Appendixes

APPENDIX A

Development and Production of Federal Coal Leases in the Southern Rocky Mountain States

Colorado

Overview

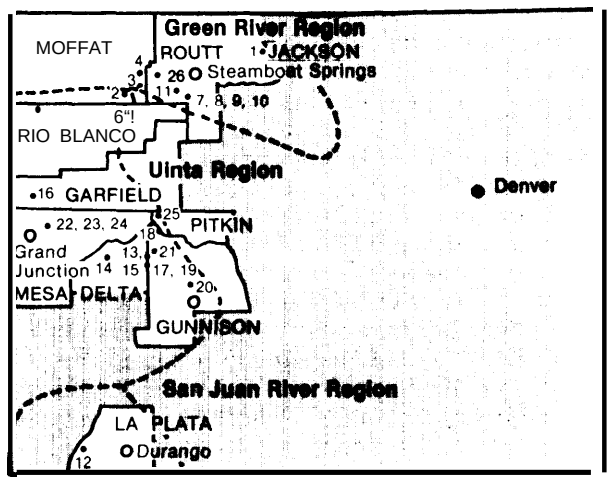
Colorado has Federal leases in four coal regions: the Green River, the Uinta, the San Juan, and the Denver Raton Mesa regions, (See table 34 in ch, 6 for a summary of acreage and reserves under lease.) The San Juan and the Denver-Raton Mesa regions contain the fewest number of Federal leases. There is one Federal lease in an approved mine plan in the San Juan region. Six Federal leases in the Denver-Raton Mesa region are currently undeveloped. Most of Colorado's 127 Federal leases and reserves are located within the Uinta and Green River regions. In the Green River region, 31 leases are in approved mine plans, 3 are in pending mine plans, and 23 are not in mine plans. In the Uinta region, 22 leases are in approved mine plans, 18 are in pending mine plans, and 23 are not in mine plans. (See fig. A-l.)

In total, Colorado's 127 Federal coal leases cover more than 126,000 acres of land and contain over 2.2 billion tons of recoverable coal reserves. The State thus ranks second to Utah, and before New Mexico in lease acreage and reserves in the Southern Rocky Mountain region. In 1979, Colorado mines with Federal leases produced almost 16 million tons of coal, as compared to roughly 10 million tons from Federal mines in Utah, and about 8 million tons from New Mexico Federal mines.

Overall the maximum production capacity for Colorado's existing and proposed Federal mines is almost 45 million tons per year. production from these mines in 1986 could exceed 29 million tons. Production from undeveloped leases in 1986 is only 0.6 million tons, By 1991, production from existing and proposed Federal mines could increase to about 35 million tons, and production from currently undeveloped leases could also increase substantially, to about 8 million tons,

The Department of Energy (DOE) 1985 production goals for Colorado of 34 million to 38 million tons are higher than OTA's estimate of potential production from Federal mines in 1986 (29.4 million tons), The difference in large part will probably be offset by production from non-Federal mines and from mines on Federal preference right lease applications (PRLAs), The OTA Colorado task force estimated that 1986 minimum State production would be about 26 million tons from all mines. By 1991, the Colorado task force projected that minimum State production would range from

Figure A-1.—Coal Mines on Federal Lands in Colorado



Map locations

1- Canadian Strip
2- Colowyo
3- Eagle Nos. 5, 9
4- Trapper
5- Deserado
6- Meeker Area
7- Apex No. 2
8- Edna
8- Trout Creek
9- Energy Fuels Nos. 1, 2
10- Johnnies
11- Seneca, 2W
12- National King Coal
13- Orchard Valley
14- Red Canyon No. 2
15- Somerset
15- Blue Ribbon
16- Loma Complex
17- Bear
17- Mt. Gunnison
18- Coal Basin
19- Hawksnest East & West
20- Ohio Creek No. 2
21- Windjammer No. 1
22- Cameo Nos. 1, 2
22- Roadside
23- Coal Canyon
24- Cottonwood Creek
25- Snowmass
26- Marr

SOURCE: Office of Technology Assessment.

32 million to 38 million tons. OTA's analysis found that potential production from mines with Federal leases could reach 43 million tons in 1991 exceeding the task force projection and almost equaling the DOE high-level **1990** production goal of 43.3 million tons. (The DOE low-level goal is 28 million tons and the midlevel goal is 35 million tons,) By the 1990's Federal mines are expected to contribute a larger share of total State production.

Green River Region

Of the four coal regions in Colorado, the Green River region is the most important in terms of its total coal reserves, its total mine capacity, and its past and anticipated coal production. Roughly 60 percent of the region's total Federal lease reserves are not yet included in any mining plans. Only 2.5 percent of the region's lease reserves are contained within mine plans pending with the Office of Surface Mining IOSM), The remaining 38 percent of the reserves are included within approved mining plans. (Additional Federal production could come from the first new lease sales under the Federal coal management program which were held in the Green River-Hams Fork region of Colorado and Wyoming. Almost 56 million tons were leased in the January 1981 sale, and an additional 64 million tons were sold in April 1981).

Approved Mine Plans.—There are 10 mine plans involving 31 Federal leases that have been approved in the Green River region. Of these, 8 were actively in production in 1979 and produced a total of 11.2 million tons of coal in that year. Two mines were not producing in 1979, Six mines are surface operations and accounted for 93 percent of the production in 1979. All of the approved mines in this region are expected to be in production in 1986; moreover, all are expected to meet Department of the Interior's (DOI) diligent development requirements by that year. Total operating capacity for these mines is estimated at 23.6 million tons per year, of which 21 percent is underground capacity. According to mine plan projections, production for 1986 will reach about 19 million tons and could increase slightly to almost 20 million tons per year by 1991. These production levels represent 83 and 88 percent of maximum design capacity for existing mines. The total capacity of currently approved mines will decline slightly as 2 mines exhaust their existing lease reserves, several other large surface mines in the region will exhaust their strippable reserves in the 1990's and plan to shift eventually to underground operations to maintain production.

Most of the currently operating Federal mines in the Green River region are large operations with annual capacities ranging from 1.1 million to 4,8 million tons per year. The five largest mines account for 80 percent of the operating capacity; the mine with the greatest planned capacity is an underground mine, the multilease Meeker Area Mine, operated by Northern Minerals. This operation, which produced less than 0.1 million tons in 1979, is projected to be in full production by 1991, and will be a four-mine complex with a capacity of 4.8 million tons per year.

Of the approved, operating mines in the Green River region, the two with the greatest current production are surface mines. These are the Trapper Mine, operated by Utah International, Inc., and the Energy Nos. l&2 Mines, operated by Energy Fuels Corp. Both of these mines, with 1979 production of 2.3 million and 3.4 million tons, respectively, are producing at roughly 85 percent of their maximum capacity.

Pending Mine Plans.—There are three mine plans with a total of four Federal leases in the Green River region that are currently pending approval, Two mines, Western Fuel's Deserado Mine, and Gulf Oil's Trout Creek Mine, are expected to produce a total of 1.3 million tons in 1986. The Trout Creek Mine is a separate underground mine proposed to operate on a Federal lease that is also included in Gulf Oil's existing Edna Strip Mine. This mine is expected to be operating at its maximum capacity of 0,5 million tons per year in both 1986 and 1991. The Deserado Mine in the Lower White River Field will supply the Moon Lake Electric Co. 's new powerplant in Bonanza, Utah. production from proposed mines in this region is expected to increase from the 1986 level as a result of increased production from the Deserado Mine. Total projected production from pending mine plans in this region is 1.8 million tons per year in 1991. One proposed small mine on a post-FCLAA lease will probably not go into production because of financial difficulties caused by the delay in issuing the lease.

Undeveloped Leases.—The Green River region has the greatest amount of undeveloped reserves and the highest estimated future production from its undeveloped leases of any region in Colorado.

The region has 23 undeveloped leases which contain approximately 816 million tons of coal within about 24,400 Federal lease acres. These leases are relatively large, both in acreage and in reserves, For example, 10 of the leases are greater than 1,000 acres in size and contain from 20 million to 250 million tons of recoverable coal reserves each.

Of the 23 undeveloped leases in the Green River region, 16 leases in 14 blocks with 792 million tons of recoverable reserves are promising new mine properties. The remaining 7 leases with less than 24 million tons of reserves could not support independent viable mining operations, (See table 44 in ch. 6.) Two leases have favorable development prospects. Seven have unfavorable development prospects; most of these leases with poor development potential have insufficient reserves to support an economically viable mine of minimal size. Based on OTA's evaluation, the majority of the reserves, 738 million tons contained within 14 leases, have uncertain development prospects,

The two leases in this region which have favorable development prospects are held by Peabody Coal Co, One lease is located midway between Peabody's existing Seneca and Seneca 2W operations, and is expected to be surface mined at a rate of about 0.6 million tons by 1986. This is the only undeveloped lease block that is projected to be in production in that year. It will supply the nearby Hayden powerplant under a dedication agreement, and will maintain Peabody's current capacity and production levels, Production from the other favorable lease, which will be an underground mine, is projected to begin in 1987 and will share existing nearby facilities. Maximum production capacity for this mine would be 1.0 million tons per year.

By 1991, 5 of the 14 leases with uncertain development potential ratings, are projected to be in production, Total production from undeveloped leases in the Green River region is estimated to be 6.4 million tons in 1991. Production will be concentrated in the Yampa, Danforth Hills, and North Park coalfields. Actual production may vary from these estimates. Current production from the Green River region goes primarily to utilities.

One of the small leases with anticipated production for 1991, held by AMCA Coal Leasing, was previously mined by underground methods, However, it also contains strippable reserves of bituminous rank which could be developed as a small mine to serve spot market or local needs. It is located in an active mining area where strip reserves are gradually being mined out, thus making its marginal strip reserves more desirable, production is estimated to be as much as 50,000 tons per year by 1991.

