKGROUND

Introduction

This environmental statement (ES) is in two parts. The first part is an updated regional analysis of the cumulative impacts of existing and anticipated coal development activity through 1990 in the region known as the Eastern Powder River Basin of Wyoming. Additional development activity in the region includes coal conversion, extraction and processing of other energy minerals (uranium, oil, and gas), development of utility and transportation systems, and activity related to population growth. This additional activity would contribute to the cumulative impact of coal development in the region.

The second part of this environmental statement analyzes impacts of the site-specific action, which is approval of the Buckskin mining and reclamation plan submitted by Shell Oil Company. Development of the Buckskin Mine is included in the cumulative development activity assessed in the regional analysis.

This document has been prepared by the Bureau of Land Management (BLM) and the Geological Survey (GS) in cooperation with the Forest Service (FS), the U.S. Fish and Wildlife Service (USFWS), and the Bureau of Mines.

Purpose of the Regional Update

This regional analysis has been prepared to update the regional analysis contained in the Final Environmental Impact Statement, Eastern Powder River Coal Basin of Wyoming (FES 74-55) filed on October 18, 1974. The update provides an assessment and analysis of cumulative regional impacts based on current coal production outlook and presently anticipated levels of regional development activity. This update also incorporates recent data, research, and impact analyses in subjects as air quality, water resources, soils and vegetation, cultural resources, transportation, and socioeconomic conditions.

The environmental statement prepared in 1974 covered the probable regional impact of the development and operation of fourteen coal strip mines, four mine-mouth, coal-fired generating plants, two gasification plants, and a 113-mile main line railroad connecting Gillette and Douglas. The statement also analyzed, on a site-specific basis, development or expansion of four mines (Wyodak,

Rawhide, Black Thunder, and Jacobs Ranch) and the 113-mile railroad.

Since FES 74-55 was issued in 1974, the development or expansion of the four mines analyzed site specifically has been approved by the GS. Three mines (Belle Ayr, Cordero, and Eagle Butte) included in the earlier regional analysis and analyzed in separate site-specific environmental statements have also been approved by GS. Five additional mines (Caballo, Coal Creek, East Gillette, Pronghorn, and Rochelle) included in the earlier regional analysis are presently being analyzed in separate site-specific environmental statements. The status of coal mining approvals is summarized in Table R1-1. The right-of-way for the 113-mile railroad has recently been issued. The four new mine-mouth, coal-fired generating plants and two coal gasification plants have not been developed at this time. Completion of the Wyodak Plant discussed in FES 74-55 occurred in 1978, and no additional new power plants are currently projected within the region through 1990. The Panhandle Eastern Gasification Plant on a site near Douglas is still in the proposal stage, pending funding for construction and operation.

Scope of Regional Analysis

The scope of this updated regional analysis includes the cumulative impacts of existing and anticipated coal development together with impacts resulting from other developments occurring or expected to occur within the Eastern Powder River Basin Environmental Statement region by 1990. The ES region is the same as that analyzed in FES 74-55 (see Figure R1-1). The geographic area of consideration is that part of the Powder River Basin in Wyoming bounded by the Powder River on the west, the coal outcrop on the east, the Wyoming state line on the north, and the North Platte River on the south. The ES region, consisting of approximately 5 million acres (4,978,560 acres), includes all of Campbell County and a portion of Converse County. The principal communities are Gillette, Douglas, Glenrock, and Wright, Wyoming. The boundary of the region coincides exactly with the Eastern Powder River Basin Planning Unit within the Casper District of the Bureau of Land Management.

Those impacts which extend beyond the ES region are analyzed to the extent that they are more associated with regional development than with other actions outside the region. Elements which will be impacted on a broader

TABLE R1-1

STATUS OF COAL MINING OPERATIONS

<u>Mine Name</u>	<u>Approved</u>	<u>FES* issued</u>	<u>DES** issued</u>
Wyodak	X	10/74	
Dave Johnston	X	--***	
Belle Ayr	X	10/75	
Cordero	X	4/76	
Rawhide	X	10/74	
Black Thunder	X	10/74	
Jacobs Ranch	X	10/74	
Kerr McGee #16	X	--****	
Eagle Butte	X	9/76	
Caballo		3/79	
Coal Creek		1/79	
East Gillette			4/77
Rochelle		preparation of DES discontinued	
Pronghorn		2/79	

- * Final Environmental Statement
 ** Draft Environmental Statement
 *** Approval prior to enactment of National Environmental Policy Act.
 **** No federal approval required.