The 1991 production from the lease held by W. R, Grace & Co. could be as high as 1.4 million tons per year. Considerable uncertainty surrounds this projected production since one possibility for the lease's development is linked to Grace's proposed synthetic fuels plant in Moffat County. Recently, their initial coal conversion goals were scaled down from 5,000 to 500 tons per day. If the smaller plant proves to be successful, Grace could scale up to its original size. Grace could also develop this tract as an alternative source of coal for more conventional uses when strippable coal reserves in northwestern Colorado are expected to be depleted in the 1990's.

There are seven large Federal leases in the Danforth Hills Field of the Green River region: six are held by Consolidation Coal Co., and one is held by Utah International, Inc. Production from these leases is contingent on resolution of uncertainties involving the issuance of associated PRLAs and negotiations with surface owners, including a potential competitor, W. R. Grace & Co, Production from Consolidation Coal's lease blocks could reach 1.3 million tons per year by 1991 with an eventual capacity between 3 million and 6 million tons per year, The lease held by Utah International, although reported to have sufficient reserves to sustain an average-sized new mine, would probably only be developed if the lessee obtained sufficient additional acreage and reserves from its PRLA or new lease sales to allow operation of a very large surface mine similar to the adjacent Colowyo Mine, If development proceeds smoothly, OTA estimates that product ion from this mine could reach 1,3 million tons by 1991 out of a potential annual capacity of 3 million to 6 million tons,

The remaining coalfield in the Green River region that may have production by 1991 is the North Park Field in Jackson County. Possible production of 0.5 million tons per year from leases shared by Kemmerer and Consolidation Coal companies is estimated for 1991, however development is contingent on improvements in coal transportation from the area, No production is projected for 13 remaining undeveloped leases in the Green River region.

Uinta Region

The Uinta region contains 63 leases covering nearly 70,000 acres with a total of over 800 million tons of recoverable reserves, Approximately 203 million tons of reserves are contained in 22 leases in approved mine plans, about 427 million tons are in 18 leases with pending mine plans, and 173 million tons of reserves are in 23 leases without mine plans. Total maximum capacity is 8 million tons per year for approved mine plans and over 11 million tons per year for Federal leases in pending

84-141 O - 81 - 25 : QL 3

plans. potential capacity for leases without plans is estimated at 1.5 million tons.

As displayed in table 37 in ch. 6, projected production for 1991 is 7.4 million tons per year for pending plans, 5.8 million tons per year for approved plans, and up to 1.3 million tons per year for leases without plans.

Approved Mine Plans.—In the Uinta region there are eight operating mines which include 22 Federal leases. All but one of these mines began producing in the late 1970's and all of them reported production for 1979. Furthermore, past and anticipated future rates of production indicate that all of the mines will satisfy DOI's diligent development requirements by 1986.

Federal lease reserves total 203 million tons in approved mine plans. Total mine plan reserves are 208 million tons. All of the reserves are high volatile bituminous and all are best suited for recovery by underground mining methods. Several mines in the region produce high-grade metallurgical coal.

Total maximum design capacity of these mines is almost 8 million tons per year. The maximum capacity of individual mines varies widely—from 0.1 million tons per year for the small Ohio Creek No. 2 Mine to 1.4 million tons per year for Western Slope Carbon's Hawksnest complex. Western Slope's 1979 production was only 31 percent of their design capacity. However, they expect to be operating at full capacity by 1991, The Coal Basin Mine's multilease operation held by Mid Continent Resources, represents another large increment of capacity for approved mine plans. Their underground operation is designed to handle 1.3 million tons per year, and their projected production for both 1986 and 1991 of 0.9 million tons is expected to account for about 65 percent of this capacity,

Two mines, the Bear Mine, operated under a sublease from ARCO, and the Roadside Mine, operated by Cambridge Mining, are expected to exhaust their reserves by the end of this decade. The Bear Mine is currently operating at close to its capacity of 0.26 million tons per year and will shut down in the next few years before operations begin on ARCO's larger, Mt. Gunnison mine on the same lease. The Roadside Mine, which began producing in the 1900's and which has a capacity of 1.2 million tons per year, is reducing its operations and anticipates production of only about 0.3 million tons by 1986.

The Orchard Valley Mine operated by Colorado Westmoreland will exhaust its current lease reserves by the mid-1980's at its present production rate. The mine is expected to continue operations with the acquisition of new Federal lease reserves.

Pending Mine Plans.—The Uinta region has 18 Federal leases in 8 currently pending mine plans. In total, there are about 427 million tons of recoverable reserves on over 34,700 lease acres. One of these proposed mines, the Loma complex of Sheridan Enterprises, reported production for 1979. This was the result of development work at the mine site.

By 1986 five new mines are projected to produce approximately 2.8 million tons of coal. At this rate of production, three of these mines, the Blue Ribbon, Loma complex, and Windjammer mines, seem likely to meet DOI's development requirements by 1986. All eight of the proposed mines are expected to be in production by 1991, and all but one seems likely to meet diligence development requirements by then.

When all mines are brought into production, maximum operating capacity is expected to exceed 11 million tons per year. Given this capacity base, anticipated 1986 production of 2.8 million tons will represent approximately 25 percent of total mine capacity, and projected production of 7.4 million tons for 1991 will represent 67 percent of full capacity. several of the newer mines will probably not achieve full capacity until after l990.

Operating capacity for individual mines ranges from 0,12 million to 5.0 million tons per year. Two mines—the Loma project, operated by Sheridan Enterprises, and the Mt. Gunnison Mine, operated by ARCO—account for 70 percent of the total capacity for pending mine plans in the Uinta region.

When completed, the Loma project is expected to be producing from six underground mines using both longwall and room-and-pillar methods. Estimated production for 1991 is expected to be about 56 percent of the 5.0 million tons per year eventual planned capacity for the Loma Mines.

The Mt. Gunnison Mine is projected to begin production in 1983, and to take approximately 10 years to reach the estimated operating capacity of 2.8 million tons per year. The coal will be recovered by room and pillar underground mining methods, The reserves in the Mt. Gunnison leases are very large. If all seams in the lease, including seams not currently mined, are made part of the logical mining unit (LMU) reserves for diligence, Mt. Gunnison might have some difficulty in meeting the 2,5 percent production required for diligence.

Undeveloped Leases.—The Uinta region has a total of 173 million tons of recoverable reserves

contained within 23 undeveloped leases. The majority of these reserves are recoverable by underground mining only, and their quality ranges from subbituminous to bituminous. Based on OTA's review of these leases, 18 leases in 6 blocks covering about 17,660 acres and containing approximately 159 million tons of reserves could sustain new mining operations. The remaining five leases, containing about 14 million tons of recoverable reserves do not have sufficient good quality reserves to support viable new mines.

Not all of the 18 viable leases, are likely to be developed. Eight leases were classified as favorable development prospects, three leases have uncerthin development prospects, and the remaining seven leases have unfavorable development potential.

None of the Uinta region undeveloped leases are expected to be in production by 1986. For 1991, OTA projects that two lease blocks held by U.S. Steel with a total of nine leases could be producing up to 1.3 million tons. Of this production, up to 0.75 million tons of high-quality metallurgical coal could be produced from eight U.S. Steel leases in the Coal Basin Field. There is some uncertainty about this production, however, due in part to the lease area's steeply dipping seams, faulting, and deeply buried seams which will make underground mining difficult and the fact that U.S. Steel has been purchasing production from the neighboring Coal Basin Mine. U.S. Steel has no current plans to develop the Coal Basin leases before 19$10. Two other mining companies have developed or planned development of adjoining mine properties which have similar property characteristics, indicating that the adverse mining conditions can be overcome. The remaining uncertainty concerns the currently depressed market for metallurgical coal. Three other lease blocks held by U.S. Steel in the Somerset-Paonia area have uncertain development prospects based on the expectation that they would be developed as part of a company strategy to expand coal operations to steam coal, since the coal on these blocks is not of metallurgical quality. U.S. Steel has an existing mine in Somerset that supplies its Geneva, Utah steel plants. The OTA Colorado task force estimated that, by making use of their existing loading and other facilities, surface mining production from the other leases could reach 0.5 million tons per year by 1991, Alternatively, the leases might be assigned to an independent operator.

No production is anticipated from the remaining 14 leases in the Uinta region including two blocks with a total of 7 leases held by Kemmerer Coal Co. in the Tongue Mesa Field. These leases have sufficient high-quality reserves to support a new mine, but there is not an adequate coal transportation system in place.

Denver-Raton Mesa Region

Currently there are no active Federal mines or any pending mine plans for Federal leases in the Denver-Raton Mesa region of southeastern Colorado. The region contains six Federal leases without mine plans, which OTA has organized into four lease blocks. Based on a review of the quality of leased coal, the size of the reserve base and the lessee's development capabilities, four of the leases in two blocks are considered to be viable mining properties. Peabody Coal Co. holds the four favorable lease properties which contain a total of over 48 million tons of surface recoverable reserves,

These leases have uncertain development prospects largely because the coal is lignite. Development of these tracts will likely require a near site use, such as a mine-mouth powerplant or synfuels facility, in order to overcome the less favorable economics of transporting the lower quality coal. The four leases could be producing up to 0.5 million tons in 1991, and thus may satisfy the DOI's diligent development requirements by that year, although this is still speculative. The other two leases in the region have unfavorable development potential. The lease held by CF&I Co., has unfavorable development prospects for 1991 because the lessee has available more attractive non-Federal reserves than those contained within this single lease block composed of small scattered parcels of Federal coal.

The remaining lease, a 40-acre tract with underground reserves, is not considered a viable mining property due primarily to its small reserves base.