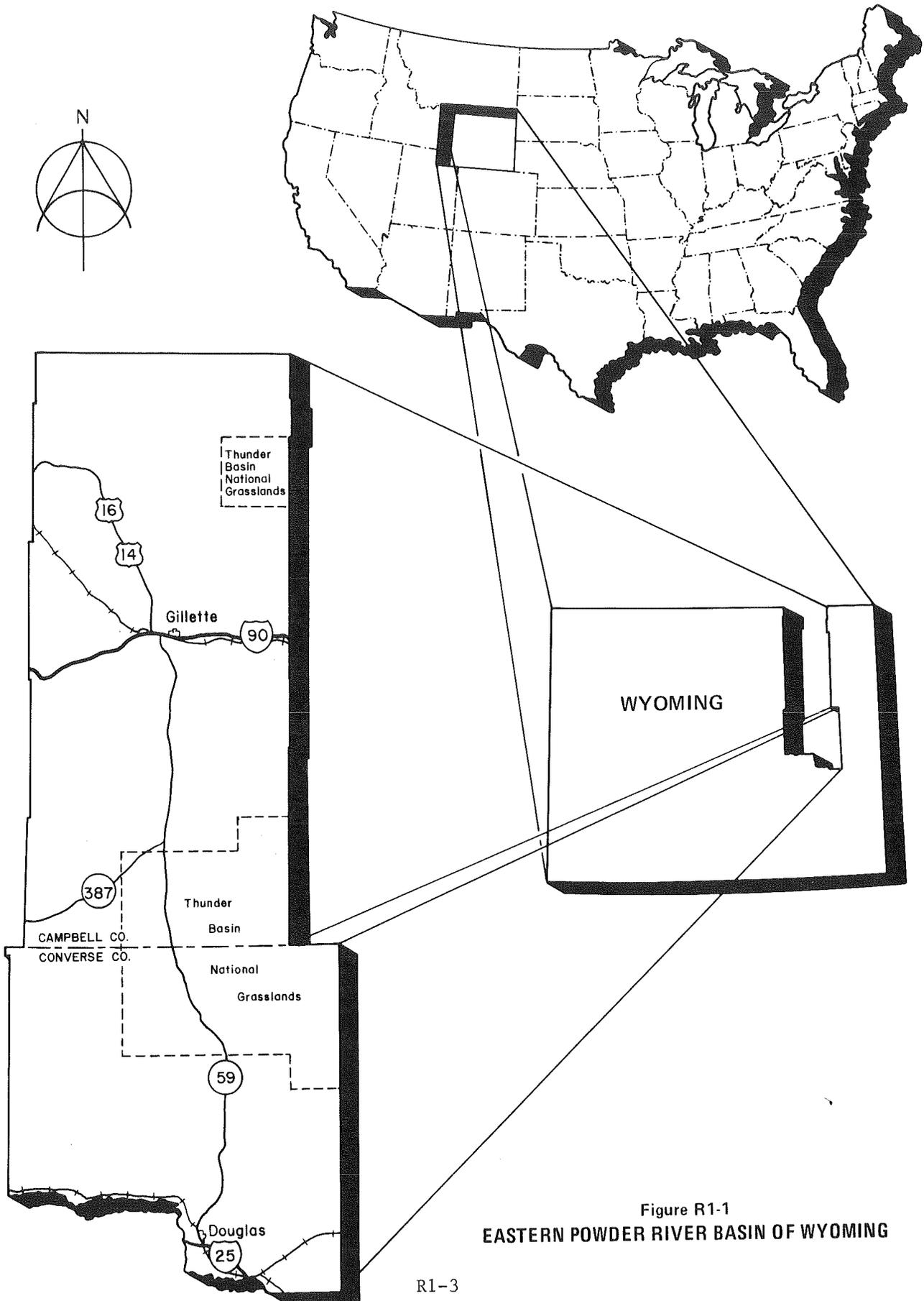


Figure R1-1
 EASTERN POWDER RIVER BASIN OF WYOMING

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geographic scope include social and economic factors, recreation, air quality, and transportation systems.

This ES does not propose new coal leasing nor does it commit the Secretary of Interior to a new coal-leasing program or the issuance of new coal leases.

The mining and reclamation plan (Buckskin Mine) analyzed in the site-specific part of this statement was submitted for review prior to the promulgation of initial regulations (30 CFR 700) required under Section 502 of the Surface Mining Control and Reclamation Act of 1977 (PL 95-87), and has not yet been reviewed for compliance therewith. Therefore, the mining and reclamation plan may not reflect the appropriate requirements of the regulations. However, to the extent possible, the applicable regulations have been considered in this analysis as federal requirements.

The mining and reclamation plan must be revised in accordance with the applicable regulations. As soon as the mining and reclamation plan is revised it will be evaluated by the Office of Surface Mining to determine compliance with the requirements of federal regulations 30 CFR 211 and 30 CFR 700. A discussion of the Surface Mining Control and Reclamation Act, and the regulations which implement it, is included in Chapter 3.

REGIONAL DEVELOPMENT SUMMARY

Three levels of coal development are assessed in the regional analysis: a probable level based on mining and reclamation plans presently filed with GS (including the site-specific action, Buckskin); a low level based on operating mines and those mines pending approval which have been or are being analyzed in site-specific ESs and were included in the earlier regional statement (FES 74-55) (see Table R1-1); and a high level based on proposed and potential mining in the region. Other major development in the region, both coal-related and noncoal-related, is added to each of the three levels of coal development in order to define three levels of regional development.

In 1974, the original regional analysis (FES 74-55) projected a probable level of development from fourteen mines resulting in an annual coal production of 150 million tons by 1990. There are now fourteen mines in the region, already approved or pending approval, which represent the low level of coal production (170 million tons annually by 1990) for the current analysis (see Chapter 8). Thus the probable level in the original analysis parallels the low level of the current analysis, except where production outlooks have been modified since 1974 (see Figure R1-2). The site-specific action under consideration (Buckskin Mine) is added to the low level to form a probable level of coal development (174 million tons annually by 1990) (see Table R1-2). The high level of coal development (330 million tons annually by 1990) represents the addition of potential new coal development to the probable level (see Chapter 8).

The various levels of coal development may be influenced by factors such as availability and economic recovery of coal, market demand and economic conditions,

requirements for diligent development of federal coal leases, and decisions, regulations, or policies developed in the private, local, state, and federal sectors.

The probable level of development is described in detail below, and is analyzed in the impact assessment chapters (Chapters 4, 5, 6, and 7). The low and high levels of development are described and analyzed in the low- and high-level scenarios of the alternatives chapter (Chapter 8). A comparison of the impacts of the probable, low, and high levels of development is presented in tabular form in Chapter 8.

Probable Level of Development

Coal Development

The probable level of coal development consists of production from one proposed mine, whose approval constitutes the site-specific action, and associated production from the fourteen previously or separately analyzed mines through the year 1990. The mines pending approval are assessed individually in site-specific environmental statements completed or under preparation by GS. The cumulative regional impacts of these fourteen mines were also included in the regional analysis in the final environmental statement on the Eastern Powder River Coal Basin of Wyoming (FES 74-55) issued October 18, 1974. Mine data is shown on Table R1-2.

Coal-Related Development

The impacts of coal-related development are analyzed as components contributing to cumulative regional impacts of the probable level of development.

Wyodak Power Plant. In the summer of 1978, Black Hills Power and Light and Pacific Power and Light companies opened the 330-Mw capacity Wyodak Power Plant near Gillette. The plant requires about 2 million tons of coal annually, supplied from the adjacent Wyodak Mine which must increase production from the present 900,000 tons per year to meet this need. Since the plant is air cooled, water requirements are only about 130 acre-feet per year, supplied by the city of Gillette's effluent treatment system. About 75 people are employed at the plant. After construction is complete, no changes in plant facilities and capacity are anticipated prior to 1990 (personal communication, Morgan 1977).

Coal Gasification Plant. Plans for one coal gasification plant have been announced. This project is a joint venture of Panhandle Eastern Pipe Line Company and Peabody Coal Company. Coal to supply the plant would come from the Rochelle Mine, to be operated by a subsidiary known as Rochelle Coal Company, and located about 48 miles north of Douglas. The plant site would be about 15 miles north of Douglas. The gasification plant would be operated by another subsidiary known as Wyoming Coal Gas Company (SERNCO 1974). This plant was included in the cumulative regional analysis present-

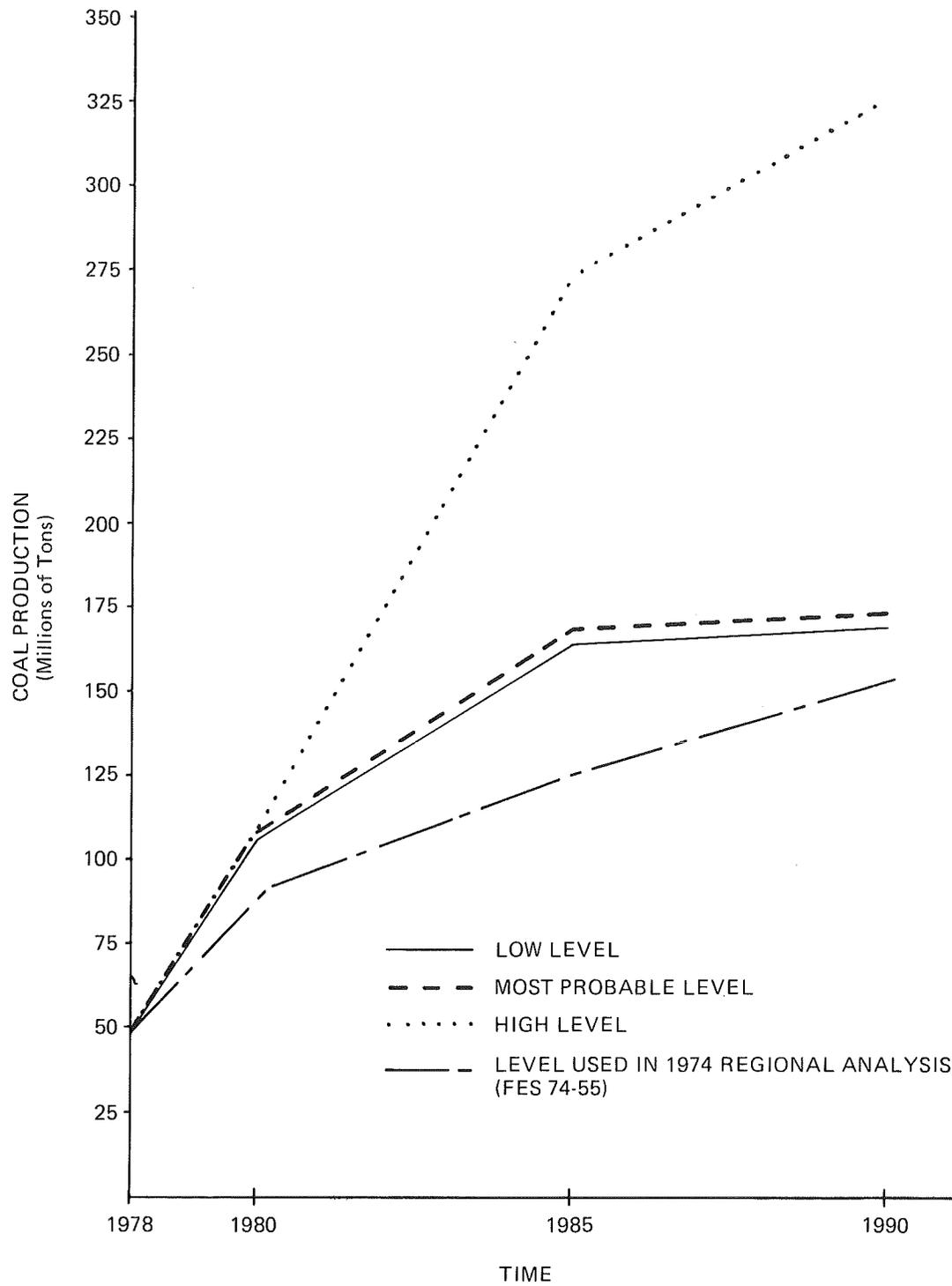


Figure R1-2
LEVELS OF COAL PRODUCTION

TABLE R1-2

PROBABLE LEVEL OF COAL DEVELOPMENT (EXISTING AND PROPOSED COAL MINING) BY 1990 IN THE EASTERN POWDER RIVER BASIN

Projects (All Surface Mines)	Annual Coal Production (MM Tons/Year)				Time Frame		
	1978	1980	1985	1990	Construction Start Up	Full Mine Operation	Mine Life (Years)
<u>Site Specific Action</u>							
Buckskin	0	2.0	4.0	4.0	1979	1985	20
<u>Operating Mines</u>							
Wyodak	0.9	2.5	2.5	2.5	1922	1979	98
Dave Johnston	3.2	3.2	3.2	3.2	1958	1970	43
Belle Ayr	18.5	20.0	20.0	20.0	1973	1985	23
Cordero	9.2	20.0	24.0	24.0	1976	1981	25
Rawhide	3.0	9.0	12.0	12.0	1977	1982	40
Black Thunder	5.8	13.7	20.0	20.0	1978	1983	40
Jacobs Ranch	2.6	10.7	15.7	15.4	1975	1984	23
Kerr-McGee #16	1.0	4.2	4.2	4.2	1978	1979	14
Eagle Butte	0.3	13.2	20.0	20.0	1976	1984	39
<u>Environmental Statement In Progress</u>							
Caballo	0.1	3.0	7.0	12.0	1977	1987	39
Coal Creek	0	4.0	10.0	10.0	1979	1983	36
East Gillette	0	4.0	11.0	11.0	1979	1982	35
Rochelle	0	0	11.0	11.0	1980	1984	29
Pronghorn	0	3.5	5.0	5.0	1979	1981	22
TOTAL	44.6	113.0	169.6	174.3			

TABLE R1-2
(cont'd)

PROBABLE LEVEL OF COAL DEVELOPMENT (EXISTING AND PROPOSED COAL MINING) BY 1990 IN THE EASTERN POWDER RIVER BASIN

Projects (All Surface Mines)	Total Permit ² Acres	Federal Coal Acres	Cumulative Acres Disturbed by 1990 ³	Average Acres Disturbed Per ⁴ Year	Cumulative Acres Reclaimed by 1990