San Juan River Region

The San Juan River coal region is located in Colorado and New Mexico; the larger portion of the region lies in New Mexico. There are six active non-Federal mines operating in the Colorado portion. The only Federal lease in the region is in the National King Coal Mine, a small operation producing about 70,000 tons per year for sale to local consumers. Coal was first produced from the lease in 1936 and production is expected to decrease from 83,000 tons in 1979 to 65,000 tons per year by 1986. The Federal lease reserves are expected to be mined out by 1991.

Summary of Production Potential

In 1979, the 19 mines with Federal leases produced over 16 million tons of coal with about half of this production (7.7 million tons) from Federal reserves. By 1986, two of the currently operating mines are expected to deplete their reserves, however, nine new Federal mines are expected to be in production. Overall, OTA projects that, total production from Federal mines will increase to nearly 30 million tons—almost double the 1979 production. The percentage of total production from Federal reserves is also expected to increase. By 1991, 35 mines containing Federal leases are projected to produce 43.1 million tons of coal, About 8 million tons of this production could come from currently undeveloped leases.

New Mexico

Overview

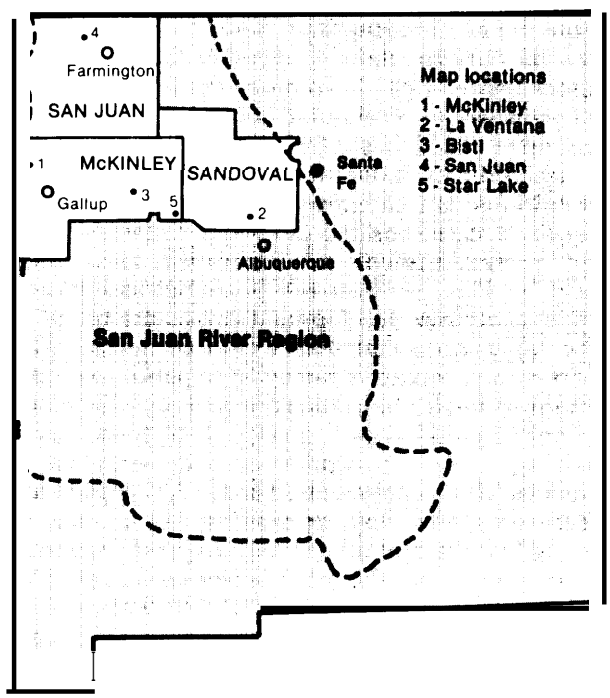
The 29 Federal coal leases in New Mexico cover over 44,000 acres and contain 447 million tons of recoverable coal. The State has the fewest leases and leased reserves among the three Southern Rockies States and fewer leased reserves than any major coal-producing Western State except North Dakota. Three of the leases are in the Raton Mesa region of northeast New Mexico and the other 26 are found in the San Juan basin in the northeastern part of the State.

Only one large coal mine complex is operating in the Raton Mesa region, It is located entirely on non-Federal land, No extensive development is expected to occur in this region on either Federal or non-Federal land, although an additional mine could be developed in the region. Coal is found in small scattered deposits throughout the rough and mountainous terrain of this region. Though the Raton Mesa contains high-quality and metallurgical-grade coals with a Btu content averaging 14,340 Btu/lb and sulfur levels averaging less than one percent, the difficult terrain, small reserves, and lack of markets has inhibited development. Other problems facing developers of three small leases here include limited local rail capacity (although the region itself is served by a main line of the Santa Fe Railroad), and complicated coal land access problems involving intermingled Federal, railroad, Spanish land grant, and private land blocks.

The San Juan basin contains 96 percent of the remaining coal resources in New Mexico, including nearly all of the strippable reserves, A substantial portion of the basin's reserves are controlled by the Navaho Tribe. Over 80 percent of the 1980 coal production of 16.5 million tons in the State came from this region and by 1990 it could account for over 95 percent. Typical San Juan coal has a Btu content of 10,492 Btu/lb and a sulfur content of 0.84 percent. It has relatively high average ash levels of 13.8 percent, although the ash content can be as high as 25 percent in some areas.

Mining currently occurs in two areas within the San Juan basin, There is at present little or no production in the central part of the basin (see fig. A-2). Production from the northwest corner, including the San Juan Mine on Federal land, is used at mine-mouth generating stations. Production from the McKinley Mine on Federal and Indian land in the southwest part of the region is shipped by rail mostly to Arizona and other Western markets. Most of the San Juan basin coal reserves, including areas with leased Federal coal, are not served presently by rail transportation. This central region of the basin is one of the largest untapped strippable coal deposits in the Western United States. The Santa Fe Railroad has proposed to build a 114-mile line into the area,

Figure A-2.—Coal Mines on Federal Lands in New Mexico



SOURCE: Office of Technology Assessment.

called the Star Lake Railroad. The final environmental impact statement has been issued. The remaining uncertainty involves 3 miles of right-of-way that cross land owned by Indian allotment holders. Rugged terrain makes rerouting across other land prohibitively expensive. Negotiations with the Indian allottees are underway and the railroad has asked the Secretary of Interior to waive the landowner consent requirement. The Bureau of Land Management had deferred granting of the rights-of-way across Federal land until resolution of the allottee issue, though it has approved use of Federal land for the project. The Star Lake-Bisti Regional Coal Environmental Statement projected that coal production associated with the railroad could eventually reach 75 million tons per year, About 8 million tons of Federal mine production in 1991 is tied to development of the Star Lake Railroad,

The 29 New Mexico Federal coal leases can be divided into 16 lease blocks. Three of these units are single leases in the Raton Mesa. The other 13 are located in the San Juan region.

Nine leases in two lease blocks are currently part of operating mines. These two mines produced 9.7 million tons of coal in 1980, about half of the State's total production with about 6.3 million tons produced from Federal reserves. Three lease blocks including nine leases are part of proposed mine plans which are now pending before DOI. The remaining 11 leases and 10 lease blocks are undeveloped and no mine plans to develop them had been submitted to DOI as of September 30, 1980.

Approved Mine plans.—The two producing mines which include Federal coal leases are the McKinley and San Juan Mines. The McKinley Mine includes four Federal leases owned by Gulf Oil Corp. and Indian and private lands. The San Juan Mine includes five leases owned by Western Coal Co., a joint venture of Public Service Co. of New Mexico and Tuscon Electric Co. It is operating almost entirely on Federal lands, although possible expansion onto coal lands on the Ute Mountain Indian Reservation to the north is being considered. Both are surface mines. The approved mine plans for these projects call for small increases in mining on Federal land over the next decade. The McKinley Mine is scheduled to increase production from *4.6* million to 5.0 million tons by 1991 and the San Juan Mine is scheduled to increase from 5.1 million to 5,5 million tons. The San Juan Mine will shift a portion of its capacity to underground operations on a new Federal lease acquired in 1980.

Pending Mine Plans.—Like the operating mines, the three lease blocks for which mine plans are pending are located in the San Juan region. Five leases are part of the La Ventana Mine project proposed by the lessee, Ideal Basic Industries. It is the only active or proposed mine on Federal leases in New Mexico that will be solely an underground operation. At least seven inactive leases in the La Ventana area once supported small underground mines, but these were closed due to structural and fire hazards, inability to comply with health and safety regulations, and the decline of the domestic coal market in New Mexico, The proposed La Ventana Mine plan has been designed to resolve what had been difficult safety problems involving poor roof conditions and the tendency of La Ventana coals for spontaneous combustion, A market for at least part of the coal produced exists at Ideal's cement plant in Albuquerque, The mine is scheduled to produce 1.1 million tons by 1986 and 1.5 million tons by 1991; it has an eventual capacity of 3 million tons per year.

The other two pending mine plans with four Federal leases are located in the area of the San Juan basin presently without rail service. Development of these tracts will depend on either the construction of the Star Lake Railroad or the construction of mine mouth power or synfuels plants, The proposed Bisti Mine includes three leases owned by Western Coal Co. Public Service Co. of New Mexico has proposed building a mine-mouth powerplant near this mine, but that project is in only preliminary planning stages and the construction schedule is still uncertain. The second lease block is a single lease owned by Peabody Coal Co., and Thermal Energy Co. The mine proposed for this site, however, is being developed by Chaco Energy Co., a subsidiary of Texas Utilities, Inc. The Star Lake Mine, as it is called, will likely supply powerplants owned by the parent company or serve other utility markets. The Star Lake Mine eventually will include reserves from pending PRLAs. The Bisti Mine is scheduled to produce 2.5 million tons by 1986 and 3 million tons by 1991. The Star Lake Mine is scheduled to produce 3 million tons in 1986 and between 3 million and 6 million tons by 1991. Coal from Star Lake would be shipped via the Star Lake Railroad.

Undeveloped Leases.—Eleven leases in ten lease blocks are inactive and have no mine plans for their development pending before DOI, although some planning work is underway on several of these. The three small leases in the Raton Mesa region fall into this category of undeveloped leases, The group also includes six small leases

and two large leases in the San Juan region. These two large leases are part of proposed mining projects which have not yet reached the completed mine plan stage. Production from these mines is likely before the end of the decade, Some preliminary investigations of mine development on several of the smaller leases as part of mine development on adjacent lands has been reported, however, prospects for production before 1991 are unfavorable.

The two leases that might be in production by 1991 include 98 percent of all the undeveloped Federal lease reserves in New Mexico. The first lease is owned by Cimmaron Coal Co. and is part of the proposed LaPlata surface mine in northwest New Mexico. The mine could serve the supply needs of the nearby San Juan powerplant as reserves from the San Juan Mine are mined out. Based on a review of a wide range of factors, including coal quantity and quality, transportation access, environmental issues, engineering problems, and markets among others, OTA found that the lease has a favorable development potential. Production is scheduled to total 0.2 million tons in 1986 and between 1 million and 2 million tons in 1991.