<u>Site Specific Action</u>					
Buckskin	1,760	600	377	50	14
<u>Operating Mines</u>					
Wyodak	3,240	1,880	363	50	243
Dave Johnston	13,990	9,660	2,760	80	1,565
Belle Ayr	5,960	2,440	1,947	165	1,643
Cordero	8,390	6,560	3,174	285	1,820
Rawhide	5,720	5,457	755	80	410
Black Thunder	8,280	5,884	1,285	175	975
Jacobs Ranch	4,960	4,352	1,760	170	1,345
Kerr McGee #16	960	0	559	57	572
Eagle Butte	4,470	3,520	1,208	85	611
<u>Environmental Statement In Progress</u>					
Caballo	7,850	5,330	1,220	195	805
Coal Creek	9,605	5,800	1,270	185	808
East Gillette	3,440	3,440	1,100	77	990
Rochelle	5,000	10,820	873	160	555
Pronghorn	2,640	4,000	455	45	310
TOTAL	86,265	69,743	19,106	1,859	12,666

R1-7

TABLE R1-2
(cont'd)

PROBABLE LEVEL OF COAL DEVELOPMENT (EXISTING AND PROPOSED COAL MINING) BY 1990 IN THE EASTERN POWDER RIVER BASIN

Projects (All Surface Mines)	EMPLOYMENT ⁵					
	1980		1985		1990	
	Construction	Permanent	Construction	Permanent	Construction	Permanent
<u>Site Specific Action</u>						
Buckskin	197	52	0	125	0	133
<u>Operating Mines</u>						
Wyodak	0	48	0	55	0	55
Dave Johnston	0	135	0	135	0	135
Belle Ayr	0	255	0	334	0	334
Cordero	0	166	0	277	0	277
Rawhide	0	327	0	430	0	430
Black Thunder	0	350	0	500	0	500
Jacobs Ranch	0	212	0	250	0	250
Kerr McGee #16	0	123	0	123	0	125
Eagle Butte	0	200	0	350	0	350
<u>Environmental Statement In Progress</u>						
Caballo	121	200	0	430	0	430
Coal Creek	194	55	0	250	0	250
East Gillette	5	110	5	161	0	161
Rochelle	200	190	0	190	0	190
Pronghorn	0	226	0	279	0	279
TOTAL	717	2,649	5	3,889	0	3,899

R1-8

TABLE R1-2
(cont'd)

PROBABLE LEVEL OF COAL DEVELOPMENT (EXISTING AND PROPOSED COAL MINING) BY 1990 IN THE EASTERN POWDER RIVER BASIN

Projects (All Surface Mines)	Estimated Number of Unit Trains for the Years			Market Area
	1980	1985	1990	
<u>Site Specific Action</u>				
Buckskin	200	400	400	Oklahoma
<u>Operating Mines</u>				
Wyodak	45 ⁷	45 ⁷	45 ⁷	Mine Mouth (Wyodak), South Dakota
Dave Johnston	0 ⁷	0 ⁷	0 ⁷	Mine Mouth (Dave Johnston Power Plant)
Belle Ayr	2,000	2,000	2,000	Colorado, Texas, Arkansas, Kansas, Ohio, Iowa
Cordero	2,000	2,400	2,400	Wyoming, Texas
Rawhide	900	1,200	1,200	Iowa, Indiana
Black Thunder	1,370	2,000	2,000	Texas
Jacobs Ranch	1,070	1,570	1,540	Arkansas, Louisiana
Kerr McGee #16	420	420	420	Unknown
Eagle Butte	1,320	2,000	2,000	Southern, Midwestern, and Ohio Valley States
<u>Environmental Statement in Progress</u>				
Caballo	300	700	1,200	Nebraska, Michigan, Indiana
Coal Creek	400	1,000	1,000	Texas
East Gillette	400 ⁷	1,100 ⁷	1,100 ⁷	Unknown
Rochelle	0 ⁷	0 ⁷	0 ⁷	Mine Mouth (Wyoming Coal Gasification)
Pronghorn	350	500	500	Minnesota, Iowa, Wisconsin, Illinois, Gulf Coast States
TOTAL	10,775	15,335	15,805	

Note: Mine information was developed from mining and reclamation plans currently on file with the Area Mining Supervisor, GS.