The second large New Mexico lease (1,910 acres) is located along the route of the Star Lake Railroad. It is owned jointly by Fannin Square Corp. (a subsidiary of Texas Eastern Transmission Corp.) and Eastern Associated Properties Corp. (a subsidiary of Eastern Gas and Fuel Associates). The lease also received a favorable development prospect rating by OTA though several uncertainties cloud its future. The lessees are likely to need additional coal reserves adjoining the lease in order to create an economical mining unit for large-scale operations. The companies hold PRLAs for much of this land which might be converted to lease shortly. Texas Eastern Transmission received a DOE grant in 1980 to study the feasibility of building a major synfuels complex near the lease and supplied with coal from it. Prospects for building such a plant are uncertain, Any export use of the coal on this lease will be dependent on the completion of the Star Lake Railroad. The companies nevertheless are proceeding with plans for the Black Lake Mine, which if it proceeds, is likely to produce between 0.7 million and 6 million tons by 1991 depending on the companies' coal needs and the rate of development of adjoining reserves.

Of the nine small leases in eight lease blocks that are not likely to be in production before 1991, four blocks received uncertain development prospect ratings by OTA and four were rated as unfavorable for development.

Two of the leases with uncertain development ratings are located in the Raton Mesa region. The lessees of both are studying mining projects that include the leases, but small reserves, mining and transportation problems caused by the rough terrain earned these leases an uncertain rating at best. The other two lease blocks receiving uncertain ratings adjoin the proposed La Ventana Mine site, Each of these lease tracts once were underground mines, but they were closed because fires and explosions made them unsafe and uneconomical to mine. If Ideal Basic Industries acquires these leases and incorporates their reserves into the La Ventana Mine plan, these problems could perhaps be overcome. The leases would probably be surface mined. In their present status it is unlikely that individual mines on these blocks could ever compete.

The final four lease blocks, one in Raton Mesa and three in the San Juan region, received unfavorable development prospect ratings by OTA and were judged to have minimal production potential. All four are isolated tracts with small reserves. Underground mines serving local markets once operated on them, but they have been closed for at least a decade because of safety, engineering, and economic problems. There is currently little or no effort on the part of the present lessee to develop new mine plans and no published expressions of interest on the part of outside parties to acquire the leases.

Production Potential

To summarize the production potential of existing Federal coal leases in New Mexico:

Two mines are currently producing about 9.7 million tons of coal per year; and by 1986 these two mines with approved mine plans are scheduled to produce 10.0 million tons. In addition, three mines which currently have mine plans pending at DOI could be producing 6,6 million tons, and one mine which is now in the premine-plan stage could be producing 0.2 million tons by 1986.

By 1991, the six existing and proposed mines are scheduled to produce between 19.0 million and 23.0 million tons. One other mine is due to begin production after 1986, and is scheduled to produce between 0.7 million and 6.0 million tons by 1991. Total 1986 production from mines on existing leases is projected to be 16.8 million tons and 1991 production is projected to be between 19.7 million and 29.0 million tons.

If these projections hold true, 6 of the 16 lease blocks covering 79 percent of the leased reserves will be included in active mining operations in 1986. By 1991, 7 lease blocks covering 20 of the 29 New Mexico coal leases and over 98 percent of the coal reserves under lease are likely to be associated with active mining projects.

The DOE 1985 production goals of 33 million to 44 million tons are higher than OTA's estimate of potential 1986 production from Federal mines of 16.8 million tons. The OTA task force estimated that 1986 total State production would be 30 million tons, and recent New Mexico Energy and Minerals Department estimates have set planned production from all mines in the State for 1985 at 47 million tons. Most of any shortfall between the DOE goals and potential Federal mine production in 1985 to 1986 would probably be absorbed by mines on Indian and non-Federal reserves, which currently provide more than half of New Mexico's annual coal output.

For 1991, the OTA task force estimated that the maximum production potential of all mines in the State would reach 72 million tons—higher than both the DOE 1990 high level goal of 67 million tons and the recent State government estimate of 68 million tons of production in 1990. According to OTA's analysis, production from mines with existing Federal leases could reach 20 million to 29 million tons in 1991.

Actual production levels could vary from the OTA's projections. Several obstacles to coal mining could lower actual production below these projections, while the removal of some barriers to development and a strong coal market could cause production to increase above these levels.

A key determinant of actual coal production from New Mexico leases will be the level of out-of-State utility coal demand specifically and coal market considerations generally. A market study prepared for OTA concluded that the price competitiveness of New Mexico coal in major Eastern and Western markets is considerably underestimated. " Actual market demand will depend on a wide range of issues including the growth of electric consumption, coal supply decisions of Texas utilities (Texas is the major potential new market for New Mexico coal), and the growth or decline in coal use relative to substitute fuels for power generation. Within New Mexico, the rate of commercialization of synfuels technology and the possible construction of additional powerplants to serve out-of-State customers are two additional factors bearing heavily on demand.

The lack of rail service to the central portion of the San Juan basin is the second most significant factor affecting the growth rate of New Mexico coal production, As explained above, the proposed Star Lake Railroad is in an advanced planning stage, but a right-of-way acquisition problem could still delay or prevent its construction.

Other major issues and uncertainties that will affect the future of the New Mexico coal industry include environmental impacts, land-use conflicts, socioeconomic impacts on local communities, and the amount of additional Federal reserves made available for mining through PRLAs and new lease sales. Mining and associated industrial development such as synfuels plants pose potentially unacceptable and unavoidable air quality impacts in this arid region. Mining in the Bisti area conflicts with protection of three wilderness study areas and with potentially important archeological and paleontological sites. An exchange of existing leases for new Federal coal to avoid some of these conflicts is under consideration. (See discussion in ch. 9.) Demand for adequate water supplies for mining, reclamation, synfuels development, and community needs and the need to protect water supplies from possible degradation could create conflicts between coal development and other users. Because of the arid climate, sparse vegetation, and high susceptibility to wind and water erosion, reclamation of surface-mined lands in the San Juan basin may prove more difficult than in other areas of the West, This difficulty is not, however, expected to restrict mine development. Most of the expanded coal development on Federal leases in New Mexico will occur in areas that are relatively isolated and sparsely populated. Associated population increases and demands for community services will impose additional administrative and financial requirements on the existing communities, Moreover, because Native Americans own or occupy substantial acreages throughout the basin, resolution of potential conflicts between mining and Native interests will require cooperation with tribal governments and the U.S. Bureau of Indian Affairs. (See ch, 12.)

There are currently twice as many acres under PRLAs than under existing leases in New Mexico. Processing of PRLAs in New Mexico will have a significant effect on the future of Federal coal development there. Two proposed Federal mines could be adversely affected by loss of reserves if adjoining PRLAs are rejected. New leased re-

See Energy and Environmental Analysis, Inc., *Feasibility of Using Cool Market Projections To Appraise Potential Production of Federal Coal Leaseholds*, draft report, May 1980.

serves from other PRLAs will compete in the market with other Federal and non-Federal coal currently available for mining.

Utah

Overview

Utah has the largest number of Federal coal leases of any State. There are 204 leases currently outstanding in Utah covering over 279,000 acres and more than 3.2 billion tons of recoverable coal reserves. Utah also has 25 pending PRLAs totaling over 75,000 acres and containing over 1 billion tons of recoverable reserves. According to U.S. Geological Survey (USGS) estimates, about 82 percent of the coal resources in Utah are federally owned, This high percentage is due, in part, to the fact that most of the coal deposits occur in the rugged mountainous terrain and the upland plateaus of central and southern Utah—areas that have largely remained in Federal ownership, while State and private land selections, land grants, and homesteads were concentrated in the valleys and flatlands. Most of Utah's known coal reserves are underground minable.

Utah has two major coal regions: the Uinta region which includes the Wasatch Plateau, Book Cliffs, and Emery coalfields in central Utah; and the Southwestern Utah coal region, which includes the Alton, Kolob, Kaiparowits Plateau, and Henry Mountain coalfields.* There are 108 Federal leases in the Uinta region and 96 leases in the Southwestern Utah region. The recoverable reserves are divided almost equally between the two regions.

Nearly 65 percent of the Federal leases in Utah are part of existing or proposed mines and thus their development and production plans are included in mine plans filed with DOI. The 14 mines with approved mine plans are all located in the Uinta region and contain 50 Federal leases with a total of 792 million tons of reserves, Eleven new mines have been proposed covering another 78 leases and 1.3 billion tons of reserves. Over 1 billion tons of new mine plan reserves are contained in the three proposed new mines in the Southwestern Utah region. The remaining 76 Federal leases without mine plans include several large tracts of good quality minable reserves that could be producing by 1990, as well as many smaller tracts that once supported small mines that will probably not be reopened. The Uinta region has 44 undeveloped leases and about 447 million tons of undeveloped reserves, The Southwestern Utah region has 32 undeveloped leases with 744 million tons of reserves—most of which are on the Kaiparowits Plateau.

Production Potential

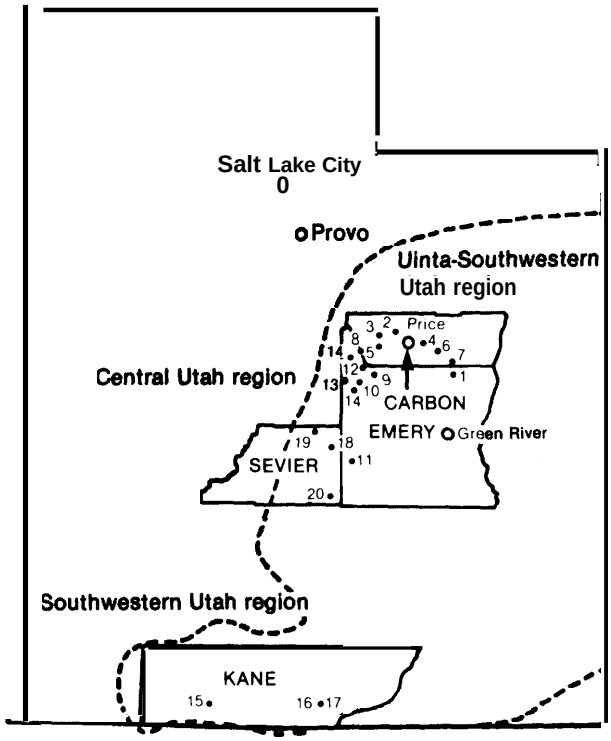
In 1979, Utah mines produced 11.8 million tons of coal with 10.4 million tons of this from mines with Federal leases. Federal production was 6.9 million tons in 1979 and came from 27 leases. In 1980, total State production increased to 13.1 million tons with 8.7 million tons coming from Federal reserves. All production in the State came from underground mines in the Uinta region. Figure A-3 shows the location of active and proposed mines with Federal leases in Utah.