- 1 Additional federal coal reserves under lease are anticipated to be mined as a part of this operation in the future, which may extend indicated mine life.
 - 2 All acreage within the area of operations for the mine.
 - 3 Only acreage disturbed by mining operations. By 1990, 3,717 additional acres will be disturbed by mine facilities.
 - 4 Average annual rate per new surface disturbance by mining activities.
 - 5 Employment data in the mining and reclamation plans were updated where possible by personal communications with the mining companies.
 - 6 One unit train equals 100 cars, each car having a capacity of 100 tons of coal. Does not include return traffic.
 - 7 Coal exported from the region is shipped south, east, or southeast.
- This number does not represent full transport of the mine production by unit train. Coal consumed at mine mouth is generally transported short distances by truck or private rail.

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ed in FES 74-55. Information concerning this proposal has been updated for this ES.

The gasification plant would require 1,000 acres for facilities, plus additional acreage for access roads, rail line, and pipelines. It would process 11 million tons of coal annually and require 5,000 to 8,000 acre-feet of water annually. From this, 270 million cubic feet per day of 960 to 970 BTU per cubic foot of gas would be produced. By-products would be 8,000 barrels of liquid petroleum products and about 100 tons of sulfur per day. The company has proposed constructing a power plant of 60-Mw capacity to supply electrical needs of the plant.

The proposed gasification plant would require a 24-inch, 475-mile gas line. About 20 miles of this line would be in the region of analysis and would require 200 acres of land. Water would be supplied from a diversion on the North Platte River and from a well field adjacent to the plant site. The water system would require about 10 miles of water pipeline. A private railroad would be established between the Rochelle Mine and the plant site. This line would be single track with sidings and electric powered. The line would be about 40 miles long and basically parallel State Highway 59 (personal communication, Leon Fergus 1977).

Presently, the gasification project plans are not proceeding, pending financial arrangements. For purposes of analysis, financing is assumed to be available by 1980. When financing becomes available, at least 2 years (1982) would elapse before construction begins. Construction would require about 4 years and employ an average of 2,000 workers. Permanent employment at the plant would be about 800 individuals.

This proposal is included in the cumulative regional analysis. However, a site-specific environmental analysis will be prepared at the time a specific gasification project is proposed.

Railroad. Most coal produced in the region will be exported to other parts of the United States to be converted or utilized.

Rail service is provided via two main lines of Burlington Northern (BN) (principal rail service) and one main line of Chicago and North Western (C&NW). Upgrading of existing tracks is presently in progress. BN and C&NW are jointly constructing a major new rail line between Gillette and Douglas, portions of which are in operation (personal communication, Interstate Commerce Commission 1977). Construction and operation of this rail line was analyzed both regionally and site specifically in FES 74-55, and federal rights-of-way were issued March 20, 1978. (See also Chapter 2, Transportation.) It is expected that about 173 miles of rail line and anticipated spur lines and sidings will be constructed by 1990 as mines begin production (from mining and reclamation plans on file with the Area Mining Supervisor, GS). In addition, a 40-mile private rail line for transporting coal for gasification (see discussion of coal gasification) would be built by 1990 (personal communication, Leon Fergus 1977). The main line between Gillette and Douglas, about 113 miles, will probably be completed between 1980 and 1985. Spur line development would be timed to

coincide with industry start-up periods. Projections in this ES indicate that coal production could increase from a present 45 million tons per year to 174 million tons per year in 1990. Rail transport requirements would be affected similarly. The quantity of coal to be shipped would increase at a fairly constant rate to 1990 (personal communication, Interstate Commerce Commission 1977), based on coal production projections.

On February 21, 1978, the U.S. Court of Appeals for the District of Columbia Circuit in the *Sierra Club v. Interstate Commerce Commission* found that the discussion of offsite impacts (those occurring outside the region) resulting from increased rail use contained in FES 74-55 was inadequate. The Interstate Commerce Commission was directed to assess and consider these impacts in connection with further proceedings directed by the court concerning the railroad construction application for the Gillette to Douglas rail line. Impacts occurring outside the region from increased rail traffic are discussed in the regional analysis, Chapters 2 and 4.

Union Pacific (UP) and C&NW recently announced plans to increase rail carrying capacity for shipments of coal. C&NW has sought a federal loan guarantee to finance the rehabilitation of its route from Shawnee, Wyoming to Fremont, Nebraska. C&NW and UP have agreed to collaborate in the development of a new rail line connecting a point east of Shawnee with the existing UP line at a point east of Torrington, Wyoming. Because these plans are tentative, they are not included in the impact analysis of this ES.

Other Major Regional Development

The impacts of major noncoal developments are included in the regional analysis as part of the cumulative regional impacts.

Oil and Gas. Oil and gas production was recorded from 166 active fields in the Powder River Basin during 1975. There are an additional 44 fields which are considered temporarily nonproductive. A great majority of the wells classed as nonproductive are shut in, awaiting secondary or tertiary recovery procedures to be implemented. These shut-in wells are considered to be in the process of reactivation.

The region produced approximately 12.3 million barrels of federal oil, or approximately 9% of the total federal oil produced in the state of Wyoming in 1975.

Oil and gas reserves will become increasingly depleted by present extraction methods, and total production figures have shown a decline since 1973. However, a highly active oil and gas exploration program in the region is expected to continue to add new fields to the discovery list. Also, new recovery methods, such as the secondary and tertiary programs, will tend to improve recovery by extending oil and gas operations in the region for at least 50 years.

Employment in the oil and gas industry in the region was approximately 5,000 people in 1974, and by 1990 is expected to increase to only 3% above the present figure. Total acreage presently used for oil and gas activity is about 4,800 acres. Acreage affected by oil and gas

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exploration and development will increase about 10% by 1990 (personal communication, GS, Conservation Division, Casper 1977).