Most of the coal produced was used by electric utilities, but a significant portion (about 1 million to 2 million tons) was used by the steel industry. About 40 to 50 percent of the coal produced in 1979 was used in the State; the rest was exported to consumers in the Southwest, west coast, and Midwest, Up to 2 million tons reportedly was stockpiled in 1979 because of soft market conditions. However, by the end of 1980 most, if not all, of Utah's excess production had been sold, in part, because of increased foreign export sales. In 1981, at least one Utah Federal mine was shipping coal under contract to Asian markets,

Coal production and mine capacity in Utah are expected to increase substantially during the 1980's as new mines are opened and existing mines reach full capacity. Production from mines with Federal leases will account for most of the growth. By 1986, total output from mines with Federal leases is expected to be as much as 30.2 million tons with up to 6.2 million tons of this coming from proposed new mines. By 1991, production from mines with Federal leases is expected to reach as high as 47 million to 74 million tons. About 7 million to 8.6 million tons could come from undeveloped leases in central Utah. Up to 25 million tons of coal could come from new mines in Southwestern Utah. The total capacity of existing mines on Federal leases at full production is 32.2 million tons per year, If all the pending mine plans went into production they would add 43 million tons of annual capacity. OTA estimates that the undeveloped leases could support an additional 18.5 million to 28.0 million tons of annual capacity. Southwestern Utah Federal coal produc-

* The BLM coal productlon region Uinta-Southwestern Utah combines the Uinta coal region of Utah and Colorado and the Southwestern Utah coal region into a single region for coal management program and production target purposes.

Figure A-3.—Coal Mines on Federal Lands in Utah



Map locations

1- Geneva
1- B Canyon
2- Braztah
3- C & W No. 1
4- Pinnacle (Deadman)
5- Gordon Creek No. 2
6- Sage Point-Dugout Canyon
6- Soldier Canyon
7- Sunnyside Nos. 1, 2, 3
8- Belina No. 1
8- O'Connor
8- Skyline
9- Star Point Nos. 1, 2
10- Des-Bee-Dove
10- Wilberg-Deercreek
11. Emery
12- Hiawatha Complex
13- Huntington Canyons Nos. 4, 5
14- Trail Mountain
15- Alton
16- Kaiparowits
17- Red and Blue
18- Convulsion Canyon (Sufco)
19- Skumpah Canyon
20- Ute Nos. 1, 2

tion could grow from nothing in 1979 to over 25 million tons in 1991, with an estimated total annual capacity of 36.3 million to 45.8 million tons. However, it is highly uncertain whether such levels of production would be achieved in the Southwestern Utah region because of the major transportation, economic, and environmental disadvantages facing coal development there.

OTA's estimate of planned production from mines with Federal leases in Utah of 30 million tons in 1986 agrees with the DOE 1985 midlevel production goal of 30,2 million tons, but is considerably higher than OTA's Utah task force estimate of 1985 production of between 15 million and 18 million tons. At least part of the difference between the conservative task force estimates and the OTA estimates and DOE goals is due to deferred powerplant construction. For 1991, OTA found that potential Federal mine production ranged from 47 million to 74 million tons with about 25 million tons of production in Southwestern Utah classified as uncertain. In comparison, the task force projected that 1990 production would range from 18 million to 40 million tons, with a likely level of 30 million tons which excludes any production in Southwestern Utah or for synfuels development. The DOE 1990 production goals for Utah range from a low of 36 million tons to a high of 63 million tons with a midlevel goal of 49 million tons.

The development and production potential of Federal leases in Uinta and Southwestern Utah coal regions are described in more detail in the following sections.

Central Utah

The central Utah portion of the Uinta region includes the Book Cliffs and Wasatch Plateau coalfields near the town of Price and the Emery coalfield near the town of Emery. The Book Cliffs and Wasatch Plateau coalfields are underground mining areas. The Emery Field has both surface and underground minable reserves. The central Utah coalfields have supported mining operations for over a century. Two active mines in the Book Cliffs Field—U.S. Steel's Geneva Mine and Kaiser Steel's Sunnyside Mine—supply metallurgical coal to their Western steel operations. The Wasatch Plateau Field is the major producing area in the State. (See figs. A-4 and A-5.)

There are 108 Federal leases outstanding in central Utah. There is only one pending PRLA in the region. * Federal leases in central Utah cover 128,930 acres and contain an estimated 1.5 billion tons of recoverable coal reserves, including about 21 million tons of surface recoverable reserves in the Emery field, The 50* * leases in the 14 mining operations with approved plans cover over 55,000 acres and more than 792 million tons of recoverable reserves and have a total maximum design capacity of 32.2 million tons per year. There are

* Possible impacts of issuance and development of this PRLA are examined in the Final *Uinta-Southwestern Utah Coal Environmental Statement*, February 1981.

** Three leases in the C)' Connor mine area are also partly included in the approved mine plans for the Belina and Skyline mines,

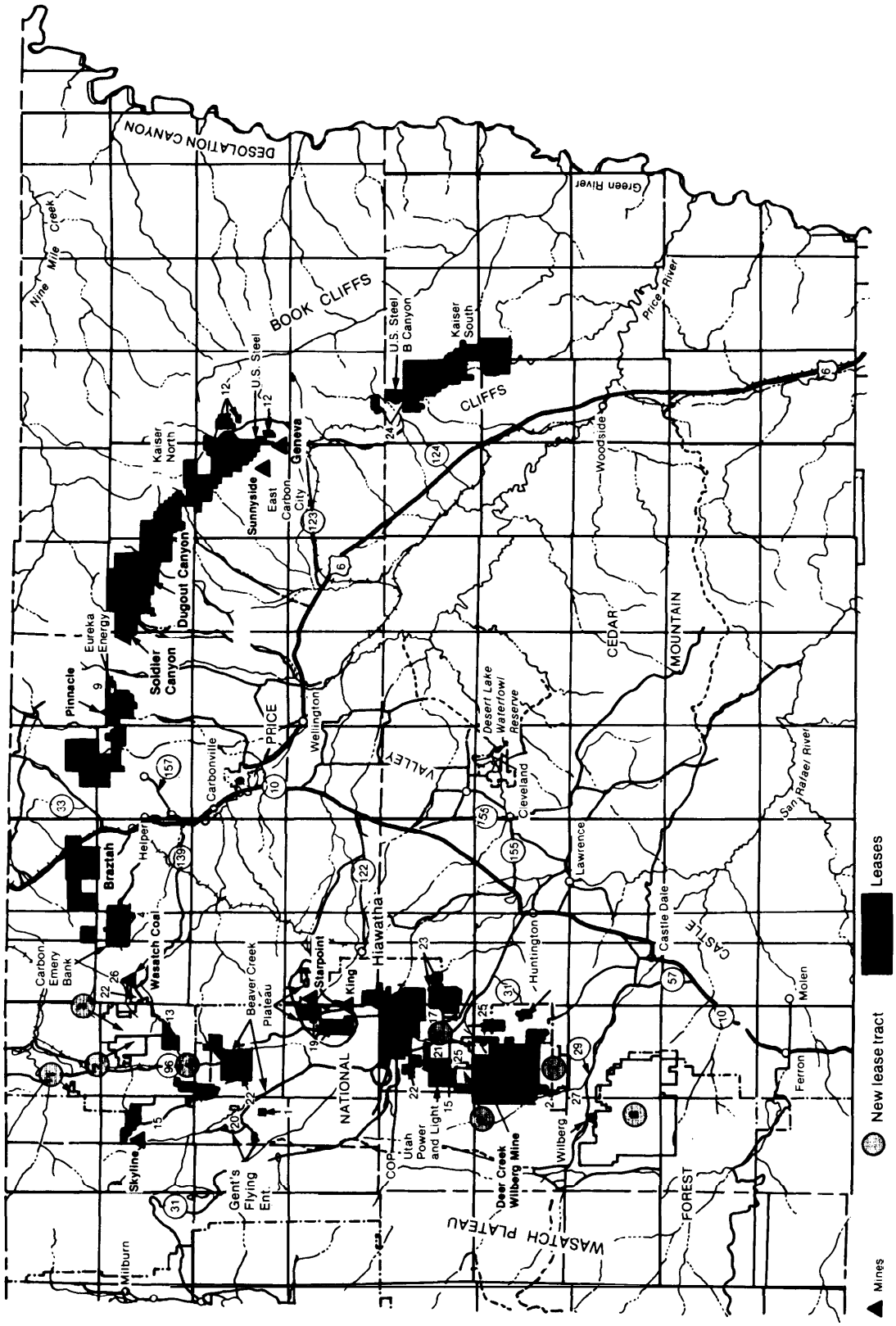
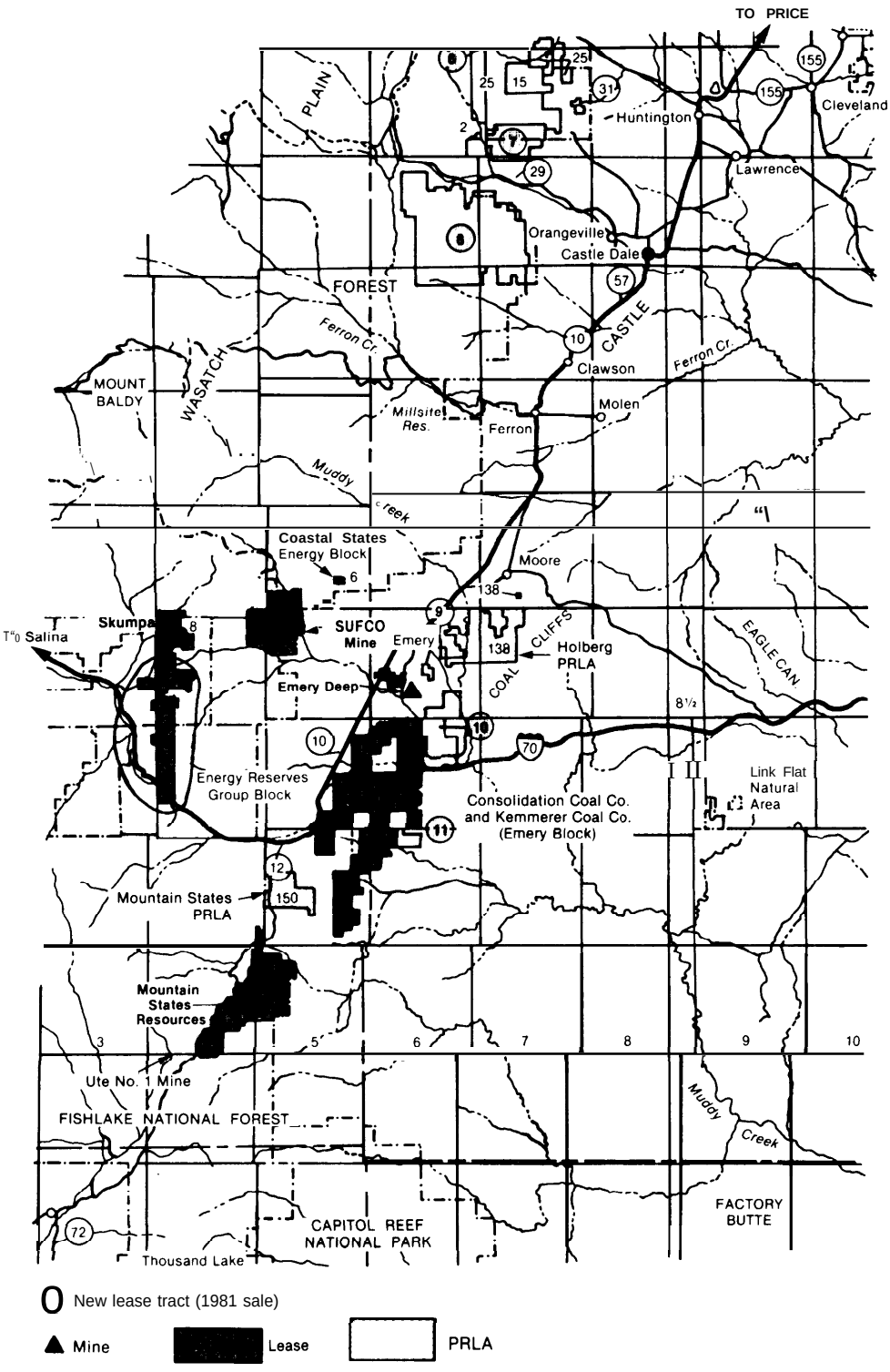