Uranium. Uranium exploration and mining is confined chiefly to the districts of Pumpkin Buttes in southwest Campbell County and Southern Powder River Basin in northwest Converse County (see Map 10, Appendix A). It is assumed that uranium activity will continue to increase through 1990.

There are presently three producing uranium mining operations (a mining project may involve several open pit, solution, or underground mines, owing to the frequent occurrence of uranium in small diffuse ore bodies) and two mills in the region. It is anticipated that there will be six mining operations by 1980, producing a total of 2,561,000 tons per year (TPY) of uranium ore. In 1985, twelve mining operations will be producing 4,445,000 TPY, while in 1990, the twelve operations will be producing 4,745,000 TPY. Three uranium mills will be operational in 1980 processing 6,200 tons per day (TPD), while in 1985 and 1990, seven mills will be operating, processing 13,200 TPD in 1985 and 16,200 TPD in 1990.

Developments proposed to be operational by 1980 would result in employment of approximately 1,800 workers for uranium mining and milling activities. Uranium employment is projected to reach 2,850 by 1985 and then 3,015 by 1990. It is anticipated that 6,200 total acres will be disturbed by uranium activity by 1980, 15,300 by 1985, and 21,800 by 1990. By 1985, 6,000 acres will be reclaimed, and by 1990, 12,500 acres will be reclaimed. It is anticipated that the majority of development activity will occur in the Southern Powder River Basin (Tennessee Valley Authority 1976; Kerr-McGee, July 1977; United Nuclear 1977; Nuclear Regulatory Commission 1977; Bickert et al. 1976; *Engineering and Mining Journal*, December 1975; Wyoming Department of Economic Planning and Development 1978).

Other Construction Activities. Tri-County Electric Association, Inc. plans to construct a 59-mile, 230-kv transmission line from the Wyodak Power Plant east of Gillette to a site on the Campbell-Converse county line. Then, approximately 15 miles of existing transmission line originating from the Dave Johnston Power Plant near Glenrock will be extended north by Pacific Power and Light Company, requiring about 28 miles of new construction to connect with the Tri-County Electric portion. The purpose of the combined 87 miles of new transmission line and associated facilities is to improve the delivery of power for present and anticipated demands of the coal, uranium, and oil and gas industries. Construction may be under way by 1980 (personal communication, Royce Harbicht 1977).

Municipal development in the region is under way, some of which will extend beyond 1980. The community of Wright is expected to increase by an average of 200 housing units per year for 10 years (personal communication, Bob Huff 1977).

Coal Slurry Pipeline

There is a proposal by Energy Transportation Systems, Inc. (ETSI) to construct a 1,667-mile, 38-inch pipeline capable of exporting 25 million tons of coal annually from the region to Arkansas, Louisiana, Mississippi, and Oklahoma in the form of a coal-water slurry (ETSI 1978). Some of the coal would come from existing mines in the region. ETSI filed an initial application for right-of-way for the slurry pipeline with the Bureau of Land Management and the Forest Service in 1974. A new application was filed in May 1978 with the Bureau of Land Management (BLM) and is in the process of being perfected.

Since detailed information about the slurry pipeline is not yet definite, analysis of the cumulative impacts of the proposed pipeline are not included in this ES. After final applications and detailed project data have been filed, the ETSI coal slurry project will be analyzed in a separate environmental analysis. Wyoming BLM has been assigned lead responsibility for preparation of this ES.

THE SITE-SPECIFIC ACTION

The site-specific portion of this ES analyzes the impacts of the specific authorization under consideration by the Department of the Interior. That authorization is approval of the mining and reclamation plan for the Buckskin Mine, after the plan has been modified to meet all applicable federal regulations. No federal rights-of-way are required as part of this action. The site-specific action is also included as a part of the probable level of development.

In May 1977, Shell Oil Company submitted the Buckskin mining and reclamation plan, in conformance with federal regulations 30 CFR 211 (May 1976) to the Area Mining Supervisor, GS. The plan outlines a surface coal mining operation on federal lease W-0325878, involving 600 acres (all private surface). The mine would be located approximately 10 miles north of Gillette, Wyoming, and would produce 4 million tons per year by 1990 to supply steam-powered generating facilities in Oklahoma. The mining area of operations or permit area is 1,760 acres, which includes the federal coal lease, a 1,000-foot operational perimeter around the lease, and the access and rail corridors.

Additional information from the Buckskin Mine plan is summarized by the first line entry of Table R1-2.

Required Authorizations for the Site-Specific Action

Assistant Secretary of Energy and Minerals

The Assistant Secretary shall approve the mining permit application (including the mining and reclamation plan) and significant modifications or amendments there-to prior to commencement of mining operations by the company.

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Office of Surface Mining (OSM)

OSM, with the concurrence of the leasing agency (Bureau of Land Management) and GS, recommends approval or disapproval of the mining and reclamation plan to the Assistant Secretary of Energy and Minerals. Whenever a state has entered into a state-federal cooperative agreement with the Secretary of the Interior, pursuant to Section 523(c) of the Surface Mining Control and Reclamation Act (SMCRA), the state regulatory authority and OSM will jointly review mining and permit applications. Such an agreement with the State of Wyoming was signed in October 1978. Both agencies will recommend approval or disapproval to the officials of the state and Department of the Interior authorized to take final actions on the permit.

Bureau of Land Management (BLM)

BLM develops special requirements to be included in the reclamation plan concerning management and protection of all resources other than coal and the postmining land use of the affected lands.

Geological Survey (GS)

GS is responsible for development, production, and coal resource recovery requirements included in the mining permit.