Figure A-4.—Federal Coal Leases, PRLA's and New Lease Tracts Wasatch Plateau and Book Cliffs Fields

SOURCE: U.S. Department of the Interior, Bureau of Land Management, *Uinta-Southwestern Utah Final Coal Environmental Impact Statement*, February 1981.

Figure A-5.— Federal Coal Leases, PRLA's and New Lease Tracts in the Emery Coai Fieid, Utah



SOURCE U.S. Department of the Interior, Bureau of Land Management, Uinta-Southwestern Utah Final Coal *Environmental Impact Statement,* **February 1981.**

also eight proposed new mines in the Uinta region with 14 leases that are in pending mine plans. * These leases cover 25,711 acres and contain about 264 million tons of recoverable reserves. The proposed new mines have a total annual capacity of over 13 million tons per year.

The remaining 44 leases in central Utah are undeveloped. These leases cover 47,679 acres and more than 447 million tons of reserves. When the contiguous leases held by the same owners are grouped together into minable blocks, the undeveloped leases in central Utah form 20 lease blocks with 12 blocks each composed of only 1 lease.

The active mines in central Utah range from a few small underground operations producing less than 100,000 tons per year to new large mines producing over 1 million tons per year. Several mines are in the process of expanding their production capacities to produce up to 5 million tons per year or more by 1985, The 14 approved mining operations on Federal leases in central Utah are all underground mines and all, but the newly approved Skyline Mine, were producing in 1980, In 1980, over 8.7 million tons of production from Federal leases were reported to USGS for royalty purposes.

By 1986, production from operations with approved mine permits is projected to reach 24 million tons, more than double the 1979 production levels. By 1991, production from these mines could rise to 29 million tons. One small operation, the Trail Mountain Mine is expected to be depleted by 1991 unless it acquires additional reserves to maintain production. Both U.S. Steel's Geneva Mine and Kaiser Steel's Sunnyside Mine are expected to be nearing the limit of their economically recoverable reserves by the late 1980's and would then begin to shift production to new mines on their other Federal leaseholdings. OTA's mine plan review indicates that about 5 million of the 32.2 million tons of capacity on approved mine plans might not be constructed as planned because of changes in the lessee's captive coal needs out-of-State.

Six of the operating mines are captive operations, including two mines operated by steel companies, two complexes run by Utah Power & Light, the Soldier Canyon Mine run by California Portland Cement, and the Braztah Mine complex held by a subsidiary of American Electric Power (AEP) and supplying AEP powerplants in Indiana. Total production for these mines in 1979 was 6.1 million tons—over half the total production in the State. By 1986 captive production from Federal mines is expected to total about 13 million tons making a slight decline in its share of total State production. The captive segment of the Utah coal industry is expected to maintain it's position in the 1980's and 1990's since a significant amount of production from new mines on Federal leases would supply captive markets.

Pending Mine Plans.—The eight proposed new mines on Federal leases would, if all were developed as scheduled, add more than 13 million tons of annual production capacity in central Utah by 1990. One new mine, Eureka Energy's 3.2 million tons per year Sage Point-Dugout Canyon Mine, is intended to supply a new 1,600-MW coal-fired powerplant to be built by its parent Pacific Gas and Electric Co. U.S. Steel's new B Canyon Mine would replace the existing Geneva Mine when that operation reaches the limits of its economically minable reserves. Mountain States Resources' Ute Nos. l&2 mines near Emery would include both underground and surface operations. Several of the proposed new mines have been in planning stages for 5 years or more, however, mine permitting and construction activities have been deferred by the lessees because of soft market conditions and slower than expected electricity demand growth.

If all the proposed new mines meet their planned production schedules, six of the eight mines will be operating by 1986 with an estimated total production of 5.6 million tons. By 1991, all eight mines could be producing a total of 11.3 million tons according to the mine plan estimates. However, because at least two of the new mines are captive operations, their construction and production schedules are dependent on the needs of their parent companies. Current indications are that the Sage Point-Dugout Canyon Mine and the B Canyon Mine could be deferred several years, thus making about 4.2 million tons of 1991 production capacity somewhat uncertain.

Undeveloped Leases.—The 44 leases in central Utah without mine plans cover 47,679 acres and contain 447 million tons of recoverable reserves. These leases are 57.9 percent of the undeveloped leases, 42 percent of the undeveloped lease acres and 37 percent of the undeveloped Federal lease reserves in the State of Utah. The 44 undeveloped leases in the Uinta region are divided into 20 lease blocks ranging in size from 80 acres to more

"These leases **include two leases that are partially included** in two different mines: the newly approved Skyline Mine and the adjacent Belina and O'Connor mines which are dissected by several fault zones and the lessees executed operating agreements to mine those portions of the leases on their respective sides of the fault.

18,000 acres. Most of the reserves are underground minable only—however, one tract contains some surface recoverable reserves. About six of these lease blocks have supported some mining activities in the past. All of the undeveloped lease reserves in central Utah are bituminous with heat value of 11,000 Btu/lb or more, sulfur contents of 1.5 percent or less, and ash contents of 15 percent or less.

Eight undeveloped lease blocks with 30 leases have enough good quality minable reserves to sustain a new average-size mine of 500,000 tons per year with a 30-year mine life. These 30 leases contain a total of 417 million tons of recoverable reserves. The remaining 14 leases in 12 blocks did not have enough reserves for a new large mine. At least three of these blocks (six leases) have adequate reserves for a small mine, however. Two of the three blocks have been mined previously and probably would not be reopened because construction and safety costs would be prohibitive, Four undeveloped leases without enough reserves for a new independent mine are adjacent to active or proposed operation and could possibly be added to those mines through assignments or operating agreements,

After reviewing the quality and amount of reserves, the mining conditions, transportation availability and the expected market conditions over the next decade, OTA classified as favorable development prospects the eight lease blocks with adequate reserves to support new mines, These eight blocks with a total of 30 leases and 417 million tons of reserves have almost 95 percent of the undeveloped lease reserves in central Utah. Three one-lease blocks were rated as uncertain development prospects depending on the availability of additional reserves. The remaining 11 leases in nine lease blocks have unfavorable prospects for development.