State of Wyoming, Department of Environmental Quality (DEQ)

Since Wyoming entered into a cooperative agreement with the Secretary of the Interior, pursuant to Section 523(c) of SMCRA, DEQ and OSM will jointly review and act on the mining and reclamation plan and permits to mine authorized under a federal coal lease.

The Land Quality Division of DEQ issues permits and licenses to mine according to the approved mining and reclamation plan. The Air Quality Division issues permits for construction and operation after review of applications with regard to air contaminants and plans for control and monitoring. The Water Quality Division issues permits to construct water systems. The Solid Waste Division issues construction fill permits and industrial waste facility permits for solid waste disposal during construction and operation.

Wyoming State Engineer

Water rights for the mining and coal-processing operations are required from the State Engineer. The State Engineer also must authorize proposed water diversions and impoundments.

FUTURE REVIEWS

Future National Environmental Policy Act Review Points

Future coal-related actions beyond those proposed and analyzed in this ES will require additional assessment of environmental impacts. Such future actions may include:

1. Mine and reclamation plan approval for development of existing federal coal leases.
2. Major mine and reclamation plan modifications for existing operations. Specifically, existing mines must modify their mining and reclamation plans to come into compliance with the Surface Mining Control and Reclamation Act.
3. Issuance of coal exploration licenses.
4. Future proposals for development of unleased federal coal.
5. Replacement (exchange) of coal in areas of high environmental cost, such as alluvial valley floors, with other federal coal.
6. Permit and/or lease readjustments. Terms and conditions of federal coal leases are readjusted every 20 years, while mining permits are issued not to exceed 5 years, under conditions of the Surface Mining Control and Reclamation Act.
7. Federal authorizations for transportation and communication rights-of-way or other mine-related facilities.
8. Federal authorizations for plant facilities and transport systems for any major new industrial project.

Related Reviews

Preference Right Lease Application Status Review

Recent interpretation of the Mineral Leasing Act of 1920 by the Office of the Solicitor, Department of the Interior, has determined that areas of federal coal under preference right lease application (PRLA) cannot be leased if, prior to issuance of the prospecting permits, there had existed, on those areas, existing mining claims under the Mining Act of 1872. This interpretation would affect only the portions of the PRLAs under mining claims. Preference right lease applicants were required to submit abstracts of any mining claims on their applications to BLM by March 1978.

Preference right lease applicants were required by 43 CFR 3520 to prepare and submit initial showings indicating evidence of commercial quantities of coal to BLM by July 1977. As the PRLAs are processed, initial showings will be evaluated in technical reports and environmental assessments to be prepared jointly by BLM, OSM, and GS.

On September 27, 1977, under order of the District Court for the District of Columbia in *Natural Resources Defense Council v. Hughes*, the Department of Interior was enjoined from issuing any new coal leases until a supplemental coal programmatic environmental statement correcting the deficiencies of the original statement has been issued in final form and a new coal management program has been developed.

DESCRIPTION OF REGIONAL DEVELOPMENT

Department of Energy (DOE)

Under the Department of Energy Organization Act of 1977 (PL 95-91), DOE was authorized to set coal production rates on federal coal leases, review and concur on stipulations included in federal coal leases, and establish diligence requirements for development of each lease. Guidelines and procedures are being developed for coordination of DOE's responsibilities with those of the Department of Interior.

ANALYSIS GUIDELINES FOR THE PROBABLE LEVEL OF PRODUCTION

An analysis of impacts requires establishing guidelines for coal-related development. The following narrative and tables were developed to establish such guidelines for coal development and other concurrent regional development activities. Probable cumulative regional development activity for the Eastern Powder River Basin is shown in Table R1-3. As new development information becomes available these guidelines can be utilized to reflect the changes.

Guidelines

The following information was used for analysis of impacts:

1. Cumulative impacts are analyzed for three time points (1980, 1985, 1990).

2. Reclamation schedules vary for each mine. Normally reclamation is conducted as an ongoing program. After a surface mining operation has been in progress for 2 to 3 years, the reclamation of the mined land is accomplished at approximately the same annual rate as acreage disturbance.

3. Reclamation on an area is considered complete when disturbed lands have been backfilled, graded, contoured, and revegetated in accordance with an approved reclamation plan, and bond has been released (Wyoming Land Quality Rules and Regulations 1975, Surface Mining Control and Reclamation Act of 1977).

4. Since telephone lines are usually built within access road or railroad rights-of-way, no additional acreage of disturbance has been attributed to these installations.

5. Any impacts lasting after closure of mine and release of bond will be considered long term.

6. Acreage and water requirements used to analyze cumulative impacts are derived in Tables R1-3, R1-4, R1-5, and R1-7. Tables R1-6 and R1-8 summarize acreage and water requirements.

TABLE R1-3

CUMULATIVE DEVELOPMENT DATA FOR THE REGION
PROBABLE LEVEL OF DEVELOPMENT

	<u>1978</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
<u>Coal Mining</u>				
Number of Coal Mines*	10	15	15	15
Coal Mine Support Facilities:				
Miles of Rail Spurs	39	60	60	60
Miles of Telephone Lines	30	50	50	50
Miles of Access Roads	7	22	22	22
Miles of Conveyor System	0	7	7	7
Miles of Power Lines	76	93	93	93
<u>Coal Related Development</u>				
Number of Power Plants**	2	2	2	2
Number of Gasification Plants	0	0	1***	1
Miles of Railroad Line				
Main Line (Common-carrier)	26	113	113	113
Private	0	0	40	40
<u>Uranium</u>				
Cumulative Number of Mining Projects	3	6	12	12
Cumulative Number of Uranium Mills	2	3	7	7
Cumulative Number of In Situ Uranium Leaching Projects	0	0	1	1
<u>Oil and Gas</u>				
Area of Activity (Acres)	4,800	4,880	5,110	5,250
<u>Other</u>				
Miles of New 230-kv Transmission Lines				
	0	0	87	87
Population Increase (1,000's)****	0	4	18	22

Note: 1978 base, and based on mining and reclamation plans and indicated trends.

* Counts East Gillette and Kerr McGee #16 individually.

** Wyodak and Dave Johnston. Neil Simpson dismantled and incorporated into Wyodak.

*** Under Construction.

**** Centaur Management Consultants, Inc. 1978. Based on State of Wyoming projection model for Campbell and Converse counties: population increases represent increase over 1978 base population (37,780).

TABLE R1-4

ACREAGE REQUIREMENTS FOR DEVELOPMENT

<u>Facility</u>	<u>Average Acres Required</u>
Mine Surface Structures (coal and uranium)	100 per mine
In Situ Uranium Leaching Project	100 per project
Uranium Mill	500 per mill
Transmission Line (230-kv)	18 per mile
Power Line	6 per mile
Telephone Line*	0 per mile
Railroad Line (157-foot right-of-way)	21 per mile
Gasification Plant (includes pipelines, power, and access)	1,500 per plant
Power Plant	2 per megawatt
Population Increase	145 per 1,000 people
Conveyor System	10 per mile
Road (100-foot right-of-way)	12 per mile
<u>Road (2 lane, 175-foot right-of-way)</u>	<u>21 per mile</u>

* Assumed either within road, rail, or power right-of-way corridor.

TABLE R1-5

SUMMARY OF CUMULATIVE ACREAGES DISTURBED AND RECLAIMED BY COAL MINING ACTIVITY
PROBABLE LEVEL OF DEVELOPMENT

	<u>1978</u>	<u>Cumulative Acreage</u>		<u>1990</u>
		<u>1980</u>	<u>1985</u>	
Surface Mines Operations	2,515	4,733	12,934	19,106
Power Lines	451	558	558	558
Rail Spurs	859	1,260	1,260	1,260
Access Roads	128	264	264	264
Conveyor Systems	0	70	70	70
Mine Structures	1,039	1,500	1,500	1,500
Relocations	36	36	36	36
Totals: Acres Disturbed	5,028	8,421	16,622	22,794
Acres Reclaimed	1,234	3,495	9,887	12,666
Difference	3,794	4,926	6,735	10,128

TABLE R1-6

CUMULATIVE ACREAGE DISTURBED AND RECLAIMED BY REGIONAL DEVELOPMENT ACTIVITIES
PROBABLE LEVEL OF DEVELOPMENT

	<u>1978</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
<u>Acreage Disturbed</u>				
Coal Mining Activity*	5,028	8,421	16,622	22,794
Power Plants	2,000	2,000	2,000	2,000
Coal Gasification	0	0	1,500	1,500
Railroad Line				
Main Line	546	2,373	2,373	2,373
Private	0	0	840	840
Uranium	5,000	6,200	15,300	21,800
Oil and Gas	4,800	4,880	5,110	5,250
Sand, Gravel, Scoria	200	200	620	1,280
230-kv Transmission Line	0	0	1,566	1,566
Population**	<u>0</u>	<u>519</u>	<u>2,640</u>	<u>3,242</u>
TOTAL	17,574	24,593	48,571	62,645
<u>Acreage Reclaimed</u>				
Coal Mining Activity*	1,234	3,495	9,887	12,666
Other Activities	<u>900</u>	<u>2,400</u>	<u>6,550</u>	<u>13,300</u>
TOTAL	2,134	5,895	16,437	25,966
<u>Difference</u>	15,440	18,698	32,134	36,679

* From Table R1-5.

** Acreage required for population increase over 1978 base municipal acreage.

TABLE R1-7

WATER REQUIREMENTS FOR DEVELOPMENT

<u>Facility</u>	
Per 1,000 Population Increase (urban)	190 A-F per year*
Mine Operation	20 A-F per million tons coal
Gasification Plant (270 Million cubic feet per day)	7,000 A-F
Power Plant (water-cooled)	10 A-F per megawatt
Power Plant (air-cooled)	0.4 A-F per megawatt
Uranium Operation	25 A-F per 1,000 tons of ore per day production
In Situ Uranium Leaching	225 A-F per year
Uranium Mill	1,000 A-F per 1,000 tons of ore per day capacity

* Based on present water use in Gillette. A-F = acre-feet.

TABLE R1-8

INCREASED WATER USAGE FOR THE REGION
PROBABLE LEVEL OF DEVELOPMENT

Annual Water Requirements (acre-feet)

Type of Use	1975	1978	Inc.*	1980	Inc.*	1985	Inc.*	1990	Inc.*
Coal Mines	170	980	810	2,200	2,030	3,400	3,230	3,500	3,330
Irrigation	10,000	10,000	0	10,000	0	10,000	0	10,000	0
Municipal**	3,990	7,220	3,230	7,830	3,840	10,550	6,560	11,290	7,300
Oil Field (water-flood)	12,000	12,000	0	12,000	0	12,000	0	12,000	0
Uranium Mines	80	140	60	230	150	400	320	430	350
Uranium Mill	500	4,200	3,700	6,200	5,700	13,200	12,700	16,200	15,700
In Situ Leaching Project	0	0	0	0	0	225	225	225	225
Power Plants***	7,500	7,630	130	7,630	130	7,630	130	7,630	130
Gasification Plant	---	---	---	---	---	7,000	7,000	7,000	7,000
Stock Water and Domestic	10,000	10,000	0	10,000	0	10,000	0	10,000	0
Totals	44,240	52,170	7,930	56,090	11,850	74,405	30,165	78,275	34,035
Sewage**** (Estimate of Water Used)	2,800	5,060	2,260	5,480	2,680	7,380	4,580	7,900	5,100

* Increase over base year (1975).

** Includes need for projected population increase in region.

*** Includes Wyodak air-cooled and Dave Johnston water-cooled plants.

**** Not a part of cumulative total.