The eight blocks with favorable prospects include two large tracts with a total of eight leases held by Kaiser Steel in the Book Cliffs Field and one very large block of eight leases in the Emery Field with more than 18,000 acres jointly held by Consolidation Coal Co. and Kemmerer Coal Co. Two other favorable blocks are held by companies with active mines on Federal leases: one lease block held by a subsidiary of ARCO, Beaver Creek Coal Co. (successor to Swisher Coal Co.), and a three lease block held by Energy Reserves Group, Inc., adjacent to its proposed Skumpah Canyon operation,

Three more blocks with favorable development prospects are located in a single township near two proposed Uinta new lease sale tracts and several active mines on existing leases. * These blocks include: one tract of five leases in Rilda Canyon owned by Utah Power & Light near its Deer Creek-Wilberg Mine; a two-lease block controlled by Nevada Electric Investment Co, adjacent to the Hiawatha Mine complex; and another block that was originally a single lease and was recently segregated into two leases, one assigned to Northwest Carbon Corp. and the other to COP Coal Development.

Development plans for four of the eight favorable blocks are known based on company interviews. Kaiser Steel plans to develop the two-lease Sunnyside North tract which has metallurgical coal reserves as replacement capacity for the existing Sunnyside Mine when it reaches the economic limits of its minable reserves. The block is not contiguous to the existing mine. The six-lease Sunnyside South block with lower quality, metallurgical-grade reserves could be mined for steam coal. Consolidation Coal, which already has one proposed mine on Federal leases in the Emery Field, plans to combine surface and underground mining operations in developing its remaining eight leases near Interstate 70 in Emery County, Utah Power & Light is expected to mine its five undeveloped leases as either a new mine or as an expansion of the Deer Creek-Wilberg Mine. Utah Power & Light is also actively seeking the Meetinghouse Canyon and Rilda Canyon new lease tracts adjacent to these lease blocks to supply its coal-fired powerplants.

The two blocks held by Beaver Creek Coal Co. and Energy Reserves Group will probably be mined when those companies shift operations from existing mines as they are depleted. Production plans for the two remaining blocks are unknown, however, it is expected that they will be developed since all three lessees involved own additional reserves in the same area and one lessee, Nevada Electric, is a major consumer of Utah coal.

The total estimated capacity that could be supported by the favorable lease blocks is 12 million tons per year, By 1986, none of the leases are expected to be producing, However, by 1991, the

*All of these blocks have been acquired by the current lessee within the past 2 years. One block of five leases was recently acquired by Utah Power & Light Corp. from Peabody Coal Co. Another block of leases was segregated and part was acquired by Northwest Carbon Corp. The remainder was assigned to COP Coal Development and another block was acquired by COP Coal Development Corp from Peabody. A not her block is held by the Nevada Electric Investment, a subsidiary of Nevada Power Co.

leases could produce between 7,0 million and 8.6 million tons.

No production is estimated for the three leases with uncertain development prospects or for the 11 leases with unfavorable development prospects since these leases are not likely to be producing during the next 10 years unless they are combined with other reserves controlled by the lessee or mined as part of an adjoining operation, Two of the uncertain leases and four of the leases with unfavorable prospects are adjacent to or contiguous with existing or proposed mines.

Some of the major concerns involving coal development in central Utah are: potential impacts on water availability and water quality such as the interruption of springs due to subsidence, interception of aquifers during mining operations, discharges into streams, increased sediment load, and leaching of salts, trace elements, and heavy metals from strata disturbed during mining. Other concerns include: losses in wildlife habitat from expansion of the areas disturbed by mining; impairment of air quality; and population increases from mine development resulting in concentration of socioeconomic impacts in the Price-Helper area. These issues are addressed more fully in the environmental impact statements on central Utah coal development and the recently completed final environmental impact statement for the Uinta coal lease sales.

One area that could have substantial impacts from new mining on Federal leases is the Emery Field. The coal leases belonging to Consolidation and Kemmerer Coal companies are bisected by Interstate 70-a major tourist route, However, because the area would most likely be underground mined and the coal reserves in the vicinity of I-70 are of poorer quality, it is unlikely that any mining would be done near the highway. The Emery area is just west of the San Rafael Swell—a scenic area of geologic interest—and expansion of mining activities could contribute to increases in airborn particulate and to reduced visibility, especially during dry spells. The Emery Field is not currently served by rail transportation so existing mines truck coal to loadout facilities near Price. The proposed Castle Valley Railroad would extend along the Wasatch Plateau to the Emery coalfield. Construction of the railroad is dependent on expanded mine production in that area.

Southwestern Utah

The Southwestern Utah coal region includes the Alton, Kolob, Kaiparowits Plateau, and Henry Mountains coalfields. The Henry Mountains Field has no Federal leases, it does, however, have three PRLAs. The southwestern Utah coalfields have both underground and surface minable reserves, however, underground reserves predominate. There are no active mines in the region, although there were several small mines operating on Federal leases that supplied coal to local markets. Three new large mines have been proposed for the Alton and Kaiparowits fields. Proposed mining operations in the Alton Field have encountered substantial opposition from environmentalists because of its proximity to several major national parks, the possible impacts on visibility and ground water, and potential reclamation problems. Mining on the Kaiparowits Plateau has been opposed because it would occur in one of the last remaining undisturbed roadless areas in the United States outside of Alaska, and also because of potential air quality impacts.

There are 96 Federal leases in the Southwestern Utah coal region covering over 150,000 acres and 1.75 billion tons of recoverable coal reserves. The 24 pending PRLAs in the region cover an additional 72,000 acres and over 1.0 billion tons of recoverable reserves. Three new large mines have been preposed in southwestern Utah: The Alton Mine with combined surface and underground operations on 28 leases held by Nevada Power and Utah International, Inc.; and two proposed underground mines on the Kaiparowits Plateau—El Paso Energy Co.'s Red and Blue Mines and the Kaiparowits Mine on leases held by resource development subsidiaries of three Southwestern utilities. These three proposed mines include 64 of the existing leases in southern Utah and cover over 93,000 acres and over 1 billion tons of reserves.

The remaining 32 leases cover over 57,000 acres and 743.5 million tons of recoverable underground reserves. These undeveloped leases are divided into 11 lease blocks—seven single lease blocks and four multilease blocks. Several of the leases supported small mines in the past. Six lease blocks with 27 of the leases are located in the Kaiparowits Plateau.

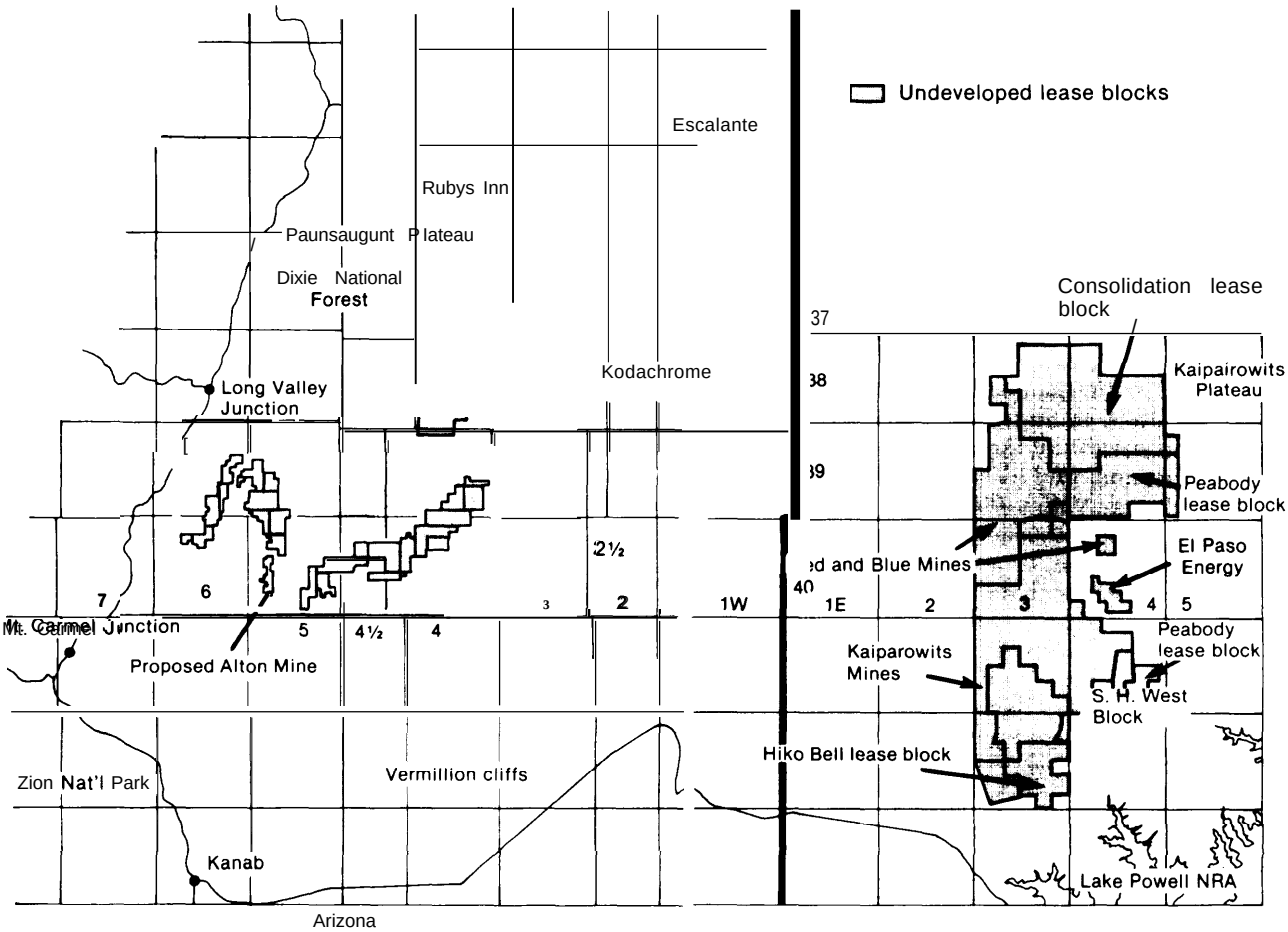
Pending Mine Plans.—The three mine plans proposed for southwestern Utah contain over 1 billion tons of recoverable reserves with about three-quarters of the reserves underground minable. The proposals include the Alton Surface Mine

and two underground mines on the Kaiparowits Plateau. Total annual production capacity of the proposed mines is 30 million tons. Estimated production in 1986 is about 600,000 tons. If all mine plans were approved in the next decade, production in 1991 could be as much as 25.4 million tons. All of these proposals face substantial uncertainties over whether and when they will go into production, All are located in remote areas that are not currently active mining areas and which are not served by rail transportation. All present potential environmental conflicts. All have substantial uncertainties over where the coal will be sold.

The Alton Mine located near the town of Alton, just south of the Paunsaugunt Plateau and Bryce Canyon National Park, is probably the best known of the southern Utah mine proposals because of its location and concern over its potential impacts on the park (see fig. A-6). The Alton Mine is part of the Allen-Warner Valley Energy Complex and is the closest to development of any of the proposed mines in southwest Utah because it has successfully obtained several necessary permit approvals and, until recently, appeared to have a definite consumer for its coal production. But, recent developments have clouded its future and the operator, Utah International, Inc., has deferred initial production until at least 1986. The mine would initially be a surface mine, but after about 20 years of operation, would begin underground mining on more deeply buried reserves.

In December 1980, Interior Secretary Andrus issued his decision on the citizens' petition to declare Federal lands in the Alton coalfield un-

Figure A-6.– Federal Coal Leases in Southwestern Utah



SOURCE US Department of the Interior, Bureau of Land Management, *Uinta-Southwestern Utah* **Final Coal** *Environmental Impact Statement,* February 1981.

suitable for mining under the Surface Mining Control and Reclamation Act of 1977 (SMCRA). This was the first section 522 unsuitability petition accepted. Secretary Andrus declared Federal lands adjacent to Bryce Canyon National Park as unsuitable for surface mining and the surface effects of underground mining. The decision affected about 9,049 acres on the eastern side of the Alton Field out of the more than 26,000 acres leased by Utah International and Nevada Power. As a result of the decision, about 24 million tons of the more than 290 million tons under lease would not be minable. The decision cited the potential adverse impacts on the park from blasting, heavy truck traffic, air quality degradation, and noise from the mining operations which would have extended to within 5 miles of the Yovimpa Point lookout in Bryce Canyon Park. The original petition had requested that Andrus declare a total of 325,000 acres (240,000 acres of Federal land) as unsuitable for mining. The lessees have filed suit in Federal District Court in Salt Lake City challenging the adequacy of the technical information supporting the decision and alleging that the Alton leases should be exempt from the unsuitability provisions because of substantial legal and financial commitments to development made before passage of the act.

In Feburary 1981, two of the partners in the Allen-Warner Valley Power project, Southern California Edison and Pacific Gas & Electric, withdrew their applications for participation in the project from consideration by the California Public Utility Commission. The decision was, in part, based on the decisions by the Secretary of Interior and EPA to approve permits for construction of one portion of the project, the Harry Allen plant in Nevada, and to withhold approval of the smaller Warner Valley Plant in Utah pending additional study. Southern California Edison also attributed its decision to a shift in company policy to the use of renewable energy sources. Substantial questions thus still remain over construction of the two plants and of the proposed slurry line from the Alton Mine to the powerplants.

The Alton lessees have submitted an informal mine plan proposal for use in environmental analyses. The lessees have reportedly deferred submittal of a final plan until after the Alton unsuitability decision was made. The proposed mine would produce up to 11.2 million tons of coal annually. The impact of the unsuitability petition on development is still unclear—about 10 percent of the reserves were withdrawn from production. Should the decision stand, the lessees are expected to seek an exchange of the affected leases for other comparable Federal coal lands in the area. Interior had previously indicated it would give prompt attention to such a request.

Two mine plans have also been submitted for underground mines on the Kaiparowits Plateau. El Paso Energy proposes to open a large underground mine complex on its 40,00()-acre" lease tract. The first two mines, the Red and Blue Mines, would produce a total of about 1.1 million tons per year. El Paso plans to expand production on the plateau in other reserve areas to reach an eventual annual capacity of 6.8 million tons per year.

The Kaiparowits Nos. 1-5 complex is proposed by a consortium of three resource development subsidiaries of electric utilities: Mono Power, a subsidiary of Southern California Edison; Resources Co., a subsidiary of Arizona Public Service Co.; and New Albion Resources Co., a subsidiary of San Diego Gas & Electric Co. These leases are located on the southern portion of the plateau just south of the El Paso leases. The lessees plan to open several underground mines on the jointly held lease tract of over 47,000 acres which would eventually produce 12 million tons per year. The leases were originally acquired as PRLAs and were intended to supply electric utilities in the Southwest or, possibly, a powerplant near the mine area. Because of concerns about impacts on the region's air quality and water supply, powerplant construction at or near the mine complex to serve out-of-State consumers is now considered unlikely.

Development of the two planned mines on the Kaiparowits Plateau is uncertain. Both mine plans were submitted before the implementation of SMCRA and have not been updated to reflect the current mine plan requirements. The major uncertainties affecting their development are lack of transportation to move coal to market and lack of any definite market for the production. Estimates by the Union Pacific Railroad are that a minimum production of 30 million tons per year would be necessary to offset the costs of construction of a rail line to the plateau. The two proposed mines would produce 18.8 million tons at full capacity—just over 60 percent of the minimum required production. It is very uncertain whether a market for the required 30 million tons or more of Kaiparowits coal will materialize over the next decade. An additional factor that affects the development of these mines is the remote location and the need to provide a supporting infrastructure for mine development. The nearby communities are few,

small, and far between, Mine construction would bring an increase in population and greater demand for services such as roads, utilities, water, and housing to serve the mine employees. These requirements could put southwestern Utah development at a disadvantage when compared to other established mining areas.

Undeveloped Leases.—There are 32 undeveloped leases in southwestern Utah. These leases cover 57,537 acres and 744 million tons of recoverable underground reserves. The leases are divided into 11 lease blocks, 7 of these are single lease blocks ranging in size from 40 to 1,440 acres. There are four multilease blocks ranging in size from 6,400 acres to more than 25,500 acres, Six of the lease blocks are located on the Kaiparowits Plateau, and the five others are small leases that are scattered across the region. Four of the five small lease blocks have previously operated as small mines but were shut down in the 1950's and 1960's as local markets diminished.

In reviewing the development potential of these lease blocks, OTA found that four of the six tracts on the Kaiparowits Plateau each had sufficient reserves of good quality coal that could support independent mining operations. These four blocks include two separate tracts held by Peabody Coal Co., one large tract on the northern portion of the Plateau held by Consolidation Coal Co., and a three-lease tract held by Hiko Bell Oil & Mining Co. on the southern edge of the plateau near the Glen Canyon Recreation Area withdrawal. Two tracts on the plateau did not meet the minimum quality and reserve requirements for new mines. One block held by El Paso has difficult mining conditions relative to the lease configuration and is separated from the company's other leases in the Red and Blue mine plan proposal, The other block, a lease owned by an individual, is on the southern portion of the plateau with generally lower quality reserves and more difficult problems of access to the seams because of topography.

All of the leases on the Kaiparowits Plateau are in an isolated, rugged area, not served by existing transportation systems capable of moving coal to market. Access for mine development is difficult because of the steep, highly dissected cliff faces of the plateau and the complex geology of the multiple coal seams. The area would require more exploratory and developmental drilling, and construction of roads, utility lines and other supporting services before substantial mining operations could begin. The 25 leases in the four lease blocks on the plateau that could support new mines were thus rated as having uncertain development prospects. The two single lease tracts were classified as unfavorable development prospects.

The five remaining small lease tracts in Southwestern Utah were found to have unfavorable development prospects as new mines. They generally did not have sufficient reserves to support a new large mining operation. Their locations made them potentially suitable to serve limited local markets only, The reserves on the small tracts are also generally poorer quality coals. Two leases located near Zion NationaI Park have some potential environmental problems (wildlife and water quality impacts) although they have been mined in the past and are not located in highly visible areas so they would not, as compared to Alton, pose a visual intrusion onto the park areas.

An analysis of the production potential of the four tracts on the Kaiparowits Plateau with uncertain development prospects indicated that they could support a total annual production of 7 million to 16 million tons depending on the choice of mining technologies and mine life. This calculation was made on the basis of available information on the reserves, geology, topography and possible mining conditions that could be encountered. Full production capacity is expected to be attained in 3 to 6 years from initial commercial production. At a minimum, because of the time needed for mine plan development and other construction, it was estimated that 1987 is the earliest date that production could begin on the plateau. This date assumes 2 years for mine plan submittal, another 2 years for approval of the mine plan and other permits, and about 2 to 3 years of preliminary mine development and construction. It is not known how long it would take to construct the required railroad or supporting community infrastructure. If the potential 7 million to 16 million tons annual production capacity from the undeveloped leases is added to the 18 million tons of production proposed from the Kaiparowits and El Paso mine complexes, the annual regional production approaches the range required to support construction of the rail line. It was suggested in the regional environmental impact statement for Southwestern Utah that initial production from mines could be trucked to Page, Ariz., and used for power generation there—however, that appears an unlikely alternative at present. It is becoming clear, however, that development of existing Federal leases on the Kaiparowits Plateau is very much an all or nothing proposition.

84-141 O - 81 - 27 : QL 3